

CAPÍTULO 1

EJERCICIO 1

- | | | |
|-------------|--------------|--------------|
| 1. Función | 6. Relación | 11. Función |
| 2. Relación | 7. Función | 12. Relación |
| 3. Función | 8. Relación | 13. Función |
| 4. Relación | 9. Función | 14. Función |
| 5. Función | 10. Relación | 15. Relación |

EJERCICIO 2

$$1. f\left(-\frac{1}{2}\right) = -\frac{5}{2} f(3) = 15, f(0) = -3$$

$$2. f(a) = a^2 - 5a + 6,$$

$$f(a+b) = a^2 + 2ab + b^2 - 5a - 5b + 6$$

$$f(x+h) = 3x^2 + 6hx + 3h^2 + 4x + 4h - 2$$

$$3. \frac{f(x+h) - f(x)}{h} = 6x + 3h + 4$$

$$4. f\left(\frac{1}{3}\right) = -\frac{1}{5}, f\left(-\frac{1}{2}\right) = \text{No existe}$$

$$f(x+h) - f(x) = \frac{4h}{(2x+2h+1)(2x+1)}$$

$$5. f(5) = 3, f(4) = 0, f(6) = \sqrt{20} = 2\sqrt{5}, f(3) = \text{No está definida}$$

$$6. f(x+h) = \sqrt{x^2 + 2xh + h^2} - 3$$

$$\frac{f(x+h) - f(x)}{h} = \frac{2x+h}{\sqrt{(x+h)^2 - 3} + \sqrt{x^2 - 3}}$$

$$7. \frac{f(x+b) - f(x)}{b} = -\frac{1}{(x+b+1)(x+1)}$$

$$8. \frac{f(x+h) - f(x)}{h} = -\frac{1}{\sqrt{1-(x+h)} + \sqrt{1-x}}$$

$$9. f(1) = \frac{4}{3}, f(0) = \frac{5}{2}, f(x+5) = \frac{|x|}{x+7}$$

$$10. f(-1) = 2, f\left(\frac{1}{x}\right) = -\frac{3}{x^2} + 2x^2 - 3x$$

Las demostraciones de los ejercicios 11, 12, 13, 14, 15, 16, 17 y 18, se dejan al estudiante.

EJERCICIO 3

$$1. (-\infty, \infty) = \{x \in \mathbb{R}\}$$

$$2. (-\infty, \infty) = \{x \in \mathbb{R}\}$$

$$3. (-\infty, -3) \cup (-3, \infty) = \{x \in \mathbb{R} | x \neq -3\}$$

$$4. (-\infty, 5) \cup (5, \infty) = \{x \in \mathbb{R} | x \neq 5\}$$

$$5. (-\infty, -4) \cup (-4, 4) \cup (4, \infty) = \{x \in \mathbb{R} | x \neq -4, x \neq 4\}$$

$$6. (-\infty, 0) \cup (0, 5) \cup (5, \infty) = \{x \in \mathbb{R} | x \neq 0, x \neq 5\}$$

$$7. (-\infty, 2) \cup (2, 5) \cup (5, \infty) = \{x \in \mathbb{R} | x \neq 2, x \neq 5\}$$

$$8. (-\infty, -5) \cup (-5, 5) \cup (5, \infty) = \{x \in \mathbb{R} | x \neq -5, x \neq 5\}$$

$$9. (-\infty, \infty) = \{x \in \mathbb{R}\}$$

$$10. (-\infty, -5) \cup (-5, 0) \cup (0, \infty) = \{x \in \mathbb{R} | x \neq -5, x \neq 0\}$$

$$11. (-\infty, -1) \cup (-1, 0) \cup (0, 1) \cup (1, \infty) = \{x \in \mathbb{R} | x \neq -1, x \neq 0, x \neq 1\}$$

$$12. [-1, \infty) = \{x \geq -1\}$$

$$13. [6, \infty) = \{x \geq 6\}$$

$$14. (-\infty, 2] = \{x \leq 2\}$$

$$15. (-\infty, 4] = \{x \leq 4\}$$

$$16. (-\infty, -5] \cup [5, \infty) = \{x \in \mathbb{R} | x \leq -5 \text{ o } x \geq 5\}$$

$$17. (-\infty, -1] \cup [6, \infty) = \{x \in \mathbb{R} | x \leq -1 \text{ o } x \geq 6\}$$

$$18. [-6, 6] = \{x \in \mathbb{R} | -6 \leq x \leq 6\}$$

$$19. (-\infty, \infty) = \{x \in \mathbb{R}\}$$

$$20. (-\infty, \infty) = \{x \in \mathbb{R}\}$$

$$21. [5, \infty) = \{x \in \mathbb{R} | x \geq 5\}$$

$$22. (2, \infty) = \{x \in \mathbb{R} | x > 2\}$$

$$23. (-\infty, 3) = \{x \in \mathbb{R} | x < 3\}$$

$$24. (-\infty, -2) \cup (-2, \infty) = \{x \in \mathbb{R} | x \neq -2\}$$

$$25. (-\infty, -4] \cup (3, \infty) = \{x \in \mathbb{R} | x \leq -4 \text{ o } x > 3\}$$

$$26. \left[1, \frac{3}{2}\right) = \left\{x \in \mathbb{R} \mid 1 \leq x < \frac{3}{2}\right\}$$

$$27. (-2, \infty) = \{x \in \mathbb{R} | x \geq -2\}$$

$$28. \left(-\infty, \frac{5}{2}\right) = \left\{x \in \mathbb{R} \mid x < \frac{5}{2}\right\}$$

$$29. (0, \infty) = \{x \in \mathbb{R} | x > 0\}$$

$$30. (-1, 3) = \{x \in \mathbb{R} | -1 < x < 3\}$$

$$31. [1, \infty) = \{y \in \mathbb{R} | y \geq 1\}$$

$$32. [-4, \infty) = \{y \in \mathbb{R} | y \geq -4\}$$

$$33. (-\infty, 9] = \{y \in \mathbb{R} | y \leq 9\}$$

$$34. \left(-\infty, \frac{9}{4}\right] = \left\{y \in \mathbb{R} \mid y \leq \frac{9}{4}\right\}$$

$$35. (-\infty, -2) \cup (-2, \infty) = \{y \in \mathbb{R} | y \neq -2\}$$

$$36. \left(-\infty, \frac{1}{2}\right) \cup \left(\frac{1}{2}, \infty\right) = \left\{y \in \mathbb{R} \mid y \neq \frac{1}{2}\right\}$$

$$37. [1, \infty) = \{y \in \mathbb{R} | y \geq 1\}$$

$$38. (-\infty, 0] = \{y \in \mathbb{R} | y \leq 0\}$$

$$39. [0, 2] = \{y \in \mathbb{R} | 0 \leq y \leq 2\}$$

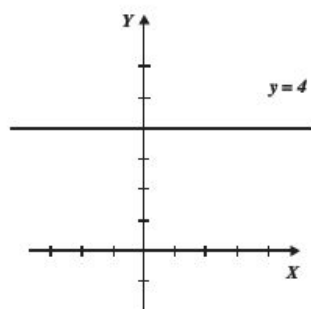
$$40. (0, 1] = \{y \in \mathbb{R} | 0 < y \leq 1\}$$

$$41. [0, 1) \cup (1, \infty) = \{x \in \mathbb{R} | 0 \leq y < 1 \text{ o } y > 1\}$$

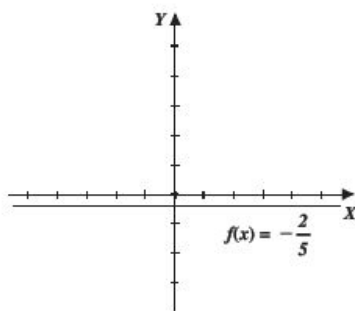
$$42. [0, \infty) = \{y \in \mathbb{R} | y \geq 0\}$$

EJERCICIO 4

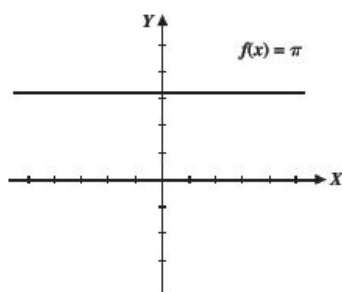
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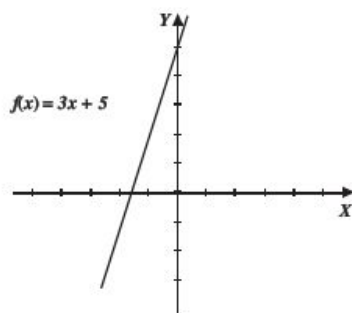
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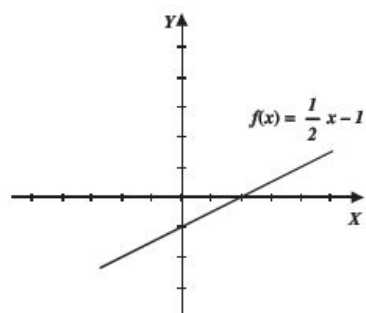
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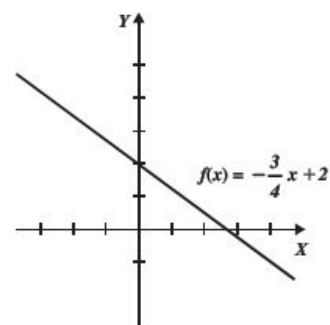
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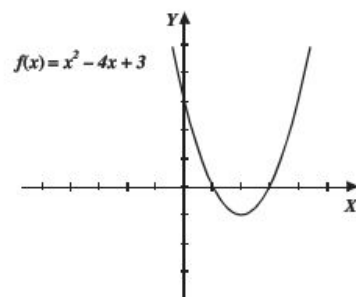
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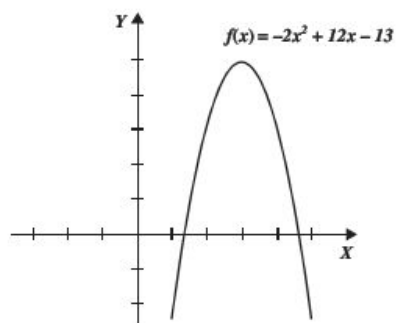
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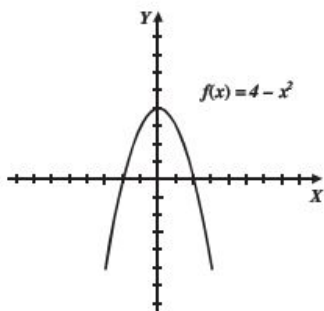
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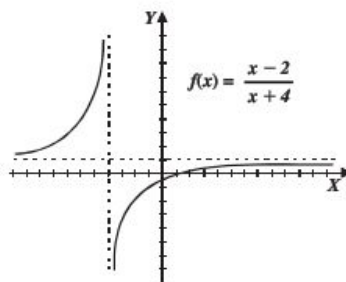
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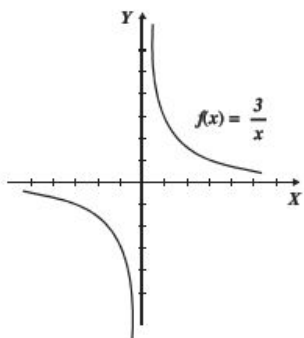
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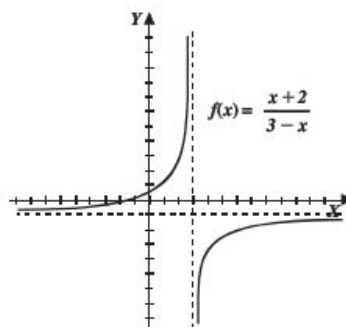
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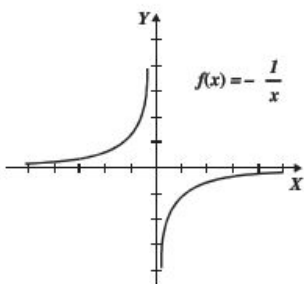
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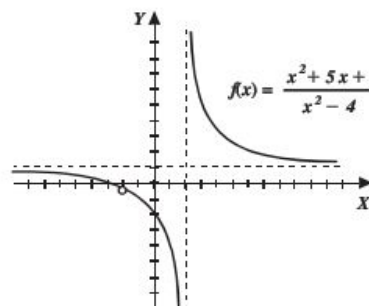
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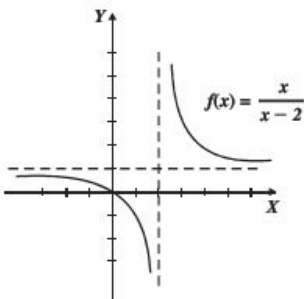
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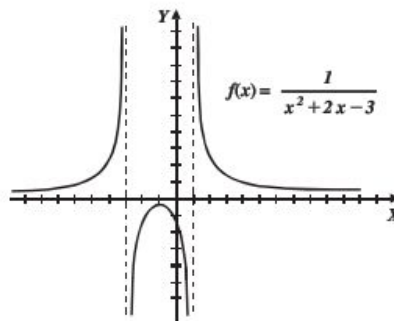
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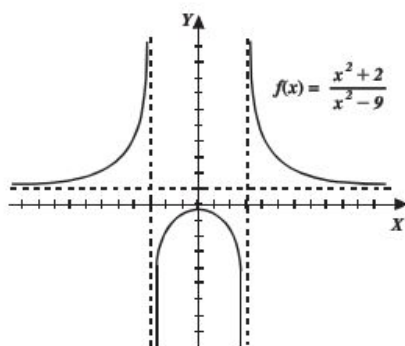
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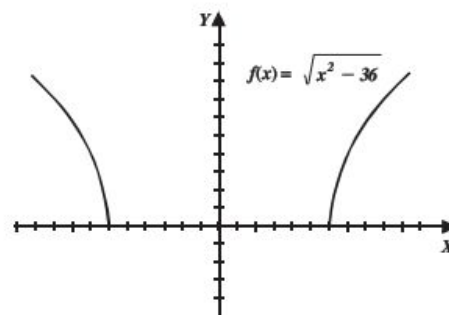
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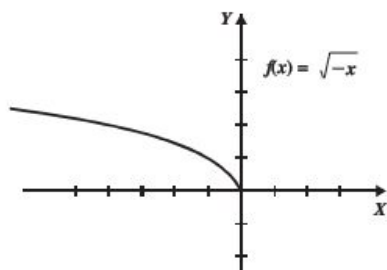
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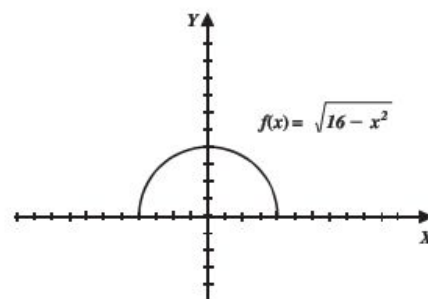
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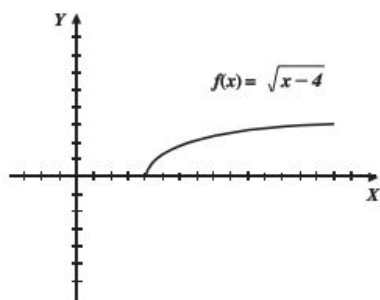
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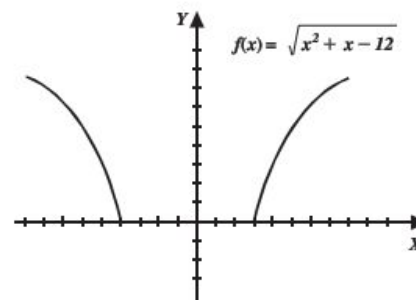
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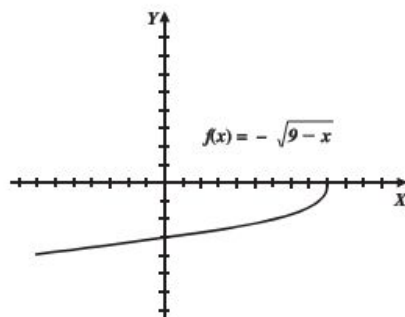
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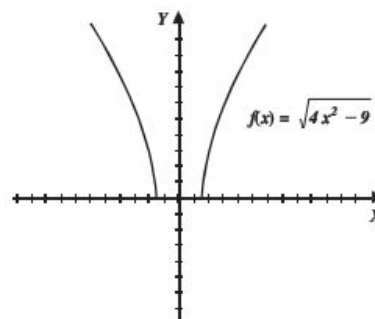
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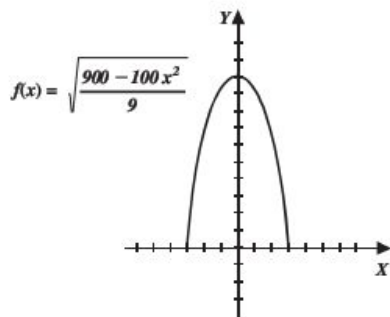
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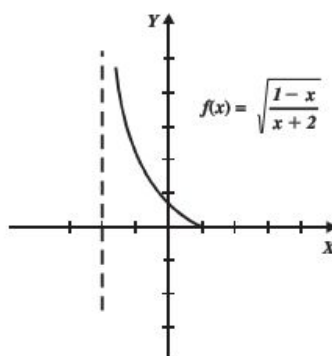
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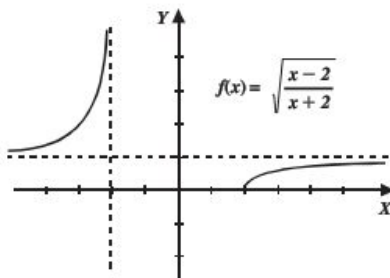
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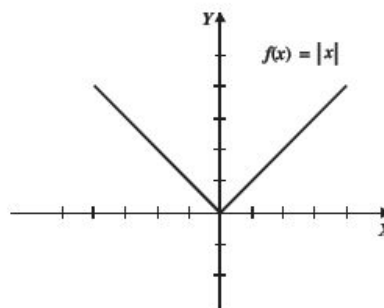
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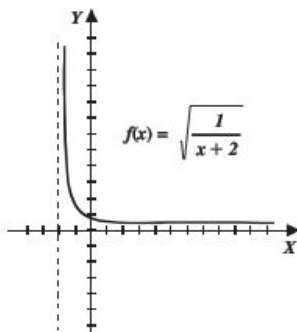
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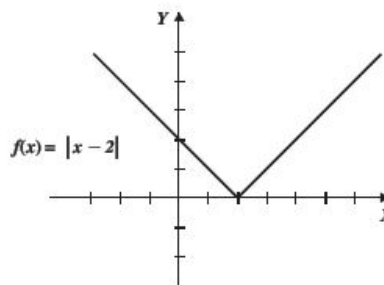
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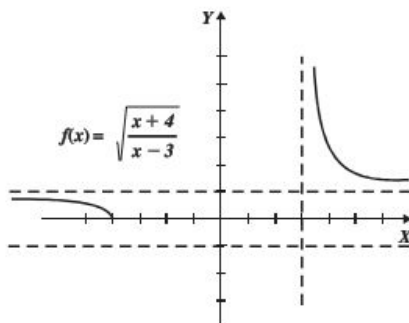
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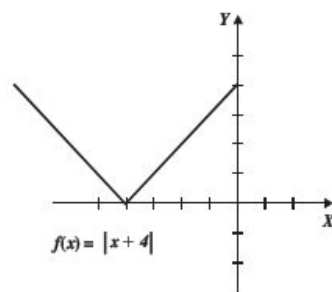
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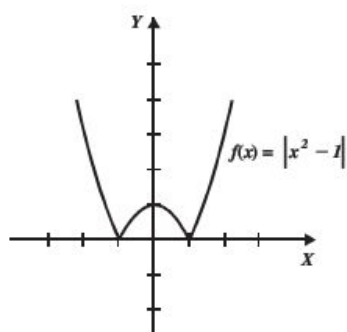
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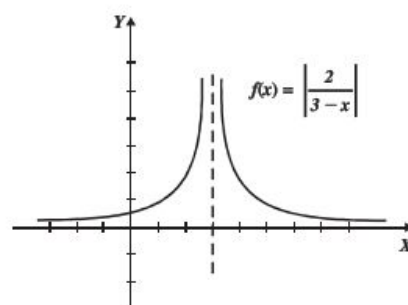
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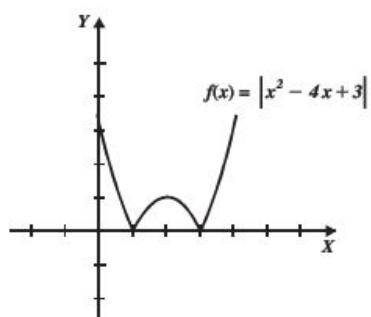
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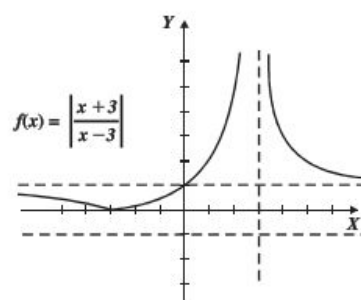
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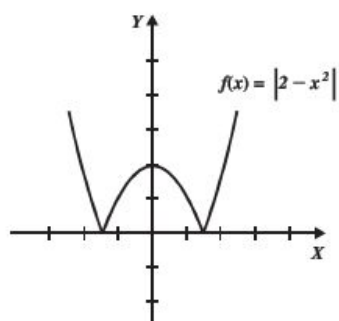
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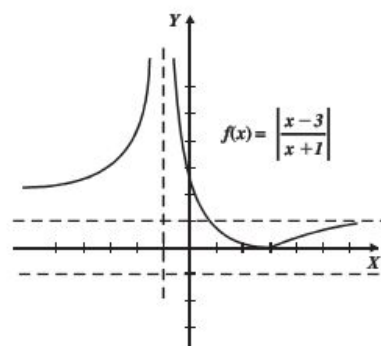
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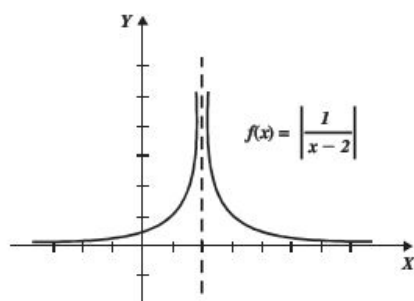
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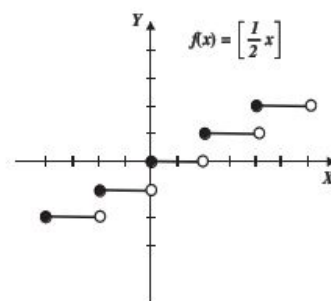
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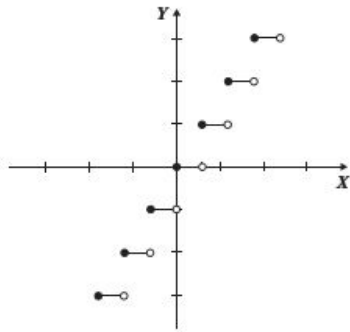
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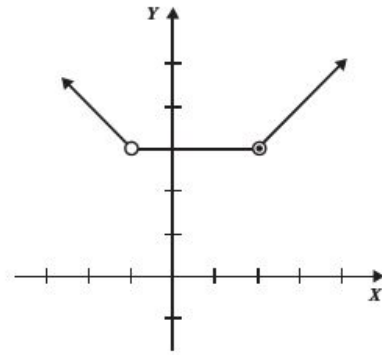
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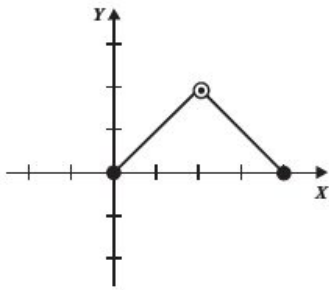


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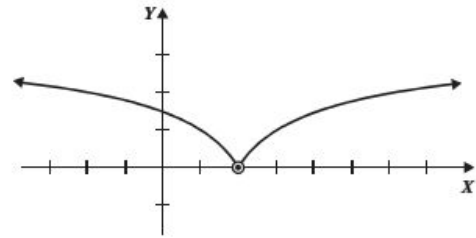


EJERCICIO 5

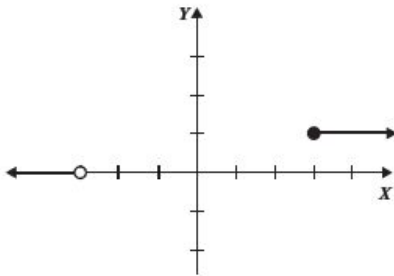
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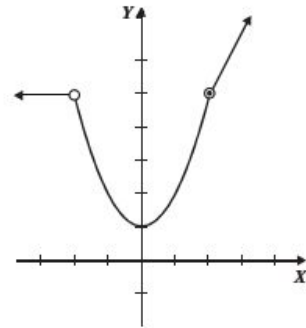
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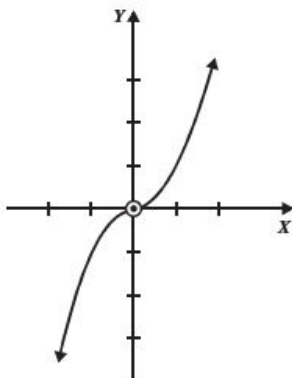
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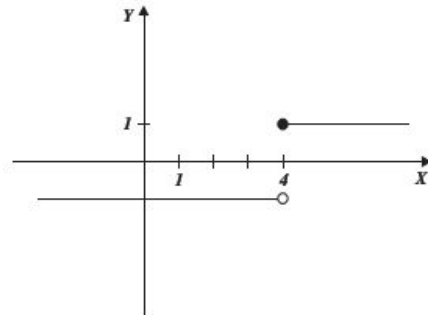
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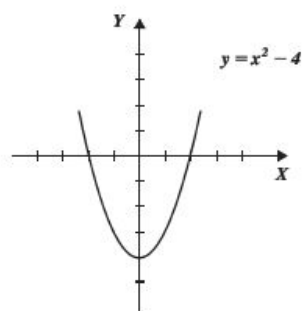


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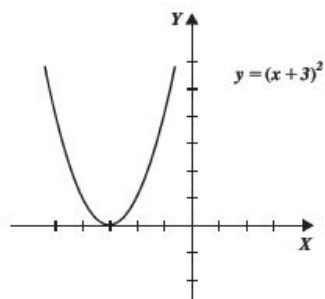


EJERCICIO 6

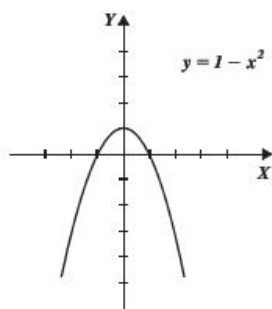
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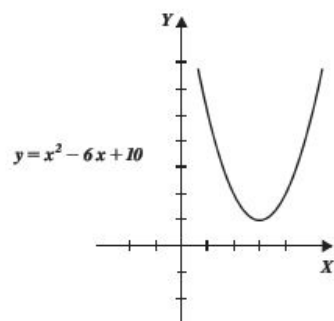
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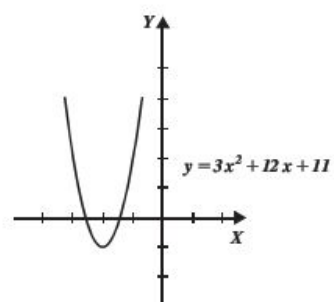
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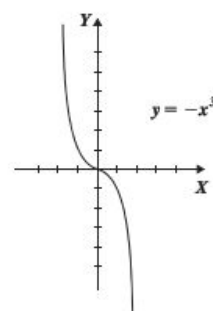
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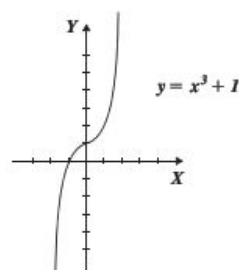
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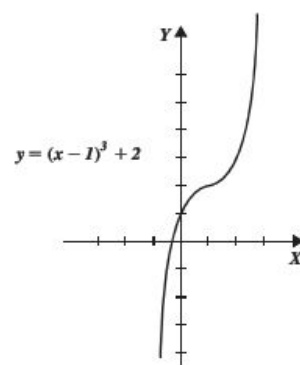
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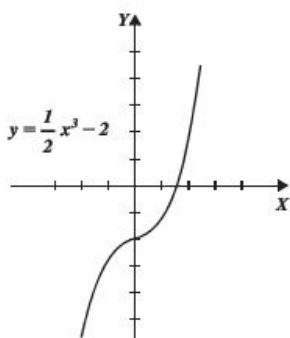
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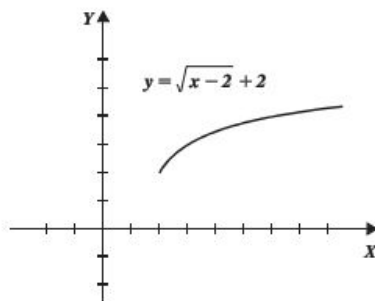
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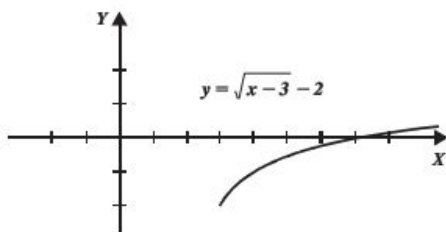
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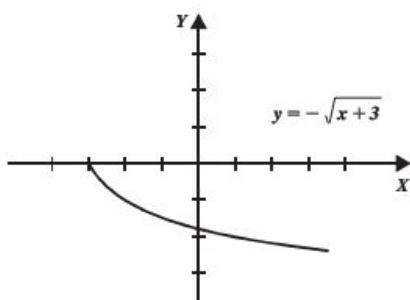
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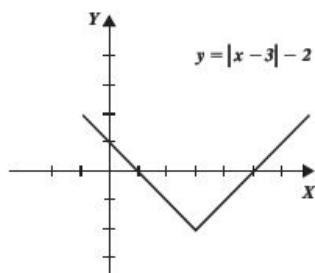
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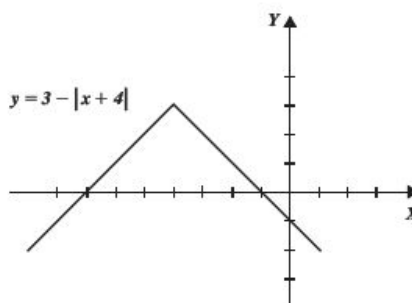
12.



13.



14.



EJERCICIO 7

1. Crece: $(0, \infty)$
2. Decece: $(-\infty, 0)$
Crece: $(0, \infty)$
3. Crece: $(-\infty, +\infty)$
4. Decece: $(-\infty, 0)$
Crece: $(0, \infty)$
5. Crece: $(2, \infty)$
6. Decece: $(-\infty, -3)$
7. Decece: $(0, \infty)$
Crece: $(-\infty, 0)$
8. Decece: $(-\infty, 3)$
Crece: $(3, \infty)$
9. Decece: $(0, 3)$
Crece: $(-3, 0)$
10. No crece ni decece, permanece constante

EJERCICIO 8

- | | |
|--------------|-----------------|
| 1. Biyectiva | 6. Ninguna |
| 2. Ninguna | 7. Biyectiva |
| 3. Ninguna | 8. Inyectiva |
| 4. Biyectiva | 9. Suprayectiva |
| 5. Inyectiva | 10. Biyectiva |

EJERCICIO 9

1. $f(x) + g(x) = 3$
 $f(x) - g(x) = 7$
 $f(x) \cdot g(x) = -10$
 $\frac{f(x)}{g(x)} = -\frac{5}{2}$
2. $f(x) + g(x) = 4x$
 $f(x) - g(x) = -10$
 $f(x) \cdot g(x) = 4x^2 - 25$
 $\frac{f(x)}{g(x)} = \frac{2x-5}{2x+5}$

$$\begin{aligned}
 3. \quad f(x) + g(x) &= 2x^2 - x - 3 \\
 f(x) - g(x) &= -7(x + 1) \\
 f(x) \cdot g(x) &= x^4 - x^3 - 15x^2 - 23x - 10 \\
 \frac{f(x)}{g(x)} &= \frac{x-5}{x+2}
 \end{aligned}$$

$$\begin{aligned}
 4. \quad f(x) + g(x) &= \frac{8x+1}{6} \\
 f(x) - g(x) &= \frac{4x-7}{6} \\
 f(x) \cdot g(x) &= \frac{2x^2+3x-2}{6} \\
 \frac{f(x)}{g(x)} &= \frac{6x-3}{2x+4}
 \end{aligned}$$

$$\begin{aligned}
 5. \quad f(x) + g(x) &= \sqrt{x-3} + \sqrt{x+4} \\
 f(x) - g(x) &= \sqrt{x-3} - \sqrt{x+4} \\
 f(x) \cdot g(x) &= \sqrt{x^2+x-12} \\
 \frac{f(x)}{g(x)} &= \frac{\sqrt{x-3}}{\sqrt{x+4}} = \frac{\sqrt{x^2+x-12}}{x+4}
 \end{aligned}$$

$$\begin{aligned}
 6. \quad f(x) + g(x) &= x + 2\sqrt{x} \\
 f(x) - g(x) &= x \\
 f(x) \cdot g(x) &= x + x\sqrt{x} \\
 \frac{f(x)}{g(x)} &= \sqrt{x} + 1
 \end{aligned}$$

$$\begin{aligned}
 7. \quad f(x) + g(x) &= \operatorname{sen}^2 x + \operatorname{cos}^2 x = 1 \\
 f(x) - g(x) &= \operatorname{sen}^2 x - \operatorname{cos}^2 x = -\operatorname{cos} 2x \\
 f(x) \cdot g(x) &= \operatorname{sen}^2 x \cdot \operatorname{cos}^2 x = \frac{1}{4} \operatorname{sen}^2 2x \\
 \frac{f(x)}{g(x)} &= \frac{\operatorname{sen}^2 x}{\operatorname{cos}^2 x} = \tan^2 x
 \end{aligned}$$

$$\begin{aligned}
 8. \quad D_f \cap D_g &= \{-1, 3, 5\} \\
 f + g &= \{(-1, 12), (3, 20), (5, 23)\} \\
 f - g &= \{(-1, -8), (3, -8), (5, -9)\} \\
 f \cdot g &= \{(-1, 20), (3, 84), (5, 112)\} \\
 \frac{f}{g} &= \left\{ \left(-1, \frac{1}{5}\right), \left(3, \frac{3}{7}\right), \left(5, \frac{7}{16}\right) \right\}
 \end{aligned}$$

$$\begin{aligned}
 9. \quad D_f \cap D_g &= \{-2, -1, 0\} \\
 f + g &= \{(-2, 0), (-1, 1), (0, 2)\} \\
 f - g &= \{(-2, -10), (-1, -7), (0, -4)\} \\
 f \cdot g &= \{(-2, -25), (-1, -12), (0, -3)\} \\
 \frac{f}{g} &= \left\{ (-2, -1), \left(-1, -\frac{3}{4}\right), \left(0, -\frac{1}{3}\right) \right\}
 \end{aligned}$$

$$\begin{aligned}
 10. \quad D_f \cap D_g &= \{-1, 1, 2\} \\
 f + g &= \{(-1, 1), (1, 1), (2, 1)\} \\
 f - g &= \{(-1, -3), (1, 1), (2, 0)\} \\
 f \cdot g &= \left\{ (-1, -2), (1, 0), \left(2, \frac{1}{4}\right) \right\}
 \end{aligned}$$

$$\frac{f}{g} = \left\{ \left(-1, -\frac{1}{2}\right), (2, 1) \right\}$$

$$\begin{aligned}
 11. \quad f(x) + r(x) &= 2x + 5 \\
 12. \quad f(x) - s(x) &= -x^2 + 4x + 13 \\
 13. \quad g(x) \cdot s(x) &= x^4 + 2x^3 - 19x^2 - 68x - 60
 \end{aligned}$$

$$14. \quad \frac{g(x)}{r(x)} = x + 3$$

$$15. \quad \frac{s(x)}{r(x)} = x - 5$$

$$16. \quad g(x) - s(x) = 8(x + 2)$$

$$17. \quad f(x) \cdot r(x) = x^2 + 5x + 6$$

$$18. \quad \frac{f(x)}{r(x)} = \frac{x+3}{x+2}$$

$$19. \quad \frac{g(x)}{s(x)} = \frac{x+3}{x-5}$$

$$20. \quad \frac{g(x)}{f(x)} + \frac{s(x)}{r(x)} = 2x - 3$$

$$21. \quad f(x) + g(x) = \frac{x^2+2}{x(x+2)}$$

$$22. \quad \frac{f(x)}{g(x)} = \frac{x^2-x}{x+2}$$

$$23. \quad f(x) \cdot g(x) = \frac{x-1}{x^2+2x}$$

$$24. \quad f(x) - h(x) = \frac{5-5x}{(x+2)(x-3)}$$

$$25. \quad g(x) \cdot h(x) = \frac{x-1}{x^2-3x}$$

$$26. \quad \frac{f(x)}{g(x)} + h(x) = \frac{x^3-3x^2+4x-2}{(x+2)(x-3)}$$

$$27. \quad \frac{h(x)}{f(x)} - g(x) = \frac{x^2+x+3}{x(x-3)}$$

$$28. \quad \frac{h(2)-f(1)}{g(3)} = -3$$

$$29. \quad f(x+1) \cdot \frac{1}{h(x+1)} = \frac{x-2}{x+3}$$

$$30. \quad h(x) - g(x) = \frac{x^2-2x+3}{x(x-3)}$$

$$31. \frac{h(x)}{g(x)} - \frac{g(x)}{f(x)} = \frac{x^4 - 2x^3 + x + 6}{x(x-1)(x-3)}$$

$$32. f(x) \cdot h(x) - g(x) = \frac{x^3 - 3x^2 + 2x + 6}{x(x+2)(x-3)}$$

$$33. \frac{f(x) + h(x)}{g(x)} = \frac{x(x-1)(2x-1)}{(x+2)(x-3)}$$

$$34. \frac{1}{g(x) + h(x)} = \frac{x(x-3)}{x^2 - 3}$$

$$35. \frac{1}{1 - h(x)} = \frac{3-x}{2}$$

EJERCICIO 10

1. $(f \circ g)(x) = 12x^2 - 46x + 40$, $(g \circ f)(x) = 6x^2 - 10x - 7$,
 $(f \circ f)(x) = 27x^4 - 90x^3 + 24x^2 + 85x + 20$,
 $(g \circ g)(x) = 4x - 9$
2. $(f \circ g)(x) = x$, $(g \circ f)(x) = x$, $(f \circ f)(x) = \sqrt[3]{x}$, $(g \circ g)(x) = x^4$
3. $(f \circ g)(x) = 4$, $(g \circ f)(x) = 2$, $(f \circ f)(x) = 4$, $(g \circ g)(x) = 2$
4. $(f \circ g)(x) = x$, $(g \circ f)(x) = x$, $(f \circ f)(x) = \sqrt{x^2 - 10}$
 $(g \circ g)(x) = \sqrt{x^2 + 10}$
5. $(f \circ g)(x) = x + 2\sqrt{x-1}$, $(g \circ f)(x) = \sqrt{x^2 + 2x}$
 $(f \circ f)(x) = (x^2 + 2x + 2)^2$, $(g \circ g)(x) = \sqrt{\sqrt{x-1} - 1}$
6. $(f \circ g)(x) = \frac{1-x}{1+3x}$, $(g \circ f)(x) = \frac{x+3}{x-1}$
 $(f \circ f)(x) = -\frac{1}{2x+1}$, $(g \circ g)(x) = x$
7. $(f \circ g)(x) = \log(x-4)$, $(g \circ f)(x) = \log(x-2) - 2$
 $(f \circ f)(x) = \log[\log(x-2) - 2]$, $(g \circ g)(x) = x - 4$
8. $(f \circ g)(x) = \frac{1}{\sqrt{x}}$, $(g \circ f)(x) = \sqrt{-x^2 - \sqrt{x^4 - 1}}$
 $(f \circ f)(x) = \sqrt{-\frac{1}{x^2}}$ no está definida
 $(g \circ g)(x) = \sqrt{x + \sqrt{x^2 - 1}}$
9. $(f \circ g)(x) = \{(1, 5), (2, 6), (3, 7), (4, 8)\}$
 $(g \circ f)(x) =$ No está definida, $(f \circ f)(x) = \{(2, 8)\}$
 $(g \circ g)(x) = \{(1, 3), (2, 4), (3, 5)\}$
10. $(f \circ g)(x) = \{(-2, 1), (-1, 4), (0, 9), (1, 16)\}$
 $(g \circ f)(x) = (1, 4)$, $(f \circ f)(x) = \{(1, 1), (2, 16)\}$
 $(g \circ g)(x) = \{(-2, 4)\}$
11. $(f \circ g)(x) = \{(3, 1), (-2, -3), (1, -1)\}$
 $(g \circ f)(x) = \{(0, -1), (1, 0)\}$, $(f \circ f)(x) = \{(0, 3), (-1, -1)\}$
 $(g \circ g)(x) = \{(-2, -2)\}$

$$12. f(x) = \frac{1}{x}$$

$$13. f(x) = \sqrt{x}$$

$$14. f(x) = mx + b$$

$$15. f(x) = x^2$$

$$16. f(x) = \sqrt{x-2}$$

$$17. f \circ g \circ h = 81x^2 - 54x + 9$$

$$18. f \circ g \circ h = 1 - 12x^2 + 48x^4 + 64x^6$$

$$19. f \circ g \circ h = \sqrt{2x-9}$$

$$20. f \circ g \circ h = \text{sen}^2(x-2)$$

$$21. f \circ g \circ h = \text{sec}^2 x$$

$$22. f \circ g \circ h = \text{sen } x$$

EJERCICIO 11

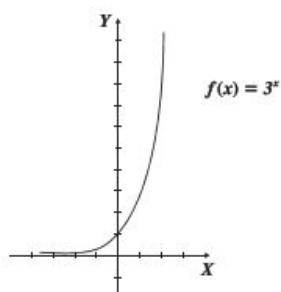
- | | | |
|------------|------------|-----------|
| 1. Ninguna | 6. Ninguna | 11. Par |
| 2. Par | 7. Par | 12. Par |
| 3. Impar | 8. Par | 13. Impar |
| 4. Ninguna | 9. Ninguna | 14. Par |
| 5. Ninguna | 10. Impar | 15. Par |

EJERCICIO 12

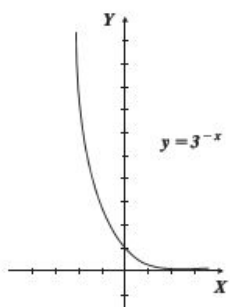
1. $f^{-1}(x) = x$
2. $f^{-1}(x) = \frac{x+5}{2}$
3. $f^{-1}(x) = \sqrt{x+9}$
4. No tiene inversa
5. $f^{-1}(x) = \sqrt[3]{x}$
6. $f^{-1}(x) = \sqrt[3]{x}$
7. $f^{-1}(x) = \sqrt[4]{x}$
8. $f^{-1}(x) = 3 - x^2$
9. No tiene inversa
10. $f^{-1}(x) = \sqrt{4-x^2}$
11. $f^{-1}(x) = x^3 - 9$
12. $f^{-1}(x) = \frac{1-3x}{2x}$
13. $f^{-1}(x) = \sqrt{x^2+1}$
14. $f^{-1}(x) = \frac{1+x}{1-x}$
15. $f^{-1}(x) = \frac{x^2}{x^2-1}$

EJERCICIO 13

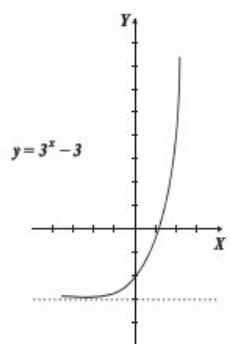
1.



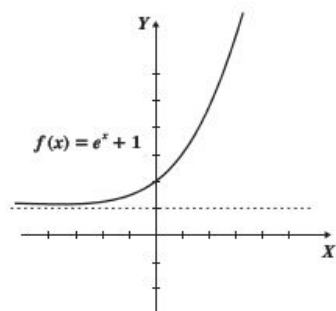
2.



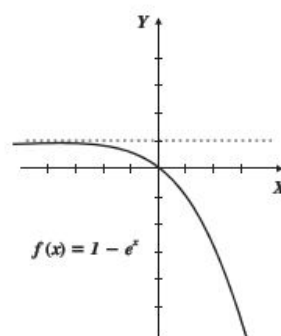
3.



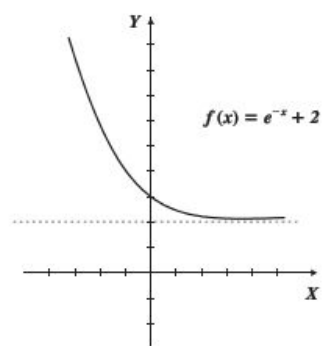
4.



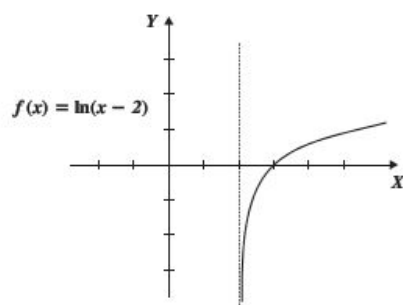
5.



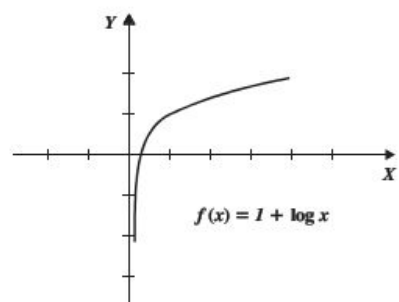
6.



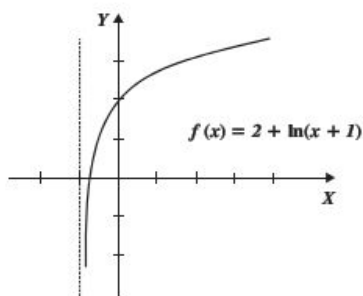
7.



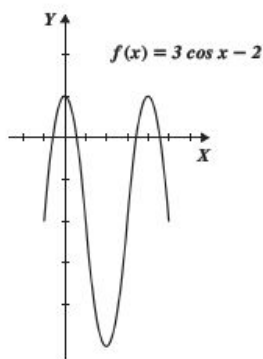
8.



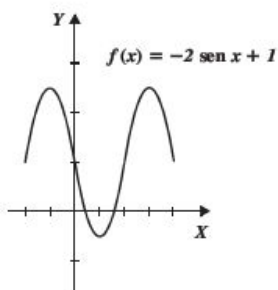
9.



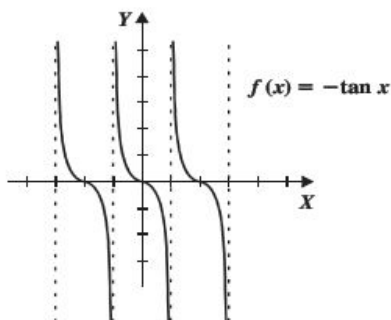
10.



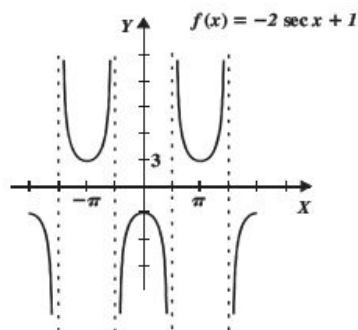
11.



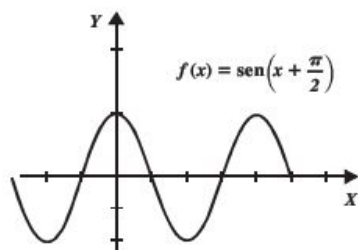
12.



13.



14.



EJERCIO 14

1. $V(h) = 40h$
2. $V(h) = \frac{4}{75} \pi h^3$
3. $P(A) = \frac{12\sqrt{5A}}{5}$
4. $A(d) = \frac{\pi d^2}{4}$
5. $V(x) = \frac{\sqrt{3}}{2} \pi x^3$
6. $A(x) = \frac{3}{4} (x + 2)^2$
7. $V(x) = \frac{\pi r^2}{6} (8r + 15)$
8. $A(x) = \frac{\pi x^2}{3}$
9. $A(x) = 3x \sqrt{16 - x^2}$
10. $A(x) = (x - 4) \left(\frac{540}{x} - 3 \right)$
11. $d(t) = \frac{9}{2} \sqrt{16t^2 + 1}$
12. $d(t) = \frac{1}{2} \sqrt{t^2 - 16}$

CAPÍTULO 2

EJERCICIO 15

- | | |
|----------------------------|--------------|
| 1. -1 | 6. 4 |
| 2. $0.16666 = \frac{1}{6}$ | 7. No existe |
| 3. -1 | 8. No existe |
| 4. 0 | 9. 2 |
| 5. 1 | 10. 3 |

EJERCICIO 16

- | | |
|----------------------|----------------------------|
| 11. $\delta = 0.01$ | 15. $\varepsilon = 0.18$ |
| 12. $\delta = 0.08$ | 16. $\varepsilon = 0.0098$ |
| 13. $\delta = 0.025$ | 17. $\varepsilon = 0.25$ |
| 14. $\delta = 0.4$ | 18. $\varepsilon = 0.002$ |

EJERCICIO 17

- | | | |
|-------|--------------------|---------------------------|
| 1. 3 | 8. $-\frac{4}{27}$ | 15. 0 |
| 2. 24 | 9. 15 | 16. No existe |
| 3. 18 | 10. $2\sqrt{3}$ | 17. 1 |
| 4. 0 | 11. 32 | 18. $\frac{\sqrt{2}}{4}$ |
| 5. 7 | 12. 1 | 19. 1 |
| 6. 64 | 13. 1 | 20. h |
| 7. -3 | 14. $-\frac{5}{8}$ | 21. $\frac{4\sqrt{3}}{3}$ |

EJERCICIO 18

- | | |
|-------------------|--------------------|
| 1. $\frac{3}{5}$ | 11. 9 |
| 2. No existe | 12. 0 |
| 3. 0 | 13. $-\frac{1}{2}$ |
| 4. $\frac{a}{c}$ | 14. $\frac{5}{4}$ |
| 5. $-\frac{2}{3}$ | 15. $\frac{1}{4}$ |
| 6. $\frac{1}{2}$ | 16. 2 |
| 7. 4 | 17. 4 |
| 8. $\frac{1}{2h}$ | 18. $-\frac{3}{7}$ |
| 9. $-\frac{1}{2}$ | 19. 15 |
| 10. $2a$ | 20. $\frac{9}{19}$ |

21. $\frac{7}{9}$

22. -6

23. $\frac{1}{3}$

24. -3

25. 3

26. $\frac{1}{12}$

27. 48

28. $\frac{1}{4}$

29. 2

30. No existe

31. $\frac{1}{2}$

32. $2\sqrt{5}$

33. $-\frac{1}{6}$

34. $\frac{24}{5}$

35. $\frac{b}{a}$

EJERCICIO 19

1. $\frac{7}{4}$

2. 2

3. 0

4. No existe

5. 3

6. $\frac{1}{2}$

7. $-\frac{1}{3}$

8. 0

9. 1

10. 0

36. $\frac{1}{n \cdot \sqrt[n]{p^{n-1}}}$

37. $-\frac{1}{2}$

38. $\frac{5}{12}$

39. 2

40. 0

41. $-\frac{3}{20}$

42. $\frac{1}{4}$

43. $\frac{1}{4}$

44. $\frac{1}{6a\sqrt[3]{a^2}}$

45. $\frac{1}{3}$

46. $\frac{1}{8}$

47. $\frac{1}{2\sqrt[3]{x}}$

48. $\frac{1}{54}$

49. $\frac{1}{4}$

50. $\frac{2}{25}$

11. $-\frac{11}{6}$

12. -1

13. $\frac{9}{2}$

14. 1

15. 1

16. $\frac{a_n}{b_n}$ si $m = n$

0 si $m < n$

No existe si $m > n$

17. $\frac{a}{c}$

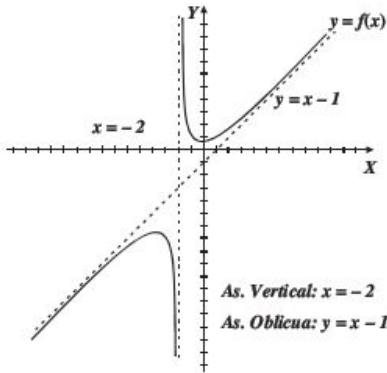
18. $\sqrt[n]{a}$

EJERCICIO 20

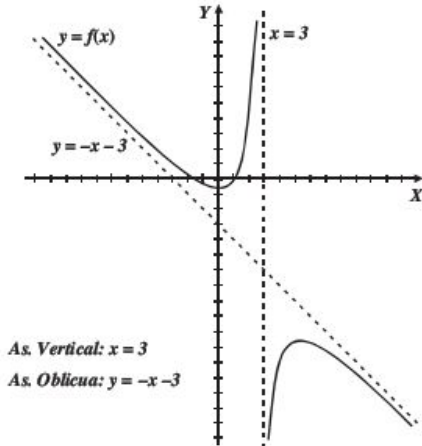
1. $y = \frac{1}{2}$
2. $y = 0$
3. No tiene asíntota horizontal
4. $y = 1, y = -1$
5. $y = 2$
6. $y = \frac{a}{c}$
7. $y = 0$
8. $y = -2$
9. No tiene asíntota horizontal
10. $y = \frac{a}{b}$

EJERCICIO 21

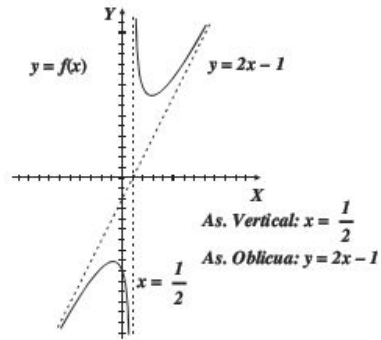
1.



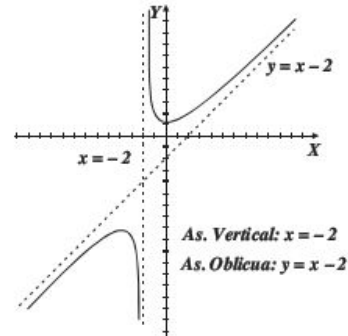
2.



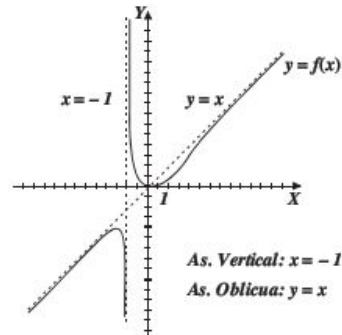
3.



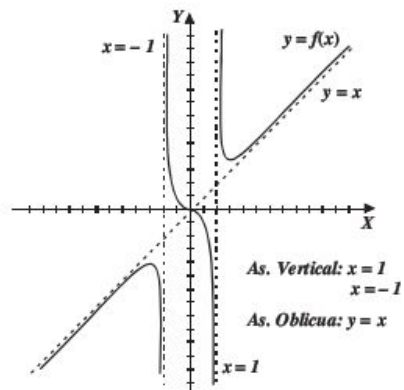
4.



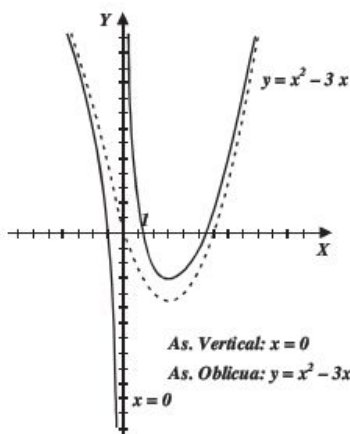
5.



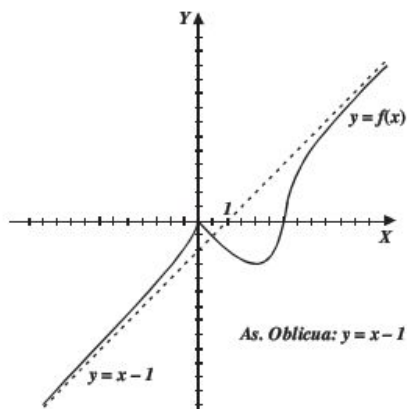
6.



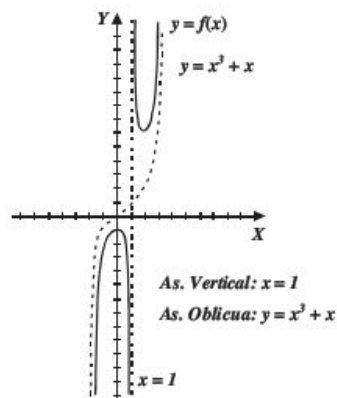
7.



8.



9.


EJERCICIO 22

- a) 11, b) 9, c) No existe
- a) -1, b) -1, c) -1, d) -6, e) -4, f) No existe
- a) 0, b) 2, c) No existe, d) $-\frac{2}{3}$, e) $-\frac{2}{3}$, f) $-\frac{2}{3}$
- a) 1, b) 4, c) 4, d) 4, e) 16
- a) 4, b) 4, c) 4, d) 8, e) 3, f) No existe

6. -7

7. 1

8. 3

9. 2

10. No existe el límite

EJERCICIO 23

 1. $\frac{1}{3}$

6. 2

 2. $\frac{1+\sqrt{3}}{2}$

 7. $-4\sqrt{3}$

3. -2

8. 0

4. -1

9. 1

 5. $-\frac{1}{2}$

10. No existe

EJERCICIO 24

1. -2

11. -2

 2. $\frac{3}{4}$

 12. $\frac{1}{2^n}$

 3. $-\frac{1}{2}$

13. 1

4. 0

14. 0

 5. $-\frac{1}{2}$

 15. $\frac{1}{2}$

6. 0

16. 0

7. 0

17. 9

 8. $\sqrt{2}$

18. 0

9. -1

 19. $\frac{n^2 - m^2}{4}$

 10. $-\sec^3(3)$

20. 0

CAPÍTULO 3
EJERCICIO 25

- Es continua en $x = 0$
- No es continua en $x = 2$
- No es continua en $x = -\frac{3}{2}$
- Es continua en $x = 3$
- Continuidad removible en $x = 2$
- No es continua en $x = 2\pi$
- Es continua en $x = 2$
- No es continua en $x = 1$
- No es continua en $x = 0$

10. No es continua en $x = -2$; es continua en $x = 2$

11. Es continua en $x = 1$; no es continua en $x = 2$

12. Es continua en $x = \pi$ y $x = \frac{3}{2}\pi$

13. No es continua en $x = -3$; es continua en $x = 3$

14. Continuidad removible en $x = 3$

15. Continuidad removible en $x = 1$

16. Continuidad removible en $x = -2$

17. Continuidad removible en $x = 8$

18. No es continua en $x = \frac{1}{2}$

19. $k = 1$

20. $k = 0$ o $k = 2$

21. $k = 1$ o $k = -\frac{2}{9}$

22. $a = -\frac{9}{4}$, $b = -7$

23. $a = -\frac{17}{2}$, $b = -2$

24. $a = 4$, $b = 2$

EJERCICIO 26

- | | |
|-------|--------|
| 1. sí | 6. sí |
| 2. no | 7. sí |
| 3. sí | 8. no |
| 4. no | 9. no |
| 5. sí | 10. sí |

EJERCICIO 27

- | | |
|-------------------------------|-------------------------|
| 1. 2 | 6. -5 |
| 2. 0 | 7. 5 |
| 3. 4 | 8. $\frac{2}{5}$ |
| 4. $\pm\sqrt{2}, \frac{1}{2}$ | 9. $\frac{\sqrt{2}}{2}$ |
| 5. 5 | 10. 1 |

CAPÍTULO 4

EJERCICIO 28

- | | |
|---------------------|------------------------------|
| 1. $y' = 3$ | 6. $y' = 3x^2$ |
| 2. $y' = -b$ | 7. $y' = 3x^2 - 2x$ |
| 3. $y' = 2x$ | 8. $y' = 4$ |
| 4. $f'(x) = 6x - 5$ | 9. $y' = -\frac{2}{(x-1)^2}$ |
| 5. $y' = 2ax + b$ | 10. $y' = 3x^2$ |

11. $f'(x) = -\frac{6}{x^3}$

12. $f'(x) = \frac{4x}{(x^2 + 1)^2}$

13. $f'(x) = \frac{1}{2\sqrt{x-2}}$

14. $f'(x) = \frac{x}{\sqrt{x^2 - 4}}$

15. $y' = \frac{2}{3\sqrt[3]{(2x+1)^2}}$

16. $y' = -\frac{1}{x\sqrt{x}}$

17. $y' = \frac{1}{3\sqrt[3]{x^2}}$

18. $y' = \frac{-2}{3(x-1)\sqrt[3]{x-1}}$

19. $y' = \frac{2}{(x-1)^{\frac{1}{2}}(x+3)^{\frac{3}{2}}}$

20. $y' = \frac{1}{n\sqrt[n]{x^{n-1}}}$

EJERCICIO 29

- | | |
|--|---|
| 1. $y' = 0$ | 16. $y' = 9x^{\frac{1}{2}}$ |
| 2. $y' = 0$ | 17. $f'(x) = \frac{2}{5\sqrt[5]{x^3}}$ |
| 3. $f'(x) = 0$ | 18. $f'(x) = \frac{1}{\sqrt[4]{x^3}}$ |
| 4. $s'(t) = 0$ | 19. $f'(x) = \frac{1}{2\sqrt{x}}$ |
| 5. $y' = 6$ | 20. $s'(t) = \frac{1}{4\sqrt[4]{t^3}}$ |
| 6. $y' = \frac{3}{4}$ | 21. $f'(x) = \frac{1}{\sqrt[3]{x^4}}$ |
| 7. $f'(x) = a$ | 22. $f'(x) = \frac{5x^4}{7}$ |
| 8. $s'(t) = b^2$ | 23. $f'(x) = \frac{4x^3}{9}$ |
| 9. $f'(x) = 5\sqrt{2}$ | 24. $s'(t) = \frac{3t^2}{a}$ |
| 10. $y' = a\sqrt{b}$ | 25. $f'(x) = -\frac{20}{x^5}$ |
| 11. $f'(x) = 5x^4$ | 26. $f'(x) = -\frac{12}{x^7}$ |
| 12. $f'(x) = 12x^2$ | 27. $f'(x) = \frac{1}{4\sqrt{x}}$ |
| 13. $s'(t) = \frac{4}{5}t^3$ | 28. $s'(t) = \frac{1}{15\sqrt[3]{t^2}}$ |
| 14. $y' = \frac{9}{2}x^{\frac{7}{2}}$ | 29. $f'(x) = -\frac{2}{x\sqrt{x}}$ |
| 15. $f'(x) = \frac{4}{3}x^{\frac{1}{3}}$ | 30. $s'(t) = -\frac{5}{4t\sqrt[4]{t}}$ |

31. $f'(x) = -\frac{4}{3x\sqrt[3]{x}}$

32. $f'(x) = 21x^2 - 6x + 3$

33. $f'(x) = 4x^3 - 15x^2 + 16x - 1$

34. $f'(x) = 10x + 4$

35. $f'(x) = 12ax^3 - 12ax^2 - 10bx + 7c$

36. $f'(x) = \frac{x^2}{2} - \frac{6x}{5} - \frac{4}{9}$

37. $s'(t) = \frac{5t^4}{6} - \frac{4t^3}{5} + \frac{3t^2}{4} - \frac{2t}{7} + \frac{1}{9}$

38. $f'(x) = \frac{2x}{\sqrt{a^2 + b^2}} - \frac{1}{a}$

39. $s'(t) = -\frac{8}{t^3} + \frac{5}{t^2}$

40. $f'(x) = -\frac{20}{x^5} + \frac{18}{x^4} + \frac{14}{x^3} + \frac{3}{x^2}$

41. $s(t) = \frac{3t^2}{5} + \frac{4}{t^3} - \frac{6}{t^2}$

42. $f'(x) = \frac{1}{15\sqrt[3]{x^2}} + \frac{1}{x\sqrt[3]{x}}$

43. $f'(x) = 3x^2 - 6x - 6 - \frac{2}{x^2}$

44. $f'(x) = 3\sqrt{x} + \frac{5}{4\sqrt{x}} + \frac{2}{x^2\sqrt{x}}$

45. $f'(x) = \frac{4}{\sqrt{x}} + \frac{6}{\sqrt[3]{x}} + 6\sqrt{x}$

46. $f'(x) = ax^{n-1} + b(n-1)x^{n-2}$

47. $f'(x) = \frac{2}{3}x + \frac{5}{7}$

48. $f'(x) = \frac{a}{n\sqrt[n]{x^{n-1}}} + \frac{b}{3\sqrt[3]{x^2}}$

49. $y' = \frac{1}{3\sqrt[3]{x}} + \frac{5\sqrt[4]{x}}{12}$

50. $f'(x) = -\frac{5}{2x^2\sqrt[4]{x}} + \frac{1}{2x\sqrt{x}} + 3$

51. $f'(x) = 14x + 15x^2$

52. $f'(x) = -\frac{6}{x^3} - \frac{5}{x^2} - 2$

53. $f'(x) = 5\sqrt[3]{x^2} + \frac{10}{3\sqrt[3]{x}} - \frac{8}{3x\sqrt[3]{x}}$

54. $y' = \frac{3}{x^2}$

55. $y' = 15(3x - 4)^4$

56. $y' = -12(2 - 4x)^2$

57. $y' = (72x^5 - 32x^3)(3x^6 - 2x^4)^3$

58. $y' = 12\sqrt{x}(2x - 1)^2(6x - 1)$

59. $y' = \frac{-3x}{\sqrt{5 - 3x^2}}$

60. $y' = \frac{x^2}{\sqrt[3]{(x^3 + 2)^2}}$

61. $y' = \frac{1 - x^2}{(x^2 + 1)^2}$

62. $y' = \frac{4x + 6}{3\sqrt{2x^2 + 6x}}$

63. $y' = \left(1 + \frac{9}{\sqrt{x}}\right)\left(\frac{x}{3} + 6\sqrt{x}\right)^2$

64. $f'(x) = \frac{x^3}{\sqrt[4]{(x^4 - 2)^3}}$

65. $f'(x) = (6x + 15)(x^2 + 5x - 3)^2$

66. $y' = \frac{4}{3\sqrt[3]{2x - 3}}$

67. $y' = \frac{1}{(4x + 3)^{\frac{3}{2}}}$

68. $f'(x) = \left(\frac{1}{3}x + 2\right)^2$

69. $y' = \left(\frac{2}{x} - \frac{1}{x^2}\right)^{\frac{1}{2}}\left(-\frac{1}{x^2} + \frac{1}{x^3}\right)$

70. $f'(z) = \frac{z}{\sqrt{z^2 - 4}}$

71. $y' = \frac{2x^5 + 1}{\sqrt[3]{(x^6 + 3x)^2}}$

72. $y' = 108x^2 + 55x - 4$

73. $y' = 40x - 12 - \frac{9}{x^2}$

74. $y' = 12x^3 + 3x^2$

75. $f'(x) = \frac{3x + 1}{\sqrt{2x + 1}}$

$$76. y' = \frac{1}{3}(2x+1)^2(8x+1)$$

$$77. y' = \frac{5x^2 - 4x}{2\sqrt{x-1}}$$

$$78. f'(x) = 12x(3x^2 - 5)^3(2x^2 + 1)^2(7x^2 - 3)$$

$$79. f'(\theta) = (6\theta^4 - 12\theta)(\theta^2 + 1)^2(2\theta^3 + \theta - 2)$$

$$80. s' = \frac{8 - 9t}{2\sqrt{4 - 3t}}$$

$$81. s'(t) = (2t + 3)\left(\frac{2}{t} - \frac{3}{t^2}\right) = 4 - \frac{9}{t^2}$$

$$82. f'(x) = \frac{6}{(1 - 2x)^2}$$

$$83. f'(t) = \frac{-bt}{a\sqrt{a^2 - t^2}}$$

$$84. f'(r) = \frac{r^3 - 5r}{(r^2 - 4)^{\frac{3}{2}}}$$

$$85. f'(t) = \frac{63}{(5t + 8)^2}$$

$$86. f'(z) = \frac{21}{(5 - 6z)^2}$$

$$87. f'(x) = -\frac{2ab}{(ax - b)^2}$$

$$88. f'(x) = -\frac{1}{x\sqrt{x}} - \frac{1}{2\sqrt{3x}}$$

$$89. f'(t) = \frac{-2}{(1 + 2t)\sqrt{1 - 4t^2}}$$

$$90. f'(w) = \frac{10(w - 3)}{(w + 2)^3}$$

$$91. f'(\theta) = \frac{24\theta^3 - 54\theta^2 + 24}{(3 - 2\theta)^2}$$

$$92. f'(s) = \frac{-6s^2 + 4s - 12}{(s^2 - 6s)^2}$$

$$93. f'(x) = \frac{10b^2x + 5x^3}{2(b^2 + x^2)^{\frac{3}{2}}}$$

$$94. f'(t) = \frac{(693 - 27t)(9t - 6)^2}{(27 - 3t)^3}$$

$$95. f'(x) = \frac{2ab}{(a - 3x)^2}$$

$$96. f'(x) = \frac{8 - 4x^2}{\sqrt{4 - x^2}}$$

$$97. y' = \frac{-4x^3}{(x^4 - a^4)^{\frac{3}{2}}}$$

$$98. y' = \frac{7x^4 + 27x^2}{3(x^2 + 3)^{\frac{4}{3}}}$$

$$99. y' = \frac{8x^2 + 24x + 9}{2\sqrt{x^2 + 3x}}$$

$$100. y' = \frac{x + 2}{2(x + 1)^{\frac{3}{2}}}$$

$$101. y' = \frac{3x - 3}{2\sqrt{x - 3}}$$

$$102. y' = \frac{-2x^2}{(x^6 - 1)^{\frac{2}{3}}(x^3 - 1)^{\frac{2}{3}}}$$

$$103. y' = \frac{nx^{n-1}}{(1 - x^n)\sqrt{x^{2n} - 1}}$$

$$104. y' = \frac{-n\sqrt[n]{x^{n-n}}}{m\left(\sqrt[n]{x^n} - 1\right)^2}$$

$$105. y' = \frac{-20x^2 + 19x + 8}{2(4 - 5x)^{\frac{3}{2}}\sqrt{2x + 1}}$$

$$106. y' = \frac{8x^6 - 8x^3 - 2}{\sqrt[3]{(4x^6 - 1)^2(2x^3 - 1)^2}}$$

EJERCICIO 30

$$1. \frac{dy}{dx} = \frac{1 - 2u}{x^2}$$

$$2. \frac{dy}{dx} = \frac{1}{2\sqrt{x}\sqrt{u^2 - 1}(1 + u)}$$

$$3. \frac{dy}{dx} = \frac{x(6u^2 - 3)}{\sqrt{2u^3 - 3u}}$$

$$4. \frac{dy}{dx} = \frac{4}{u^3} - \frac{9}{u^4}$$

$$5. \frac{dy}{dx} = \frac{(8 + 12x - 3x^2)(u^2 + 1)}{(u^2 - 1)^2}$$

$$6. \frac{dy}{dx} = \frac{5u^3 + 3u}{\sqrt{u^3 + u}}$$

$$7. \frac{dy}{dx} = \frac{3x^2}{\sqrt{u}(x^3 + 1)^2}$$

$$8. \frac{dy}{dx} = \frac{8x}{(u - 1)^2(v - 2)^2\sqrt{x^2 - 1}}$$

$$9. \frac{dy}{dx} = -\frac{v}{2\sqrt{x}\sqrt{u-1}(v^2-1)^2}$$

$$10. \frac{dy}{dx} = -\frac{2x(x^2+3)}{(v+1)\sqrt{v^2-1}\sqrt{u^3}}$$

$$11. \frac{dy}{dx} = -\frac{2u}{\sqrt{v}(x-1)^2}$$

EJERCICIO 31

$$1. y' = 8 \cos 8x$$

$$2. f'(x) = -6x \operatorname{sen} 3x^2$$

$$3. f'(x) = 3x^2 \sec^2 x^3$$

$$4. s'(t) = 6 \sec 6t \tan 6t$$

$$5. f'(x) = -12x^2 \csc^2 4x^3$$

$$6. f'(x) = -9 \csc 9x \cot 9x$$

$$7. f'(x) = -a \operatorname{sen} ax$$

$$8. s'(t) = 2bt \sec^2 bt^2$$

$$9. f'(x) = 12x \sec x^2 \tan x^2$$

$$10. f'(x) = -\frac{1}{8} \csc \frac{x}{4} \cot \frac{x}{4}$$

$$11. f'(x) = -3a \operatorname{sen} 3x$$

$$12. f'(x) = -3 \csc^2(3x-5)$$

$$13. f'(x) = \cos \frac{x}{2}$$

$$14. f'(x) = -5 \operatorname{sen} \left(5x - \frac{\pi}{2} \right)$$

$$15. s'(t) = a \sec^2(at + \pi)$$

$$16. f'(x) = \cos x - \operatorname{sen} x$$

$$17. s'(t) = \frac{1}{2\sqrt{t}} \cos \sqrt{t}$$

$$18. f'(x) = -\frac{1}{3\sqrt[3]{x^2}} \csc^2 \sqrt[3]{x}$$

$$19. f'(x) = -\frac{1}{x^2} \cos \frac{1}{x}$$

$$20. s'(t) = \frac{3}{t^4} \operatorname{sen} \frac{1}{t^3}$$

$$21. f'(x) = -\frac{\sec \frac{1}{\sqrt{x}} \tan \frac{1}{\sqrt{x}}}{2x\sqrt{x}}$$

$$22. f'(x) = 3 \sec^2 3x - 3 = 3 \tan^2 3x$$

$$23. f'(x) = a - a \csc^2 ax = -a \cot^2 ax$$

$$24. f'(x) = 2(x-1)\cos(x-1)^2$$

$$25. f'(x) = -18t(3t^2+2)^2 \operatorname{sen}(3t^2+2)^3$$

$$26. f'(x) = -\frac{2}{\sqrt{x-1}} \csc^2 \sqrt{x-1}$$

$$27. f'(x) = -\frac{2}{(x-1)^2} \sec^2 \left(\frac{x+1}{x-1} \right)$$

$$28. f'(x) = -\frac{2ab}{(ax-b)^2} \sec \left(\frac{ax+b}{ax-b} \right) \tan \left(\frac{ax+b}{ax-b} \right)$$

$$29. f'(x) = 10 \operatorname{sen} 5x \cos 5x = 5 \operatorname{sen} 10x$$

$$30. f'(x) = -3b \cos^2 bx \operatorname{sen} bx$$

$$31. f'(x) = 24x \tan^3 3x^2 \sec^2 3x^2$$

$$32. f'(x) = \frac{2 \cos 4x}{\sqrt{\operatorname{sen} 4x}} = 2 \sqrt{\operatorname{sen} 4x} \cot 4x$$

$$33. f'(x) = 5x \tan 5x^2 \sqrt{\sec 5x^2}$$

$$34. f'(x) = \frac{2x \sec^2 x^2}{\sqrt[3]{9 \tan^2 x^2}}$$

$$35. f'(x) = x \cos x + \operatorname{sen} x$$

$$36. f'(x) = 2x \cos x^2 - 2x^3 \operatorname{sen} x^2$$

$$37. f'(x) = \frac{3x \cos 3x - \operatorname{sen} 3x}{x^2}$$

$$38. f'(x) = -\frac{10t^2 \operatorname{sen} 5t^2 + 2 \cos 5t^2}{t^3}$$

$$39. y' = 2ax \cos(ax^2)$$

$$40. y' = -3a \operatorname{sen}(3x)$$

$$41. y' = \frac{\sec^2 \sqrt{x}}{2\sqrt{x}}$$

$$42. y' = x \sec 3x^2 \tan 3x^2$$

$$43. y' = -\frac{1}{3} \csc \frac{2x}{3} \cot \frac{2x}{3}$$

$$44. y' = 2x + 3 + \frac{1}{x^2} \cos \left(\frac{1}{x} \right)$$

$$45. y' = -6x \csc^2(1-x^2)$$

$$46. y' = \frac{-4}{3(x-1)^2} \cdot \cos \left(\frac{x+1}{x-1} \right)$$

$$47. y' = 2b \operatorname{sen} 4bx$$

$$48. y' = 24(2x-1)^2 \tan^3(2x-1)^3 \sec^2(2x-1)^3$$

$$49. y' = \frac{\operatorname{sen} 2x}{\sqrt{\cos^3 2x}}$$

$$50. y' = \frac{2x \sec^2 x^2}{\sqrt[3]{9 \tan^2 x^2}}$$

$$51. y' = \cos 4x (\cos^2 4x - 6x \operatorname{sen} 8x)$$

$$52. y' = x \csc ax (2 - ax \cot ax)$$

$$53. y' = (1-x \cot 2x) \sqrt{\csc 2x}$$

54. $y' = \frac{-m \operatorname{sen} nx \operatorname{sen} mx - n \cos nx \cos mx}{\operatorname{sen}^2 nx}$

55. $y' = \frac{-\cos x}{(1 + \operatorname{sen} x)^2}$

56. $y' = -x \operatorname{sen} x$

57. $y' = \frac{\sec^2 x (\tan x - 1)}{\sqrt{(\tan^2 x - 1)^3}}$

58. $y' = (2x^2 - 6) \cos 2x + 10x \operatorname{sen} 2x$

59. $y' = -2 \cos(2x - 1)$

60. $y' = x \sec(\pi - x) \cdot [2 - x \tan(\pi - x)]$

61. $y' = \frac{81x^2 \operatorname{sen}^2 x [3x^2 \cos x + x \cos x + \operatorname{sen} x]}{(3x + 1)^4}$

62. $y' = \frac{1}{(x-1)\sqrt{x^2-1}} \operatorname{sen} \sqrt{\frac{x+1}{x-1}}$

63. $y' = \left(\frac{\sec x}{x}\right)^2 (x \operatorname{sen} x - \cos x)$

64. $y' = -x \operatorname{sen} x + \cos x$

65. $y' = 2 \cos 2x$

66. $y' = 2 \sec^2 x \tan x$

67. $y' = -\frac{1}{2} \operatorname{sen} \frac{x}{2}$

68. $y' = -6 \operatorname{sen}(6x + 2)$

69. $y' = -\frac{x \operatorname{sen} x + 2 \cos x}{x^3}$

70. $y' = (\operatorname{sen} x + \cos x)(\tan^2 x - \tan x + 2)$

71. $y' = -\cos^3 x$

72. $y' = x^2 \operatorname{sen} x$

73. $y' = \operatorname{sen}^4 2x$

EJERCICIO 32

1. $y' = \frac{5}{\sqrt{1-25x^2}}$

2. $f'(x) = \frac{-8x}{\sqrt{1-16x^4}}$

3. $f'(x) = \frac{3}{1+9x^2}$

4. $y' = -\frac{3x^2}{1+x^6}$

5. $f'(x) = \frac{2}{x\sqrt{x^4-1}}$

6. $f'(x) = -\frac{2}{x\sqrt{9x^4-1}}$

7. $f'(x) = -\frac{1}{\sqrt{b^2-x^2}}$

8. $f'(x) = \frac{1}{\sqrt{16-x^2}}$

9. $f'(x) = \frac{a}{a^2+x^2}$

10. $f'(x) = \frac{1}{x\sqrt{x-1}}$

11. $y' = -\frac{2x}{\sqrt{-8+6x^2-x^4}}$

12. $y' = \frac{1}{\sqrt{1-x^2}}$

13. $y' = \frac{x^2}{x^2+1} + 2x \operatorname{arc} \tan x$

14. $y' = \operatorname{arc} \operatorname{sen} x$

15. $y' = \frac{x^2}{\sqrt{16-x^2}}$

16. $y' = \operatorname{arc} \operatorname{csc}\left(\frac{1}{x}\right) + \sqrt{\frac{1+x}{1-x}}$

17. $y' = x \operatorname{arc} \tan x$

18. $\varphi' = \frac{\theta}{(1-\theta^2)\sqrt{\theta^2-2}}$

19. $y' = \sqrt{1-4x^2}$

20. $y' = x^2 \operatorname{arc} \operatorname{sen} x$

21. $f'(r) = \sqrt{\frac{b-r}{b+r}}$

22. $y' = \frac{x^2}{x^2+1}$

23. $y' = \frac{3+6x^2}{(1+4x^2)(1+x^2)}$

24. $y' = \frac{1}{2\sqrt{x-x^2}}$

25. $y' = \frac{1}{\sqrt{x^2-1}} + \operatorname{arc} \cos\left(\frac{1}{x}\right)$

26. $y' = \frac{4a-8x}{\sqrt{1-(4ax-4x^2)^2}}$

27. $f'(r) = \frac{1}{\sqrt{-r^2 + 4r - 3}}$

28. $y' = \frac{1}{4x^2 + 4x + 5}$

29. $y' = \frac{x+2}{\sqrt{4x-x^2}}$

30. $y' = \frac{x^2}{\sqrt{4x-x^2}}$

31. $y' = \sqrt{2x-x^2}$

32. $s'(t) = \frac{2-3t}{\sqrt{9-t^2}}$

33. $y' = \sqrt{25-9x^2}$

34. $w' = \frac{\theta+5}{(\theta+4)\sqrt{\theta+2}}$

35. $y' = \frac{1}{5+4\cos x}$

36. $y' = \frac{\cos x}{5-3\cos x}$

37. $y' = -\frac{1}{3}$

38. $y' = \arccot(\tan x) - x$

39. $y' = \frac{1}{(4x^2-1)} \left(\frac{1}{x} - \frac{4x \arccsc 2x}{\sqrt{4x^2-1}} \right)$

40. $y' = \frac{\sqrt{7-8\cos x + \cos^2 x}}{14-2\cos x}$

41. $y' = \frac{64}{(3x+2)\sqrt{5x^2+28x-12}}$

42. $s' = \frac{t^2}{\sqrt{2t-t^2}} + 2t \arccos(1-t) + 2$

43. $y' = -\frac{1}{\sqrt{1-(a+x)^2}}$

EJERCICIO 33

1. $y' = \frac{3}{x}$

2. $f'(x) = \frac{2}{x}$

3. $f'(x) = \frac{6x-5}{3x^2-5x+2}$

4. $f'(x) = \frac{1}{2x}$

5. $f'(x) = \frac{6 \log e}{x}$

6. $f'(x) = \frac{3 \log e}{x}$

7. $f'(x) = \frac{\log_3 e}{x}$

8. $f'(x) = \frac{\log_4 e}{3x}$

9. $f'(x) = \frac{4 \ln^3 x}{x}$

10. $f'(x) = \frac{3 \ln^2 5x}{x}$

11. $y' = x(1 + \ln x^2)$

12. $y' = 2(1 + \ln x)$

13. $y' = \frac{1 - \ln x}{x^2}$

14. $f'(x) = \frac{2 - \ln x^2}{x^2}$

15. $y' = -\frac{a}{2(b-ax)} = \frac{a}{2(ax-b)}$

16. $f'(x) = \frac{9x^2-2}{x(3x^2-1)}$

17. $f'(x) = \frac{2ax^2-b}{x(ax^2-b)}$

18. $y' = \frac{13}{(3x-5)(2x+1)}$

19. $f'(x) = \frac{bc}{c^2x^2-b^2}$

20. $y' = \cot x$

21. $y' = -5 \tan 5x$

22. $y' = \frac{2x}{x^2-4}$

23. $y' = \frac{3}{2(3x+4)}$

24. $y' = \frac{12}{4x^2-9}$

25. $y' = \frac{x^2}{x^3+8}$

26. $y' = \frac{\ln x}{2x}$

27. $y' = \frac{27x^2 + 12x + 6}{(3x+2)(3x^2+2)}$

28. $y' = \frac{2 \log_3 e}{4x^2 - 1}$

29. $y' = \frac{(30bx^2\sqrt{x} - 3) \log e}{10bx^3\sqrt{x} - 6x}$

30. $y' = \tan x$

31. $y' = 2 \cot x$

32. $y' = 1 + \ln x$

33. $y' = -2 \tan 2x$

34. $y' = \frac{1}{2x\sqrt{\ln x}}$

35. $y' = \sec x$

36. $y' = -\frac{1 + \sin 2x}{\cos 2x}$

37. $y' = \frac{x + \tan x}{x \tan x}$

38. $y' = 2x^2(1 + \ln x^3)$

39. $y' = \frac{3 \sec^2 \sqrt{x}}{2\sqrt{x} \tan x} = \frac{3 \sec \sqrt{x} \csc \sqrt{x}}{2\sqrt{x}}$

40. $y' = \frac{\log e}{2x}$

41. $y' = 2^{x^2+5x} \cdot \ln 2 \cdot (2x+5)$

42. $f'(x) = \frac{b^{\sqrt{x}} \ln b}{2\sqrt{x}}$

43. $y' = \frac{3^{\ln x} \ln 3}{x}$

44. $y' = (x \cos x + \sin x) \cdot 5^{x \sin x} \cdot \ln 5$

45. $y' = 2^{\ln x}(1 + \ln 2)$

46. $y' = 5^x(\ln 5^x + 1)$

47. $y' = 2xe^{x^2} = 2xy$

48. $y' = (6x-2)e^{3x^2-2x+1} = (6x-2)y$

49. $y' = \frac{3xe^{\sqrt{3x^2-1}}}{\sqrt{3x^2-1}} = \frac{3xy}{\sqrt{3x^2-1}}$

50. $y' = (x \sec^2 x + \tan x)y$

51. $y' = e^{\frac{2x}{b}} + e^{-\frac{2x}{b}}$

52. $y' = \frac{8}{(e^{2x} + e^{-2x})^2}$

53. $f'(x) = 4e^{4x}$

54. $f'(x) = 10xe^{5x^2}$

55. $f'(x) = 3e^{3x-1}$

56. $f'(x) = \frac{1}{5}e^{\frac{x}{5}}$

57. $f'(x) = \frac{1}{3}\sqrt[3]{e^x}$

58. $f'(x) = \frac{1}{4}\sqrt[4]{e^x}$

59. $f'(x) = -\frac{2}{x^3}e^{\frac{1}{x^2}}$

60. $f'(x) = \frac{e^{\sqrt{x}}}{2\sqrt{x}}$

61. $f'(\theta) = \sin 2\theta \cdot e^{\sin^2 \theta}$

62. $f(x) = -2 \sin 2x \cdot e^{\cos 2x}$

63. $y' = (\sin x + \cos x)e^{x+\cos x}$

64. $f'(x) = (3 \ln 5)5^{3x}$

65. $f'(x) = (2 \ln 7)7^{2x}$

66. $f'(x) = (2x \ln 5)5^{x^2}$

67. $y' = 2x^{2x}(1 + \ln x)$

68. $y' = x^{\cos x-1}(\cos x - x \ln x^{\sin x})$

69. $y' = \frac{\sqrt[3]{x}}{x^2}(1 - \ln x)$

70. $y' = \frac{e^{\arctan x}}{1+x^2} = \frac{y}{1+x^2}$

71. $y' = \frac{1+2x}{2x}$

72. $y' = 3e^{\ln x^2} = 3x^2$

73. $y' = \frac{xe^x}{(x+1)^2}$

74. $y' = \frac{e^x(x \ln x + \ln x - 1)}{2 \ln^2 x}$

75. $y' = \frac{-1}{x(\ln x - 1)\sqrt{\ln^2 x - 1}}$

76. $y' = \frac{e^{\cos x} \cos x}{(1 - e^{\cos x})\sqrt{e^{2 \cos x} - 1}}$

77. $y' = \frac{2a \cot ax}{e^y}$

78. $y' = \frac{e^{\ln \sqrt{e^2 \sec x}}(1 + \cot x)}{2} = \frac{y(1 + \cot x)}{2}$

79. $y' = xe^{\sin x}(x \cos x + 2)$

80. $y' = \cot x$

81. $y' = \frac{3x^2 - 8}{x(x^2 - 4)}$

82. $y' = \frac{x + 3}{\sqrt{x^2 + 9}}$

83. $y' = \sec^3 2x$

84. $y' = \arctan x$

85. $y' = \sqrt{x^2 - 4}$

86. $y' = \arcsin x$

87. $y' = \frac{1}{4x^2 - 9}$

88. $y' = \operatorname{arccot} x$

89. $y' = \operatorname{arccsc} \frac{x}{2}$

EJERCICIO 34

1. $y' = -\frac{x}{y}$

2. $y' = -\frac{y}{x}$

3. $y' = \frac{4}{y}$

4. $y' = -\frac{2x + 5}{4y - 2}$

5. $y' = -\frac{3x + y}{x - 6y}$

6. $y' = \frac{x + 1}{1 - y}$

7. $y' = \frac{(x - y)^2 + 2y}{2x}$

8. $y' = \frac{b^2 x}{a^2 y}$

9. $y' = -\frac{y}{x}$

10. $y' = \frac{2y^2 + 3x^2 y + 10xy^2}{3y^2 - 4xy - x^3 - 10x^2 y + 1}$

11. $y' = \frac{4xy - 9x^2 - 5y - 3}{5x - 2x^2 - 1}$

12. $y' = \frac{2\sqrt{x + y} - y}{2x + 3y}$

13. $y' = \frac{2y\sqrt{x + y} - 1}{1 - 2x\sqrt{x + y}}$

14. $y' = \frac{2 - 4x - 3y}{3x + 3}$

15. $y' = (1 - 4\sqrt{x})\sqrt{\frac{y}{x}}$

16. $y' = \frac{y}{x(2y - 1)}$

17. $y' = -\frac{y}{x}$

18. $y' = \frac{\tan e^y}{e^y}$

19. $y' = 3e^{x-y}$

20. $y' = \frac{2xy}{x^2 + 1}$

21. $y' = \frac{1 - x + y}{1 - y + x}$

22. $y' = \frac{x(1 - e^x)}{y(e^y - 1)}$

23. $y' = -x$

24. $y' = -\frac{y}{x \ln x}$

25. $y' = \frac{y}{x^2 + y^2 + x}$

26. $y' = \frac{y}{x} \left(\frac{x \ln y - y}{y \ln x - x} \right)$

27. $y' = \frac{1}{x \ln x}$

28. $y' = \frac{e^x(1 + e^y)}{e^y} = (e^{-y} + 1) \ln(1 + e^y)$

29. $y' = \frac{y(x - \ln y)}{x \ln x}$

30. $y' = \frac{e^x}{1 + x e^y} = \frac{e^y}{1 - y}$

31. $y' = \frac{y^2}{e^{y^2} - xy} = \frac{y}{1 - y}$

32. $y' = \frac{1}{e^{x+y}[\cos(e^{x+y}) - 1]} - 1$

33. $y' = \frac{e^{x \cos y} \cos y - 3}{x e^{x \cos y} \sin y} = \frac{1}{x} \left(\frac{1}{\tan y} - \frac{1}{x \sin y} \right)$

34. $y' = -\frac{\cos(x+a)}{\operatorname{sen}(y-b)}$

35. $y' = \frac{\operatorname{sen} x}{\cos y - 1} = -\frac{\operatorname{sen} x(\csc y + \cot y)}{\operatorname{sen} y}$

36. $y' = \frac{\operatorname{sen}(4x) \cos(2x)}{\operatorname{sen}(2y) \cos(2y)} = \frac{\operatorname{sen}(8x)}{\operatorname{sen}(8y)}$

37. $y' = -\frac{\operatorname{sen} x e^{\cos x}}{\cos y(1+e^{\operatorname{sen} y})}$

38. $y' = \frac{2-y \cos(xy)}{x \cos(xy)} = \frac{2 \sec(xy) - y}{x}$

39. $y' = -\frac{\cos x}{\operatorname{sen} y}$

40. $y' = \frac{\operatorname{sen} x}{\operatorname{sen} y \cdot e^{\operatorname{sen} y}}$

41. $y' = \frac{\cos x - \operatorname{sen} y - 1}{x \cos y}$

42. $y' = \left(\frac{y^2+1}{y^2+1-x} \right) \operatorname{arc} \tan y$

43. $y' = \frac{\cot(x+y)}{1-\cot(x+y)}$

44. $y' = \frac{1}{2^x \ln 2} = \frac{1}{\ln 2^x + \ln 8}$

45. $y' = -\frac{y}{e^{\operatorname{sen} y} \cos y + x - 2}$

46. $y' = \frac{y}{x} \left(\frac{x \ln y - y}{y \ln x - x} \right) = \frac{y^2}{x^2} \left(\frac{1 - \ln x}{1 - \ln y} \right)$

47. $y' = \frac{\operatorname{sen}(x+y) + \cos(x+y)}{1 - \operatorname{sen}(x+y) - \cos(x+y)}$

48. $y' = \frac{\tan^2(xy) + y^2 \sec^2(xy)}{\tan(xy) - xy \sec^2(xy)}$

49. $y' = \frac{x^2 + y + 1}{(x^2 + 1) \operatorname{arc} \cot x}$

50. $y' = \frac{y \cdot e^x}{\sqrt{1 - e^{2x} (\operatorname{sen} y + \operatorname{arc} \cos(e^x))}}$

EJERCICIO 35

1. $\frac{d^4 y}{dx^4} = 24$

2. $\frac{d^3 y}{dx^3} = 0$

3. $\frac{d^2 y}{dx^2} = -\frac{170}{(5x+3)^3}$

4. $\frac{d^2 y}{dx^2} = \frac{4ab^2}{(ax-b)^2}$

5. $\frac{d^3 y}{dx^3} = 24a^3(ax+b)$

6. $\frac{d^4 y}{dx^4} = \operatorname{sen} x + \cos x$

7. $y'' = -\csc^2 x$

8. $y''' = -\frac{72}{(x-1)^5}$

9. $y'' = e^x \sec^2 e^x (2e^x \tan e^x + 1) = e^x \sec^2 e^x (2e^x y + 1)$

10. $\frac{d^2 y}{dx^2} = \frac{18y-6}{(2-3x)^2}$

11. $\frac{d^2 y}{dx^2} = -\frac{9}{(9-x^2)^{\frac{3}{2}}}$

12. $\frac{d^2 y}{dx^2} = -\frac{x^2+y^2}{y^3} = -\frac{16}{y^3}$

13. $\frac{d^4 y}{dx^4} = \frac{2}{x^3}$

14. $\frac{d^2 y}{dx^2} = -\frac{\operatorname{sen} x \operatorname{sen}^2 y + \cos^2 x \cos y}{\operatorname{sen}^3 y} = -\csc y \left(\operatorname{sen} x + \frac{\cos^2 x \cos y}{\operatorname{sen}^2 y} \right)$

15. $\frac{d^3 y}{dx^3} = -x^2 \cos x - 6x \operatorname{sen} x + 6 \cos x$

16. $\frac{d^3 y}{dx^3} = \frac{12}{(x+1)^4}$; $\frac{d^n y}{dx^n} = \frac{2 \cdot n! \cdot (-1)^{n+1}}{(x+1)^{n+1}}$

17. $y'' = \frac{2y}{(x+1)^2}$

18. $\frac{d^3 y}{dx^3} = -2 \sec^2 x \tan x$

19. $\frac{d^2 y}{dx^2} = \frac{2 \cos^2 x}{(1+\operatorname{sen} x)^3} + \frac{\operatorname{sen} x}{(1+\operatorname{sen} x)^2} = \frac{2-\operatorname{sen} x}{(1+\operatorname{sen} x)^2}$

20. $y'' = \frac{-12}{(x+2y)^3}$; $y''' = \frac{-108x}{(x+2y)^5}$

7. Sub-tangente = 8

Sub-normal = $\frac{1}{2}$

Tangente = $2\sqrt{17}$

Normal = $\frac{\sqrt{17}}{2}$

8. Sub-tangente = -2

Sub-normal = $-\frac{1}{8}$

Tangente = $-\frac{\sqrt{17}}{2}$

Normal = $\frac{\sqrt{17}}{8}$

9. Sub-tangente = $-\frac{3}{2}$

Sub-normal = -6

Tangente = $-\frac{3\sqrt{5}}{2}$

Normal = $-3\sqrt{5}$

10. Sub-tangente = $-\frac{3}{4}$

Sub-normal = $-\frac{16}{27}$

Tangente = $-\frac{\sqrt{145}}{12}$

Normal = $\frac{2\sqrt{145}}{27}$

11. T: $4x + y - 1 = 0$

N: $x - 4y + 38 = 0$

12. T: $x + y - 1 = 0$

N: $x - y + 1 = 0$

13. T: $y = 0$

N: $2x - 1 = 0$

14. T: $8x - y - 12 = 0$

N: $x + 8y - 34 = 0$

15. T: $4x + y + 8 = 0$

N: $x - 4y - 15 = 0$

16. T: $\sqrt{5}x + 2y - 9 = 0$

N: $2x - \sqrt{5}y = 0$

17. T: $x + 2y - 7 = 0$

N: $2x - y - 4 = 0$

18. T: $2x + y - 2 = 0$

N: $x - 2y + 4 = 0$

19. T: $y - 1 = 0$

N: $2x - \pi = 0$

20. T: $3\sqrt{3}x + 6y - (3 + \sqrt{3}\pi) = 0$

N: $12x - 6\sqrt{3}y + (3\sqrt{3} - 4\pi) = 0$

21. T: $4x - 2y + (6 - \pi) = 0$

N: $4x + 8y - (24 + \pi) = 0$

22. T: $2x - y - 6 = 0$

N: $x + 2y - 8 = 0$

23. T: $x + y - 2 = 0$

N: $x - y = 0$

24. T: $6x + 2y - 9 = 0$

N: $2x - 6y + 7 = 0$

25. T: $x - 2 = 0$

N: $2y - 1 = 0$

26. T: $7x - y - 8 = 0$

N: $x + 7y - 94 = 0$

27. T: $x - ey = 0$

N: $ex + y - 1 - e^2 = 0$

28. T: $8x + y - 7 = 0$

N: $2x - 16y + 47 = 0$

EJERCICIO 39

1. Agudo $26^\circ 33'$, obtuso $153^\circ 27'$
2. Agudo $73^\circ 42'$, obtuso $106^\circ 18'$
3. Agudo $78^\circ 41'$, obtuso $101^\circ 19'$
4. Agudo $35^\circ 15'$, obtuso $144^\circ 44'$
5. Agudo $28^\circ 23'$, obtuso $151^\circ 36'$
6. Agudo $28^\circ 4'$, obtuso $151^\circ 55'$
7. Agudo $71^\circ 33'$, obtuso $104^\circ 28'$
8. $125^\circ 32'$
9. $\theta = 63^\circ 26'$
10. $\theta = 18^\circ 26'$
11. $\theta = 6^\circ 54', 57^\circ 25'$
12. $\theta = 33^\circ 41'$
13. $\theta = 54^\circ 44'$

EJERCICIO 40

1. $r = \frac{5\sqrt{5}}{3}, \frac{d\theta}{ds} = \frac{3\sqrt{5}}{25}$
2. $r = \frac{17\sqrt{17}}{8}, \frac{d\theta}{ds} = \frac{8\sqrt{17}}{289}$
3. $r = 4\sqrt{2}, \frac{d\theta}{ds} = \frac{\sqrt{2}}{8}$
4. $r = \frac{5\sqrt{10}}{3}, \frac{d\theta}{ds} = \frac{3\sqrt{10}}{50}$
5. $r = 1, \frac{d\theta}{ds} = 1$

6. $r = \frac{17\sqrt{17}}{2}, \frac{d\theta}{ds} = \frac{2\sqrt{17}}{289}$

7. $r = \frac{1}{2}, \frac{d\theta}{ds} = 2$

8. $r = \frac{\sqrt{11}}{4}, \frac{d\theta}{ds} = \frac{4\sqrt{11}}{11}$

9. $C(-2, 5)$

10. $C\left(-\frac{3}{4}, -\frac{3}{2}\right)$

11. $C\left(\frac{\pi}{2}, 0\right)$

12. $C(-2, 3)$

13. $C\left(\frac{23}{2}, -32\right)$

EJERCICIO 41

1. Punto mínimo $(3, -4)$

Creciente en $(3, \infty)$ Decreciente en $(-\infty, 3)$

2. Punto máximo $\left(\frac{5}{6}, -\frac{23}{12}\right)$

Creciente en $(-\infty, \frac{5}{6})$ Decreciente en $(\frac{5}{6}, \infty)$

3. Punto máximo $(-1, 2)$

Punto mínimo $(1, -2)$ Creciente en $(-\infty, -1) \cup (1, \infty)$ Decreciente en $(-1, 1)$

4. Punto máximo $(0, 0)$

Punto mínimo $(4, -32)$ Creciente en $(-\infty, 0) \cup (4, \infty)$ Decreciente en $(0, 4)$

5. Punto máximo $(-1, 5)$

Punto mínimo $\left(\frac{1}{2}, -\frac{7}{4}\right)$ Creciente en $(-\infty, -1) \cup \left(\frac{1}{2}, \infty\right)$ Decreciente en $\left(-1, \frac{1}{2}\right)$

6. Punto máximo $\left(-\frac{1}{2}, \frac{17}{4}\right)$

Punto mínimo $\left(\frac{2}{3}, \frac{29}{27}\right)$ Creciente en $(-\infty, -\frac{1}{2}) \cup \left(\frac{2}{3}, \infty\right)$ Decreciente en $\left(-\frac{1}{2}, \frac{2}{3}\right)$

7. Punto máximo $(2, 15)$

Punto mínimo $(-1, -12)$ Creciente en $(-1, 2)$ Decreciente en $(-\infty, -1) \cup (2, \infty)$

8. Punto máximo $\left(-1, \frac{8}{3}\right)$

Punto mínimo $(3, -8)$ Creciente en $(-\infty, -1) \cup (3, \infty)$ Decreciente en $(-1, 3)$

9. Punto máximo $\left(-2, \frac{34}{3}\right)$

Punto mínimo $\left(3, -\frac{19}{2}\right)$ Creciente en $(-\infty, -2) \cup (3, \infty)$ Decreciente en $(-2, 3)$

10. Punto máximo $\left(1, \frac{17}{12}\right)$

Punto mínimo $(0, 1) \left(3, -\frac{5}{4}\right)$ Creciente en $(0, 1) \cup (3, \infty)$ Decreciente en $(-\infty, 0) \cup (1, 3)$

11. Punto máximo $(1, -3)$

Creciente $(-\infty, 0) \cup (0, 1)$ Decreciente $(1, 2) \cup (2, \infty)$

12. No tiene máximos y mínimos

Decreciente en $(-\infty, 3) \cup (3, \infty)$

13. Punto máximo $\left(2, \frac{1}{2}\right)$

Punto mínimo $\left(-2, -\frac{1}{2}\right)$ Creciente en $(-2, 2)$ Decreciente en $(-\infty, -2) \cup (2, \infty)$

14. Punto mínimo $\left(0, -\frac{1}{4}\right)$

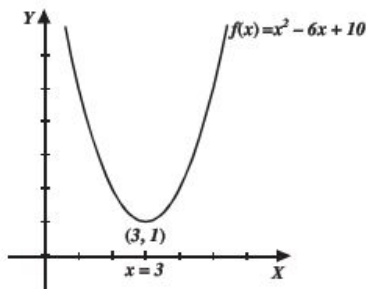
Creciente en $(0, 2) \cup (2, \infty)$ Decreciente en $(-\infty, -2) \cup (-2, 0)$

15. Punto máximo $(-6, -12)$

Punto mínimo $(0, 0)$ Creciente en $(-\infty, -6) \cup (0, \infty)$ Decreciente en $(-6, -3) \cup (-3, 0)$

EJERCICIO 42

1.



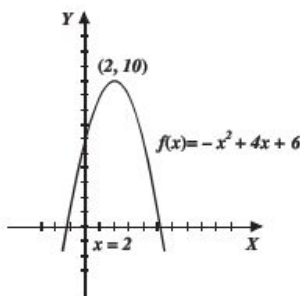
Punto mínimo (3, 1)

Crece (3, ∞)

Decrece ($-\infty$, 3)

Concavidad hacia arriba ($-\infty$, ∞)

2.



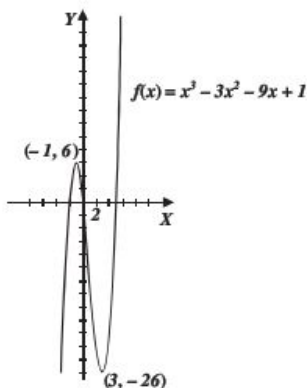
Punto máximo (2, 10)

Crece ($-\infty$, 2)

Decrece (2, ∞)

Concavidad hacia abajo ($-\infty$, ∞)

3.



Punto máximo (-1, 6), Punto mínimo (3, -26)

Crece ($-\infty$, -1) \cup (3, ∞)

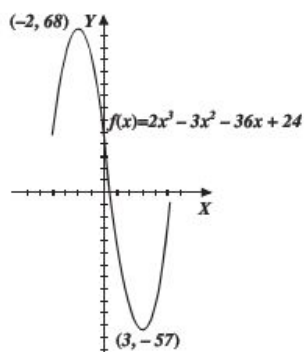
Decrece (-1, 3)

Concavidad hacia abajo ($-\infty$, 1)

Concavidad hacia arriba (1, ∞)

Punto de inflexión (1, -10)

4.



Punto máximo (-2, 68)

Punto mínimo (3, -57)

Crece ($-\infty$, -2) \cup (3, ∞)

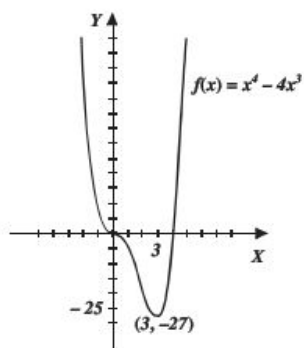
Decrece (-2, 3)

Concavidad hacia abajo ($-\infty$, $\frac{1}{2}$)

Concavidad hacia arriba ($\frac{1}{2}$, ∞)

Punto de inflexión ($\frac{1}{2}$, $\frac{11}{2}$)

5.



Punto mínimo (3, -27)

Puntos de inflexión (0, 0), (2, -16)

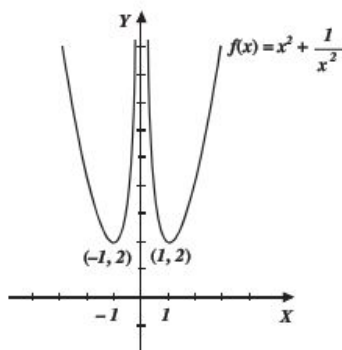
Crece (3, ∞)

Decrece ($-\infty$, 0) \cup (0, 3)

Concavidad hacia abajo (0, 2)

Concavidad hacia arriba ($-\infty$, 0) \cup (2, ∞)

6.

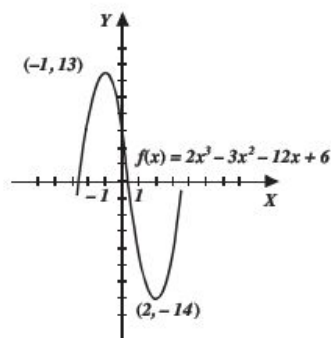

 Puntos mínimos $(-1, 2), (1, 2)$

 Crece $(-1, 0) \cup (1, \infty)$

 Decece $(-\infty, -1) \cup (0, 1)$

 Concavidad hacia arriba $(-\infty, 0) \cup (0, \infty)$

7.


 Punto máximo $(-1, 13)$

 Punto mínimo $(2, -14)$

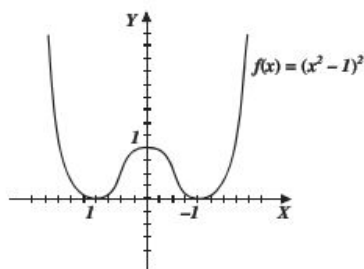
 Crece $(-\infty, -1) \cup (2, \infty)$

 Decece $(-1, 2)$

 Concavidad hacia abajo $(-\infty, \frac{1}{2})$

 Concavidad hacia arriba $(\frac{1}{2}, \infty)$, Punto de inflexión $(\frac{1}{2}, -\frac{1}{2})$

8.


 Punto máximo $(0, 1)$

 Puntos mínimos $(-1, 0), (1, 0)$

 Crece $(-1, 0) \cup (1, \infty)$

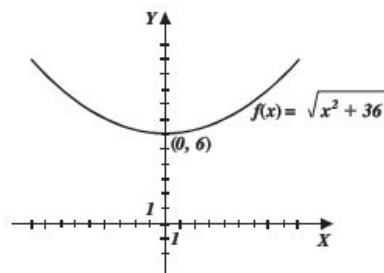
 Decece $(-\infty, -1) \cup (0, 1)$

 Concavidad hacia abajo $(-\frac{1}{\sqrt{3}}, \frac{1}{\sqrt{3}})$

 Concavidad hacia arriba $(-\infty, -\frac{1}{\sqrt{3}}) \cup (\frac{1}{\sqrt{3}}, \infty)$

 Punto de inflexión $(-\frac{1}{\sqrt{3}}, \frac{4}{9}), (\frac{1}{\sqrt{3}}, \frac{4}{9})$

9.

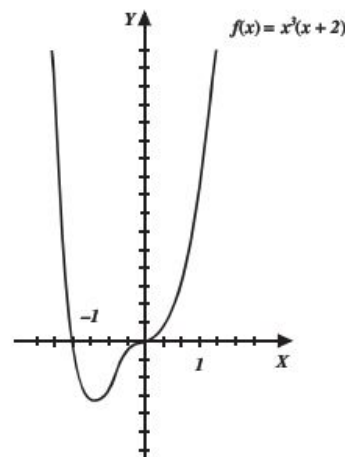

 Punto mínimo $(0, 6)$

 Crece $(0, \infty)$

 Decece $(-\infty, 0)$

 Concavidad hacia arriba $(-\infty, \infty)$

10.


 Punto mínimo $(-\frac{3}{2}, -\frac{27}{16})$

 Puntos de inflexión $(0, 0), (-1, -1)$

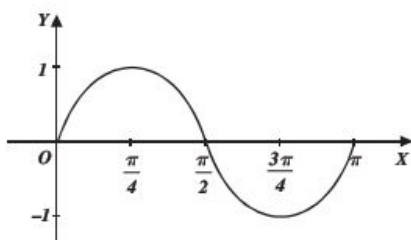
 Crece $(-\frac{3}{2}, 0) \cup (0, \infty)$

 Decece $(-\infty, -\frac{3}{2})$

 Concavidad hacia abajo $(-1, 0)$

 Concavidad hacia arriba $(-\infty, -1) \cup (0, \infty)$

11.



Punto mínimo $\left(\frac{3\pi}{4}, -1\right)$

Punto máximo $\left(\frac{\pi}{4}, 1\right)$

Punto de inflexión $\left(\frac{\pi}{2}, 0\right)$

Decrece $\left(\frac{\pi}{4}, \frac{3\pi}{4}\right)$

Crece $\left(0, \frac{\pi}{4}\right) \cup \left(\frac{3\pi}{4}, \pi\right)$

Concavidad hacia arriba $\left(\frac{\pi}{2}, \pi\right)$

Concavidad hacia abajo $\left(0, \frac{\pi}{2}\right)$

EJERCICIO 43

1. 20 y 20

2. -25 y 25

3. 2 pulgadas por lado y el volumen de 128 in^3

4. $V = 6144\pi \text{ cm}^3$

5. $V = \frac{500\sqrt{6}\pi}{9\pi} \text{ in}^3$

6. $r = \sqrt[4]{\frac{100}{3}}$

$h = \sqrt[4]{\frac{400}{3}}$

7. $A = 54 \text{ cm}^2$

8. $A = 24u^2$

9. Número = 1

10. Base = $\sqrt{3}r$

altura = $\frac{3}{2}r$

11. $(1, 1), (-1, -1)$

2. $A = \frac{32\sqrt{3}}{9} u^2$

13. Base = $2\sqrt{2}$

altura = $\sqrt{2}$

14. $2\sqrt{6}$ y $2\sqrt{3}$ ft

15. $d = 2\sqrt{5}$

16. 8 y 8

17. $2\sqrt{5}$ y $\sqrt{5}$ unidades

18. $A = 6u^2$

19. $h = 2 \text{ cm}$

20. Cada lado mide $2u$

21. 20 y 20

22. $4\sqrt{2}$ y 8

23. $P\left(\frac{3}{2}, \frac{1}{2}\right)$

24. $A = 15u^2$

25. $A = 2ab u^2$

26. $4x + 3y - 24 = 0$

27. Radio $4\sqrt{2}$
altura = $8\sqrt{2}$ pulgadas

28. $\left(\frac{1}{2}\sqrt{4a^2 + k^2}, \frac{k}{2}\right)$

29. Números 4 y 4

30. $\frac{2P}{4 + \pi}; \frac{P}{4 + \pi}$

31. 400 m, 800 m

32. $\frac{100\sqrt{3}\pi}{9 + \sqrt{3}\pi} \text{ cm}, \frac{900}{9 + \sqrt{3}\pi} \text{ cm}$

33. $\frac{2000\sqrt{3}\pi}{27} \text{ cm}^3$

34. $25\sqrt{2} \text{ cm} \times 25\sqrt{2} \text{ cm}$

35. $r = \frac{5}{\sqrt{\pi}} \text{ in} = \frac{10}{\sqrt{\pi}} \text{ in}$

36. $5\sqrt{5} \text{ m}$

37. $r = \sqrt[3]{\frac{3V}{5\pi}}$

38. $P(2, 0),$

$P\left(-\frac{\sqrt{6}+2}{2}, \sqrt{6}-\frac{3}{2}\right)$

EJERCICIO 44

1. $6 \frac{\text{m}}{\text{s}}, \frac{17 \text{ m}}{2 \text{ s}}, 10 \frac{\text{m}}{\text{s}}$

2. $0 < t < 4$ y $6 < t$

3. a) $s = 22$ si $t = 2, s = 18$ si $t = 4$
 $a = -6$ si $t = 2, a = 6$ si $t = 4$

b) $s = 20, v = -3$ si $t = 3$

c) "s" crece cuando $0 < t < 2$ o $t > 4$

d) "v" crece cuando $0 < t < 2$ o $t > 4$

4. a) $t = 18 \text{ s}, v = -54 \frac{\text{m}}{\text{s}}$

b) $t = 9 \text{ s}, s = 243 \text{ m}$

5. $v = -2 \frac{\text{m}}{\text{s}}, s = 35 \text{ m}$

EJERCICIO 45

1. $\frac{5}{2}\sqrt{10} \text{ cm}$

2. $\frac{3}{5}\sqrt{449} \frac{\text{m}}{\text{min}}$

3. $\frac{360 \text{ m}}{\sqrt{17} \text{ s}}$

4. $\frac{4}{75}\sqrt{\frac{5}{\pi}} \text{ m}^3$

5. $-\frac{25 \text{ m}}{12 \text{ s}}$

6. $10\pi \frac{\text{cm}^2}{\text{s}}$

7. $-\frac{3 \text{ m}}{49\pi \text{ min}}$

8. $-\frac{405 \text{ km}}{8\sqrt{14} \text{ h}}$

9. a) $100 \frac{\text{km}}{\text{h}}$

b) $\frac{820 \text{ km}}{\sqrt{73} \text{ h}}$

10. $-\frac{4 \text{ m}}{9\pi \text{ min}}$

11. 90.58 km/h

12. $4.8 \frac{\text{m}}{\text{s}}$

13. $\frac{7 \text{ pies}}{4\pi \text{ min}}$

14. $\frac{\sqrt[3]{27} \text{ cm}}{5 \text{ min}}$

15. $\frac{14 \text{ u}}{3 \text{ s}}$

16. $\frac{7}{50} \sqrt{29} \frac{\text{m}}{\text{s}}$

17. $1.95 \frac{\text{m}}{\text{s}}$

4342 $\frac{\text{m}}{\text{s}}$

7. $c = \pm \sqrt{\frac{13}{3}}$

8. $c = 0$

9. $c = 0$

10. $c = \pi$

11. No es continua en $x = 1$

12. $c = 1$

EJERCICIO 49

1. $c = \frac{3}{2}$

2. $c = \frac{1}{2}$

3. $c = \sqrt{3}$

4. $c = 0$

5. $c = 3$

6. $c = -1$

7. $c = 1.7613$

8. $c = 2.1750$

9. $c = 0.5413$

10. $c = 1.3204$

EJERCICIO 46

1. a) $I = \$15\,275.00$, $U = \$8\,370.00$, $Q = \$47.90$

b) $I = \$9\,424.00$, $U = \$7\,208.00$, $Q = \$26.93$

$Q = \$16.00$ por artículo

2. Costo promedio mínimo = \$14.80 por artículo

Se deben producir 1 225 artículos para un costo mínimo

3. Ingreso real: $I(31) - I(30) = \$156.00$

Ingreso aproximado: \$160.00

4. 59 metros

5. $p(x) = 100 - \frac{1}{800}x$

\$50.00 por boleto

EJERCICIO 47

1. $\frac{15}{2}$

8. $\frac{1}{3}$

15. e

2. 2

9. e

16. ∞

3. -1

10. 0

17. -1

4. $\frac{1}{3} \ln 2$

11. 1

18. 1

5. 1

12. $-\frac{1}{2}$

19. 1

6. $-\frac{9}{4}$

13. $e^{\frac{1}{2}}$

20. 0

7. 1

14. 0

EJERCICIO 48

1. $c = 0$

4. $c = \frac{3}{4}$

2. $c = \frac{3}{4}$

5. $c = \pm \sqrt{3}$

3. $c = \frac{5}{2}$

6. $c = 0.36$

EJERCICIO 50

1. $dy = adx$

2. $dy = (2ax + b)dx$

3. $df(x) = (3x^2 - 4x)dx$

4. $ds = \left(\frac{1}{2\sqrt{t}} - \frac{1}{3\sqrt[3]{t^2}} \right) dt$

5. $dh(t) = -36t(5 - 3t^2)^5 dt$

6. $dy = -\frac{6x}{(x^2 - 2)^5}$

7. $dy = -\frac{1}{x^2} \sqrt[3]{\left(\frac{x}{2x+3} \right)^2} dx$

8. $dy = \frac{2(x^2 + 1)}{\sqrt{x^2 + 2}} dx$

9. $df(x) = (7x + 5)(x - 1)^2(x + 3)^3 dx$

10. $dh(s) = \frac{8}{(2s + 3)^2} ds$

11. $dg(x) = \frac{-2x}{(x^2 - 1)^2} dx$

12. $dy = \frac{x + 8}{2(x + 3)^{\frac{3}{2}}} dx$

13. $dy = \frac{-2abx}{(ax^2 - b)\sqrt{a^2x^4 - b^2}} dx$

14. $df(x) = (1 + 2 \text{ sen } 2x)dx$

15. $df(t) = 6 \tan^2 2t \sec^2 2t dt$

16. $dy = -2 \tan x (\sec x - \sec^2 x) dx$

17. $dg(x) = \frac{-2 \cos x}{(1 + \text{sen } x)^2} dx$

18. $ds(t) = \frac{-t \operatorname{sen} t - 2 \cos t}{2t^2 \sqrt{\cos t}} dt$

19. $df(x) = \frac{\sec x}{\sec x + 1} dx = \frac{1}{1 + \cos x} dx$

20. $dy = \frac{2x}{x^2 + 5} \log e dx$

21. $dy = \frac{x}{x^2 - 3} dx$

22. $dy = \frac{3}{2x^2x + 32x - 4} dx$

23. $dy = \frac{3}{2} \sqrt{x} e^{\sqrt{x}} dx$

24. $dy = 2x^3 + 5(3x^2 \ln 2) dx$

25. $dh(t) = -\frac{2}{(e^t - e^{-t})^2} dt$

26. $df(x) = x(\ln x^2 + 1) dx$

27. $df(x) = -\frac{2}{\sqrt{1-4x^2}} dx$

28. $dy = -\frac{2}{x^2 + 4} dx$

29. $dy = \frac{1}{2x\sqrt{x-1}} dx$

30. $dy = -\frac{3}{x\sqrt{9x^6-1}} dx$

EJERCICIO 51

1. $\approx \frac{167}{18} = 9.277$

2. $\approx \frac{89}{27} = 3.296$

3. $\approx \frac{17}{8} = 2.125$

4. $\approx \frac{45 + 2\sqrt{3}\pi}{90} = 0.620$

5. $\approx \frac{108 + \sqrt{3}\pi}{36} = 3.151$

6. $\approx \frac{76 + 30\sqrt{3} + 2\pi}{15} = 8.949$

7. $\approx \frac{5489}{4} = 1372.25$

8. $\approx \frac{180(\sqrt{3} - \sqrt{2}) - \pi(7 + \sqrt{2})}{360} = 0.8549$

9. $\approx \frac{45 - 3\pi}{720} = 0.054$

10. $\approx \frac{9 - \sqrt{3}\pi}{9\sqrt{3}} = 0.228$

11. $dA = 0.286 \text{ cm}^2$

12. $dA = 2.265 \text{ cm}^2, dV = 3.341 \text{ cm}^3$

13. $dV = 1.8\pi \text{ cm}^3$

14. Lado = 8 cm

15. Error relativo = $\frac{dA}{A} = 0.00249$,

Error porcentual = 0.249%

Error relativo = $\frac{dV}{V} = 0.00374$,

Error porcentual = 0.374%

16. Lado = $\frac{1}{9}$ cm

17. $d\phi = 0.02$ cm

18. Error relativo = $\frac{dA}{A} = 0.00088$,

Error porcentual = 0.088%

Solución a los ejercicios de cálculo integral

The background of the page is a complex, abstract composition of overlapping, semi-transparent circles and lines in various shades of gray and white. The lines are thin and intersect to form a grid-like pattern, while the circles vary in size and opacity, creating a sense of depth and movement. The overall effect is a modern, technical, and mathematical aesthetic.

CAPÍTULO 6

EJERCICIO 1

- | | | |
|---------------------|-------------------------------------|----------------------|
| 1. 354 | 5. 14 560 | 9. 63 |
| 2. -40 | 6. 17 | 10. $\frac{853}{70}$ |
| 3. $-\frac{5}{4}$ | 7. $-\frac{322}{3}$ | 11. 414 |
| 4. $\frac{223}{70}$ | 8. $3\left(1 + \frac{b}{2a}\right)$ | 12. 81 |

EJERCICIO 2

- | | | |
|----------------------|----------------------|---------------------|
| 1. $57u^2$ | 5. $\frac{10}{3}u^2$ | 9. $\frac{9}{4}u^2$ |
| 2. $5u^2$ | 6. $\frac{bh}{2}u^2$ | 10. $242u^2$ |
| 3. $\frac{32}{3}u^2$ | 7. $12u^2$ | |
| 4. $\frac{7}{2}u^2$ | 8. $2u^2$ | |

CAPÍTULO 7

EJERCICIO 3

- | | | |
|----------------------------------|---|--|
| 1. $\frac{x^7}{7} + C$ | 12. $4 \ln x + C$ | 23. $\frac{4x^6}{3} - x^5 - x^4 - 2x^3 - x^2 - 3x + C$ |
| 2. $x^5 + C$ | 13. $\frac{4\sqrt[4]{x^3}}{3} + C$ | 24. $\frac{ax^4}{4} - \frac{bx^3}{3} - \frac{cx^2}{2} + dx + C$ |
| 3. $\frac{bx^4}{4} + C$ | 14. $9\sqrt[3]{x^2} + C$ | 25. $\frac{x^3}{3\sqrt{a^2+b^2}} - \frac{3x^2}{2\sqrt{a}} - 5\sqrt{bx} + C$ |
| 4. $\frac{\sqrt{3x^3}}{3} + C$ | 15. $\frac{5x^5\sqrt[3]{x^3}}{8} + C$ | 26. $\frac{x^4}{4} - 2x^3 - 7x + C$ |
| 5. $ax + C$ | 16. $3a\sqrt[3]{x} + C$ | 27. $5x^{\frac{3}{5}} - \frac{5x^{\frac{4}{5}}}{2} + C$ |
| 6. $\frac{3}{4}x + C$ | 17. $\frac{5}{2} \ln x + C$ | 28. $6\sqrt[3]{x^2} - \frac{20\sqrt[4]{x^3}}{3} + C$ |
| 7. $\frac{1}{3}x + C$ | 18. $\frac{2x\sqrt{bx}}{3} + C$ | 29. $\frac{2y^{\frac{7}{2}}}{7} - \frac{15y^{\frac{7}{3}}}{7} - \frac{8y^{\frac{5}{4}}}{5} - \frac{2y^{\frac{3}{2}}}{3} + C$ |
| 8. $\frac{3x\sqrt[3]{x}}{4} + C$ | 19. $\frac{15\sqrt[3]{x^2}}{2} - 3x\sqrt[3]{x} + C$ | 30. $\frac{2y^{\frac{5}{2}}}{5} - \frac{3y^{\frac{2}{3}}}{2} + \frac{4}{3y^{\frac{3}{4}}} + C$ |
| 9. $4x\sqrt[4]{x} + C$ | 20. $-\frac{3}{4x^4} + \frac{2}{x} - 6 \ln x + C$ | 31. $\frac{3t^{\frac{33}{2}}}{2} - \frac{9t^{\frac{2}{3}}}{7} + \frac{3t^{\frac{3}{2}}}{2} + C$ |
| 10. $-\frac{1}{2x^2} + C$ | 21. $\frac{3t\sqrt[3]{at}}{4} + C$ | 32. $\frac{3t^{\frac{3}{2}}\sqrt{7t}}{4} + C$ |
| 11. $-\frac{5}{3x^3} + C$ | 22. $\frac{2t\sqrt{6t}}{3} + C$ | 33. $\frac{(3x+4)^7}{21} + C$ |
| | | 34. $\frac{(ax^2-b)^6}{12a} + C$ |
| | | 35. $\frac{(t^3-4)^3}{9} + C$ |
| | | 36. $-\frac{(a-by)^5}{5b} + C$ |
| | | 37. $\frac{t^5}{5} - 4t^3 + 36t + C$ |
| | | 38. $\frac{x^4}{4} + \frac{8x^3}{3} + 8x^2 + C$ |
| | | 39. $\frac{x^6}{6} + \frac{3x^5}{5} + \frac{3x^4}{4} + \frac{x^3}{3} + C$ |
| | | 40. $\frac{2(m+ny)\sqrt{m+ny}}{3n} + C$ |
| | | 41. $\frac{2(5x-3)^{\frac{3}{2}}}{15} + C$ |
| | | 42. $\frac{1}{a}\sqrt{at^2+b} + C$ |

43. $\frac{1}{6}\sqrt[3]{(9x-1)^2} + C$
44. $\frac{x^2}{2} - \frac{16x\sqrt{x}}{3} + 16x + C$
45. $-\frac{1}{18(3x^2-4)^3} + C$
46. $-\frac{5}{3(3x-4)} + C$
47. $-\frac{2}{3(2x^2+5)^3} + C$
48. $\frac{2(\sqrt{x}-b)^3}{3} + C$
49. $\frac{1}{a}\ln(at+b) + C$
50. $\frac{1}{6}\ln|3x^2-4| + C$
51. $\ln|x+3| + C$
52. $\ln|x^2-3| + C$
53. $-\frac{1}{(x^2-3x+6)} + C$
54. $\frac{2(x^3-6x+3)^{\frac{3}{2}}}{9} + C$
55. $-\frac{1}{an(m-1)(ay^n+b)^{m-1}} + C \forall m \neq 1$
56. $-\frac{(1-e^{3x})^3}{9} + C$
57. $-\frac{(4-\ln|x+3|)^4}{4} + C$
58. $-\frac{(1-\operatorname{sen} 4x)^4}{16} + C$
59. $-\frac{2(3+\cot x)^{\frac{3}{2}}}{3} + C$
60. $-\sqrt{1-\sec 2x} + C$
61. $-\frac{1}{a}\ln|1-\operatorname{sen} ax| + C$
62. $\frac{4}{3}(e^{\sqrt{x}}-1)^{\frac{3}{2}} + C$
63. $\frac{(2+\ln|\operatorname{sen} x|)^2}{2} + C$
64. $-\frac{1}{2(1-\cos^2 x)^2} + C$
65. $\frac{1}{3b}\operatorname{sen}^3 bx + C$
66. $-\frac{\cot^2 mx}{2m} + C$
67. $-\frac{\cos^3 4x}{12} + C$
68. $\frac{2\sqrt{\operatorname{sen} 5x+4}}{5} + C$
69. $4x - \ln(x+2)^6 + C$
70. $\frac{3x^2}{2} + 3x + \ln|(x-1)^5| + C$
71. $-\frac{1}{\ln y} + C$
72. $\frac{1}{2}\ln|\ln 3x| + C$
73. $\frac{2(ax^{n+1}+b)^{\frac{3}{2}}}{3a(n+1)} + C$
74. $\frac{1}{3}\sqrt{\left(1-\frac{1}{x^2}\right)^3} + C$
75. $-\frac{1}{3}\operatorname{csc} 3x + C$
76. $-\frac{1}{(x+1)^2} + \frac{3}{x+1} + 4\ln(x+1) + C$
77. $\ln\left|\frac{(x+2)^3}{(x+5)^4}\right| + C$
78. $\ln\left|(2x-1)^{\frac{3}{2}}(3x-4)^{\frac{5}{3}}\right| + C$
79. $-3\sqrt[3]{\cos x} + C$
80. $\frac{2}{5}\operatorname{sen}^5 x + C$
81. $2\sqrt{1-\cot w} + C$
82. $-\frac{3}{2}\sqrt{2\cos^2 y-1} + C$
83. $2\sqrt{1-\cos \alpha} + C$
84. $\frac{4}{7}\tan^{\frac{7}{2}} x + C$

EJERCICIO 4

1. $\frac{1}{4} e^{4x} + C$
2. $16 e^{\frac{x}{2}} + C$
3. $\frac{1}{a} e^{ax+b} + C$
4. $\frac{2}{3} e^{\sqrt{3x}} + C$
5. $\frac{1}{3} e^{3x} + C$
6. $-\frac{1}{4} e^{\cos 4x} + C$
7. $\frac{2}{3} e^{x^3} + C$
8. $\frac{b^{4x}}{4 \ln b} + C$
9. $\frac{3^{2x}}{2 \ln 3} + C$
10. $\frac{2^x e^x}{1 + \ln 2} + C$
11. $3 \sqrt[3]{e^x} + C$
12. $\frac{2}{3} \sqrt{e^{3x}} + C$
13. $-\frac{1}{5^{4x} \ln 625} + C$
14. $-\frac{1}{2} e^{\frac{1}{x^2}} + C$
15. $\frac{3}{4} \sqrt[3]{e^{4x}} + C$
16. $x^3 - \frac{1}{3} e^{x^3} + C$
17. $e^{x^2-3x+1} + C$
18. $-\frac{5}{2\sqrt[3]{e^{2x}}} + C$
19. $-\frac{1}{2} e^{\frac{1}{\sec 2x}} + C$
20. $-\frac{1}{8e^{2x}} + C$
21. $\frac{4^x \cdot e^{2x}}{2 + \ln 4} + C$
22. $2 \left(e^{\frac{x}{2}} - 2e^{-\frac{x}{4}} \right) + C$
23. $\frac{1}{6} e^{6x} - \frac{4}{3} e^{3x} + 4x + C$
24. $\frac{5^{x^2}}{\ln 25} + C$
25. $\frac{1}{4} (e^{4x} - e^{-4x}) - 2x + C$
26. $\frac{1}{3} e^{\tan 3x} + C$
27. $\frac{5^{x^2}}{3 \ln 5} + C$
28. $\frac{10^{3x}}{3 \ln 10} - \frac{2^x}{\ln 2} + C$
29. $n \left(e^{\frac{x}{n}} - \frac{1}{\ln a} a^{\frac{x}{n}} \right) + C$
30. $\frac{1}{2} (e^{2x} + 5e^{-2x}) + C$
31. $-\frac{1}{ae^{ax}} - x + C$
32. $-e^{\cos^2 x} + C$
33. $\frac{1}{2} e^{\arcsin 2x} + C$
34. $e^{\arctan x} + C$
35. $\frac{3^{4x}(3 \cdot 3^{4x} + 8 \cdot 3^{2x} + 6)}{24 \ln 3} + C$

EJERCICIO 5

1. $-\frac{1}{5} \cos 5x + C$
2. $\frac{1}{6} \sin 6x + C$
3. $-4 \cos \frac{x}{4} + C$
4. $\frac{1}{b} \ln |\sec bx| + C$
5. $a \tan \frac{x}{a} + C$
6. $-\frac{1}{a} \cot ax + C$
7. $\frac{1}{b} \tan bx + C$
8. $\sec x + C$
9. $-4 \csc \frac{t}{4} + C$
10. $-\frac{1}{8} \cos 4x^2 + C$
11. $\frac{5}{3} \sin \frac{x^3}{5} + C$
12. $-\frac{1}{2} \csc^2 x + C$
13. $\frac{1}{a} \sec ax + C$
14. $\frac{3}{8} \tan 4x^2 + C$
15. $-\frac{1}{3} \cot(3x-1) + C$
16. $\frac{1}{a} \ln |\sin(ax-b)| + C$
17. $\frac{1}{a} \ln |\sec ax + \tan ax| + C$
18. $\frac{1}{8} \ln |\csc 4x^2 - \cot 4x^2| + C$
19. $-2\sqrt{\csc x} + C$
20. $\frac{1}{b} (\tan b\theta - \cot b\theta) + C$
21. $\frac{2}{3} (\csc 3x - \cot 3x) - x + C$
22. $\frac{2}{5} (\tan 5x + \sec 5x) - x + C$
23. $\frac{1}{2} [\sin^2 x - 2 \cos x] + C$
24. $-\frac{1}{2} \sin(2-x^2) + C$
25. $\ln |\csc x - \cot x| + \cos x + C$
26. $\sin x - \cos x + C$
27. $\ln |\cos x - 1| + C$
28. $\cot \left(\frac{\pi}{3} - x \right) + C$
29. $-\cot w + C$
30. $\frac{1}{2} (2 \tan x - x) + C$
31. $-\frac{1}{3} \cot^3 x + C$
32. $\frac{2\sqrt{\sin x}(\cos^2 x + 4)}{5} + C$
33. $\frac{1}{4} \ln |1 - 4 \cot w| + C$
34. $\frac{-[x \cos x - 2(\sin x - 1)]}{\cos x} + C$
35. $-2 \ln \left| \cot \left(\frac{y}{2} \right) \right| + C$
36. $\ln \sqrt{\sec 2\alpha} + C$
37. $2\sqrt{\sin^2 \theta + 1} + C$
38. $-\frac{1}{2} \cos(e^{2x}) + C$
39. $-\frac{1}{2} \cos(\ln x^2) + C$
40. $\frac{2}{3} \ln |\sec \sqrt{x} + \tan \sqrt{x}| + C$

EJERCICIO 6

1. $\frac{1}{9} \arctan\left(\frac{x}{9}\right) + C$

2. $\frac{1}{b^2} \arctan\left(\frac{y}{b}\right) + C$

3. $\frac{1}{8} \ln\left|\frac{y-4}{y+4}\right| + C$

4. $\frac{1}{20} \ln\left|\frac{5+2x}{5-2x}\right| + C$

5. $\frac{\sqrt{2}}{16} \ln\left|\frac{\sqrt{2x}-4}{\sqrt{2x}+4}\right| + C$

6. $\frac{1}{72} \ln\left|\frac{x-4}{x+4}\right| + C$

7. $\frac{1}{3} \arcsen\frac{3x}{5} + C$

8. $\frac{1}{2} \ln|2x + \sqrt{4x^2 - 7}| + C$

9. $\frac{1}{3} \arcsen\frac{2x}{3} + C$

10. $\frac{\sqrt{2}}{2} \ln|x + \sqrt{x^2 - 4}| + C$

11. $\frac{4}{b^2 m} \arctan\left(\frac{b^2 x}{m}\right) + C$

12. $\frac{1}{2b^2} \ln\left|\frac{v^2 - b^2}{v^2 + b^2}\right| + C$

25. $\frac{e^{2x}}{4} \sqrt{16 - e^{4x}} + 4 \arcsen\left(\frac{e^{2x}}{4}\right) + C$

26. $\frac{x}{2} \sqrt{1 - 2x^2} + \frac{\sqrt{2}}{4} \arcsen\sqrt{2}x + C$

27. $\sqrt{5} \arcsen\left(\frac{\sqrt{10} m}{20}\right) + C$

28. $\left(\frac{2x+1}{4}\right) \sqrt{4x^2 + 4x + 1 - a^2} - \frac{a^2}{4} \ln\left(2x+1 + \sqrt{4x^2 + 4x + 1 - a^2}\right) + C$

29. $\left(\frac{\sqrt{7} x^m}{2m}\right) \sqrt{49x^{2m} + 4} + \left(\frac{2\sqrt{7}}{7m}\right) \ln\left(7x^m + \sqrt{49x^{2m} + 4}\right) + C$

30. $\frac{\sqrt{14}}{14} \arctan\left(\frac{\sqrt{14} t}{7}\right) + C$

13. $\frac{1}{2} \arctan\left(\frac{\ln x}{2}\right) + C$

14. $\frac{1}{2} \ln\left|\frac{1 + \operatorname{sen} x}{1 - \operatorname{sen} x}\right| + C$

15. $\frac{1}{2} \arcsen\left(\frac{x^2}{3}\right) + C$

16. $\frac{5\sqrt{3}}{3} \arcsen(x) + C$

17. $2 \ln\left(\sqrt{e^x} + \sqrt{e^x + 4}\right) + C$

18. $\frac{1}{2} \arcsen\left(\frac{2\sqrt{5}y}{5}\right) + C$

19. $\frac{1}{10a^2} \ln\left|\frac{5+ay}{5-ay}\right| + C$

20. $\frac{\sqrt{3}}{3} \ln|\sqrt{3}t + \sqrt{3t^2 + 5}| + C$

21. $\frac{\sqrt{10}}{20} \ln\left|\frac{\sqrt{10}y+5}{\sqrt{10}y-5}\right| + C$

22. $\frac{\sqrt{3}}{3} \ln|\sqrt{3}x + \sqrt{3x^2 + 4}| + C$

23. $\frac{1}{b^2} \arctan\frac{x}{b^2} + C$

24. $\frac{1}{\sqrt{2}} \arcsen\frac{\sqrt{2}y}{2} + C$

31. $\left(\frac{3}{5}\right) \sqrt{5x^2 - 16} + \left(\frac{2\sqrt{5}}{5}\right) \ln\left(\sqrt{5}x + \sqrt{5x^2 - 16}\right) + C$

32. $-\frac{\sqrt{5}}{20} \ln\left(\frac{\sqrt{5} + \cos 2t}{\sqrt{5} - \cos 2t}\right) + C$

33. $-\arcsen(\cos x) + C$

34. $\frac{t \ln(3t)}{2} \sqrt{t^2 \ln^2(3t) + 4} + 2 \ln\left(t \ln(3t) + \sqrt{t^2 \ln^2(3t) + 4}\right) + C$

EJERCICIO 7

1. $\frac{1}{6} \ln\left|\frac{x}{x+6}\right| + C$

2. $\frac{1}{8} \ln\left|\frac{x}{x+8}\right| + C$

3. $\ln\left|\frac{x+2}{x+3}\right| + C$

4. $\ln\left|\frac{2x+1}{x+1}\right| + C$

5. $\frac{1}{9} \ln\left|\frac{x-2}{x+7}\right| + C$

6. $\frac{1}{7} \ln\left|\frac{2x+1}{x+4}\right| + C$

7. $\frac{1}{2a} \ln\left|\frac{ax+3}{ax+5}\right| + C$

15. $\frac{1}{2} \ln|2x - 1 + \sqrt{4x^2 - 4x + 3}| + C$

16. $\frac{\sqrt{3}}{3} \ln|3z + 2 + \sqrt{9z^2 + 12z}| + C$

17. $\frac{\sqrt{2}}{2} \ln|4x + 1 + 2\sqrt{4x^2 + 2x}| + C$

18. $\ln|2 \ln x + 7 + 2\sqrt{\ln^2 x + 7 \ln x + 6}| + C$

19. $\ln|2w - 9 + 2\sqrt{w^2 - 9w + 5}| + C$

20. $\frac{x+2}{2} \sqrt{x^2 + 4x - 3} - \frac{7}{2} \ln|x + 2 + \sqrt{x^2 + 4x - 3}| + C$

21. $\frac{41\sqrt{2}}{32} \arcsen\left(\frac{\sqrt{41}(4x+3)}{41}\right) + \left(\frac{4x+3}{8}\right) \sqrt{4 - 3x - 2x^2} + C$

8. $3 \ln\left|\frac{e^x + 4}{e^x + 5}\right| + C$

9. $\frac{1}{7} \ln\left|\frac{2w-3}{w-5}\right| + C$

10. $\frac{1}{11} \ln\left|\frac{2\alpha-1}{\alpha-5}\right| + C$

11. $\frac{\sqrt{7}}{7} \arcsen\left(\frac{\sqrt{7}(x-1)}{7}\right) + C$

12. $x + \frac{1}{4} \ln\left|\frac{e^x - 1}{e^x + 3}\right| + C$

13. $\frac{\sqrt{3}}{6} \ln\left|\frac{\operatorname{sen} x - 3 - \sqrt{3}}{\operatorname{sen} x - 3 + \sqrt{3}}\right| + C$

14. $\frac{\sqrt{5}}{5} \arcsen\left(\frac{5w-11}{9}\right) + C$

22. $\left(\frac{2x-3}{4}\right)\sqrt{3x-x^2} + \frac{9}{8}\arcsen\left(\frac{2x-3}{3}\right) + C$
23. $\frac{(3x-2)\sqrt{3x^2-4x}}{6} - \frac{2\sqrt{3}}{9}\ln|3x-2+\sqrt{9x^2-12x}| + C$
24. $\left(\frac{2x^2-1}{8}\right)\sqrt{x^4-x^2-20} - \frac{81}{16}\ln|2x^2-1+2\sqrt{x^4-x^2-20}| + C$
25. $\left(\frac{2x+5}{4}\right)\sqrt{24-5x-x^2} + \frac{121}{8}\arcsen\left(\frac{2x+5}{11}\right) + C$
26. $\left(\frac{2x+3}{8}\right)\sqrt{x^2+3x+8} + \frac{23}{16}\ln|2x+3+2\sqrt{x^2+3x+8}| + C$
27. $2\ln|\sqrt{x-2}+\sqrt{x-4\sqrt{x-2}}| + C$
28. $\frac{1}{n}\left[\left(\frac{e^{nx}-1}{2}\right)\sqrt{3+2e^{nx}-e^{2nx}} + 2\arcsen\left(\frac{e^{nx}-1}{2}\right)\right] + C$
29. $\ln|2y+1+2\sqrt{y^2+y+1}| + C$
30. $\left(\frac{3x+2}{6}\right)\sqrt{3x^2+4x+1} - \frac{\sqrt{3}}{18}\ln|\sqrt{3(3x^2+4x+1)+3x+2}| + C$
31. $\frac{\sqrt{2}}{2}\arcsen\left(\frac{4w-5}{5}\right) + C$
32. $\frac{2\sqrt{a}}{a}\ln|2\sqrt{ax}+3+2\sqrt{ax+3\sqrt{ax}+2}| + C$
33. $\frac{\sqrt{3}}{3}\ln|\sqrt{3}(6y+13)+6\sqrt{3y^2+13y-10}| + C$
34. $\frac{1}{2}\ln\left|\frac{(x+1)^{11}}{(3x+1)^7}\right| + C$
35. $-\frac{1}{6}\ln|(3-x)^5(3+x)^{13}| + C$
36. $-\frac{1}{9}\ln|(3x+4)^5(3x-4)^2| + C$
37. $\ln\left|\frac{e^x(x-\sqrt{3}-2)^{\frac{6\sqrt{3}+7}{2}}}{(x+\sqrt{3}-2)^{\frac{6\sqrt{3}-7}{2}}}\right| + C$
38. $\frac{\sqrt{73}}{438}\ln|(6x+5+\sqrt{73})^{\sqrt{73}+17}(6x+5-\sqrt{73})^{\sqrt{73}-17}| + C$
39. $\frac{1}{5}\ln\left|\frac{(x-6)^{11}}{(x-1)^6}\right| + C$
40. $\frac{1}{3}\ln|x^2+9x-5| + \frac{4\sqrt{101}}{101}\ln\left|\frac{2x+9-\sqrt{101}}{2x+9+\sqrt{101}}\right| + C$
41. $3\sqrt{x^2-4} + 2\ln|x+\sqrt{x^2-4}| + C$
42. $-\frac{11}{3}\arcsen\frac{3x}{2} - \frac{1}{3}\sqrt{4-9x^2} + C$
43. $\frac{5}{4}\ln|4x+\sqrt{16x^2+25}| - \frac{1}{8}\sqrt{16x^2+25} + C$
44. $\frac{3}{2}\sqrt{7-2x^2} + 2\sqrt{2}\arcsen\left(\frac{\sqrt{14}x}{7}\right) + C$
45. $\frac{\sqrt{129}}{2580}\ln\left|\frac{(10x+\sqrt{129}-7)^{67-\sqrt{129}}}{(10x-\sqrt{129}-7)^{67+\sqrt{129}}}\right| + C$
46. $5\sqrt{x^2+3x-5} - \frac{37}{2}\ln|2x+3+2\sqrt{x^2+3x-5}| + C$
47. $\frac{13\sqrt{2}}{8}\ln\left|\frac{4x+5+\sqrt{8(2x^2+5x-1)}}{e^{\frac{2\sqrt{4x^2+10x-2}}{13}}}\right| + C$
48. $-5\sqrt{4-2x-x^2} - 4\arcsen\frac{\sqrt{5}(x+1)}{5} + C$
49. $\frac{7}{2}\ln\left|\frac{e^{\frac{(4x^2-2)\sqrt{x^2-3x+4}}{21}}}{(2x-3+\sqrt{x^2-3x+4})^{-1}}\right| + C$
50. $\frac{175}{16}\ln\left|\frac{e^{\frac{(16x^2+84x-2)\sqrt{x^2+7x+6}}{175}}}{(2x+7+2\sqrt{x^2+7x+6})^{-1}}\right| + C$

CAPÍTULO 8

EJERCICIO 8

1. $\frac{1}{16}\sen^4 4x + C$
2. $-\frac{1}{18}\cos^6 3x + C$
3. $\frac{1}{3a}\cos^3 ax - \frac{1}{a}\cos ax + C$
4. $\frac{1}{15}\cos^3 5x - \frac{1}{5}\cos 5x + C$
5. $\frac{4}{3}\cos^3 \frac{x}{4} - 4\cos \frac{x}{4} + C$
6. $\sen x - \frac{\sen^3 x}{3} + C$
7. $\frac{1}{a}\sen ax - \frac{\sen^3 ax}{3a} + C$

8. $\frac{1}{6} \operatorname{sen} 6x - \frac{\operatorname{sen}^3 6x}{18} + C$

9. $3 \operatorname{sen} \frac{x}{3} - \operatorname{sen}^3 \frac{x}{3} + C$

10. $-\cos x + \frac{2}{3} \cos^3 x - \frac{1}{5} \cos^5 x + C$

11. $-\frac{1}{a} \cos ax + \frac{2}{3a} \cos^3 ax - \frac{1}{5a} \cos^5 ax + C$

12. $-\frac{1}{4} \cos 4x + \frac{1}{6} \cos^3 4x - \frac{1}{20} \cos^5 4x + C$

13. $-2 \cos \frac{x}{2} + \frac{4}{3} \cos^3 \frac{x}{2} - \frac{2}{5} \cos^5 \frac{x}{2} + C$

14. $\operatorname{sen} y - \frac{2}{3} \operatorname{sen}^3 y + \frac{1}{5} \operatorname{sen}^5 y + C$

15. $\frac{1}{b} \operatorname{sen} bx - \frac{2}{3b} \operatorname{sen}^3 bx + \frac{1}{5b} \operatorname{sen}^5 bx + C$

16. $3 \operatorname{sen} \frac{x}{3} - 2 \operatorname{sen}^3 \frac{x}{3} + \frac{3}{5} \operatorname{sen}^5 \frac{x}{3} + C$

17. $\frac{1}{7} \cos^7 \theta - \frac{3}{5} \cos^5 \theta + \cos^3 \theta - \cos \theta + C$

18. $\frac{1}{21} \cos^7 3x - \frac{1}{5} \cos^5 3x + \frac{1}{3} \cos^3 3x - \frac{1}{3} \cos 3x + C$

19. $-\frac{1}{7} \operatorname{sen}^7 y + \frac{3}{5} \operatorname{sen}^5 y - \operatorname{sen}^3 y + \operatorname{sen} y + C$

20. $-\frac{1}{28} \operatorname{sen}^7 4x + \frac{3}{20} \operatorname{sen}^5 4x - \frac{1}{4} \operatorname{sen}^3 4x + \frac{1}{4} \operatorname{sen} 4x + C$

21. $-\frac{1}{24} \cos^6 4x + \frac{1}{32} \cos^8 4x + C$

22. $\frac{1}{6} \operatorname{sen}^6 x - \frac{1}{8} \operatorname{sen}^8 x + C$

23. $\sqrt{\operatorname{sen} 2x} \left(1 - \frac{2 \operatorname{sen}^2 2x}{5} + \frac{\operatorname{sen}^4 2x}{9} \right) + C$

EJERCICIO 9

1. $\frac{1}{10} \tan^2 5x + \frac{1}{5} \ln |\cos 5x| + C$

2. $\tan^2 \frac{x}{2} + 2 \ln \left| \cos \frac{x}{2} \right| + C$

3. $-\frac{1}{8} \cot^2 4x - \frac{1}{4} \ln |\operatorname{sen} 4x| + C$

4. $-\frac{3}{2} \cot^2 \frac{x}{3} - 3 \ln \left| \operatorname{sen} \frac{x}{3} \right| + C$

5. $-\frac{1}{6} \left(\frac{\cot^4 6x}{4} - \frac{\cot^2 6x}{2} - \ln |\operatorname{sen} 6x| \right) + C$

6. $-4 \left(\frac{1}{4} \cot^4 \frac{y}{4} - \frac{1}{2} \cot^2 \frac{y}{4} - \ln \left| \operatorname{sen} \frac{y}{4} \right| \right) + C$

7. $\frac{1}{20} \tan^4 5x - \frac{1}{10} \tan^2 5x + \frac{1}{5} \ln |\sec 5x| + C$

8. $-\frac{1}{15} \cot^3 5x + \frac{1}{5} \cot 5x + x + C$

9. $\frac{1}{18} \tan^3 6x - \frac{1}{6} \tan 6x + x + C$

10. $\frac{1}{6} \tan^2 3x + \frac{1}{6} \cot^2 3x + \frac{4}{3} \ln |\operatorname{sen} 3x| + \frac{4}{3} \ln |\cos 3x| + C =$

$\frac{1}{6} \tan^2 3x + \frac{1}{6} \cot^2 3x + \frac{4}{3} \ln |\operatorname{sen} 6x| + C$

11. $\frac{1}{6} \tan^3 2y + C$

12. $-\frac{1}{9} \cot^3 3y + C$

EJERCICIO 10

1. $\frac{1}{3} \tan 3x + \frac{1}{9} \tan^3 3x + C$

2. $\frac{1}{a} \tan ax + \frac{1}{3a} \tan^3 ax + C$

3. $6 \tan \frac{x}{6} + 2 \tan^3 \frac{x}{6} + C$

4. $-\frac{1}{9} \cot 9x - \frac{1}{27} \cot^3 9x + C$

5. $-\frac{1}{b} \cot bx - \frac{1}{3b} \cot^3 bx + C$

6. $-7 \cot \frac{x}{7} - \frac{7}{3} \cot^3 \frac{x}{7} + C$

7. $\frac{3}{2} \tan \frac{2x}{3} + \frac{1}{2} \tan^3 \frac{2x}{3} + C$

8. $-\frac{4}{5} \cot \frac{5x}{4} - \frac{4}{15} \cot^3 \frac{5x}{4} + C$

9. $\frac{1}{24} \tan^3 8x + \frac{1}{40} \tan^5 8x + C$

10. $\frac{1}{3a} \tan^3 ax + \frac{1}{5a} \tan^5 ax + C$

11. $\frac{7}{3} \tan^3 \frac{x}{7} + \frac{7}{5} \tan^5 \frac{x}{7} + C$

12. $\frac{1}{5} \tan^3 \frac{5x}{3} + \frac{3}{25} \tan^5 \frac{5x}{3} + C$

13. $\frac{1}{25} \sec^5 5x - \frac{1}{15} \sec^3 5x + C$

14. $\frac{1}{5b} \sec^5 bx - \frac{1}{3b} \sec^3 bx + C$

15. $\frac{6}{5} \sec^5 \frac{x}{6} - 2 \sec^3 \frac{x}{6} + C$

16. $\frac{7}{20} \sec^5 \frac{4x}{7} - \frac{7}{12} \sec^3 \frac{4x}{7} + C$

17. $-\frac{1}{5b} \csc^5 bx + \frac{1}{3b} \csc^3 bx + C$

18. $-\frac{1}{20} \csc^5 4x + \frac{1}{12} \csc^3 4x + C$

19. $2 \tan \frac{x}{2} \left(1 + \frac{2}{3} \tan^2 \frac{x}{2} + \frac{1}{5} \tan^4 \frac{x}{2} \right) + C$

20. $-\frac{2}{3} \left[\cot \left(\frac{3\theta}{2} \right) + \frac{1}{3} \cot^3 \left(\frac{3\theta}{2} \right) \right] + C$

21. $\frac{2}{3} \left(\tan x^3 + \frac{1}{3} \tan^3 x^3 \right) + C$

22. $\tan x \left(1 + \frac{2}{3} \tan^2 x + \frac{1}{5} \tan^4 x \right) + C$

23. $\tan \alpha - \frac{1}{5} \tan^3 \alpha + C$

24. $\frac{1}{2} \tan 2t + \frac{1}{6} \tan^3 2t + C$

25. $-\frac{1}{3} \cot(3x-1) - \frac{1}{9} \cot^3(3x-1) + C$

26. $\frac{1}{5} \sec^5 x - \frac{2}{3} \sec^3 x + \sec x + C$

27. $\frac{1}{6} \sec^3 2x + C$

28. $-\frac{1}{7} \csc^7 x + \frac{2}{5} \csc^5 x - \frac{1}{3} \csc^3 x + C$

29. $\frac{1}{21} \sec^7 3x - \frac{2}{15} \sec^5 3x + \frac{1}{9} \sec^3 3x + C$

30. $2\sqrt{\tan x} \left(\frac{1}{9} \tan^4 x + \frac{2}{5} \tan^2 x + 1 \right) + C$

31. $\frac{1}{3} \tan 3t + 2 \cot \left(\frac{t}{2} \right) + \frac{1}{9} \tan^3 3t + \frac{2}{3} \cot^3 \left(\frac{t}{2} \right) + C$

32. $-\frac{1}{2} \cot(2x-1) - \frac{1}{6} \cot^3(2x-1) + C$

33. $-\cot \left(\frac{\theta}{5} \right) \cdot \left[5 + \frac{10}{3} \cot^2 \left(\frac{\theta}{5} \right) + \cot^4 \left(\frac{\theta}{5} \right) \right] + C$

34. $-\cot x \left(\frac{1}{7} \cot^6 x + \frac{3}{5} \cot^4 x + \cot^2 x + 1 \right) + C$

35. $\frac{1}{2} \tan x^2 - \frac{1}{6} \tan^3 x^2 + C$

EJERCICIO 11

1. $\frac{1}{2} x - \frac{1}{12} \operatorname{sen} 6x + C$

2. $\frac{1}{2} x - \frac{1}{4a} \operatorname{sen} 2ax + C$

3. $\frac{1}{2} x - \frac{5}{4} \operatorname{sen} \frac{2}{5} x + C$

4. $\frac{1}{2} x - \frac{1}{3} \operatorname{sen} \frac{3}{2} x + C$

5. $\frac{1}{2} x + \frac{1}{20} \operatorname{sen} 10x + C$

6. $\frac{1}{2} x + \frac{1}{4b} \operatorname{sen} 2bx + C$

7. $\frac{1}{2} x + \frac{7}{4} \operatorname{sen} \frac{2}{7} x + C$

8. $\frac{1}{2} x + \frac{1}{14} \operatorname{sen} 7x + C$

9. $\frac{3}{8} x - \frac{1}{32} \operatorname{sen} 16x + \frac{1}{256} \operatorname{sen} 32x + C$

10. $\frac{3}{8} x - \frac{1}{4a} \operatorname{sen} 2ax + \frac{1}{32a} \operatorname{sen} 4ax + C$

11. $\frac{3}{8} x - \frac{7}{4} \operatorname{sen} \frac{2}{7} x + \frac{7}{32} \operatorname{sen} \frac{4}{7} x + C$

12. $\frac{3}{8} x - \frac{1}{3} \operatorname{sen} \frac{3}{2} x + \frac{1}{24} \operatorname{sen} 3x + C$

13. $\frac{3}{8} x + \frac{1}{36} \operatorname{sen} 18x + \frac{1}{288} \operatorname{sen} 36x + C$

14. $\frac{3}{8} x + \frac{1}{4b} \operatorname{sen} 2bx + \frac{1}{32b} \operatorname{sen} 4bx + C$

15. $\frac{3}{8} x + \frac{3}{4} \operatorname{sen} \frac{2}{3} x + \frac{3}{32} \operatorname{sen} \frac{4}{3} x + C$

16. $\frac{3}{8} x + \frac{3}{20} \operatorname{sen} \frac{10}{3} x + \frac{3}{160} \operatorname{sen} \frac{20}{3} x + C$

17. $\frac{5}{16} x - \frac{1}{4} \operatorname{sen} 2x + \frac{3}{64} \operatorname{sen} 4x + \frac{1}{48} \operatorname{sen}^3 2x + C$

18. $\frac{5}{16} x - \frac{1}{16} \operatorname{sen} 8x + \frac{3}{256} \operatorname{sen} 16x + \frac{1}{192} \operatorname{sen}^3 8x + C$

19. $\frac{5}{16}x - \frac{1}{4a}\text{sen } 2ax + \frac{3}{64a}\text{sen } 4ax + \frac{1}{48a}\text{sen}^3 2ax + C$

20. $\frac{5}{16}x - \text{sen} \frac{1}{2}x + \frac{3}{16}\text{sen } x + \frac{1}{12}\text{sen}^3 \frac{1}{2}x + C$

21. $\frac{5}{16}x - \frac{1}{10}\text{sen } 5x + \frac{3}{160}\text{sen } 10x + \frac{1}{120}\text{sen}^3 5x + C$

22. $\frac{5}{16}x + \frac{1}{4}\text{sen } 2x + \frac{3}{64}\text{sen } 4x - \frac{1}{48}\text{sen}^3 2x + C$

23. $\frac{5}{16}x + \frac{1}{12}\text{sen } 6x + \frac{1}{64}\text{sen } 12x - \frac{1}{144}\text{sen}^3 6x + C$

24. $\frac{5}{16}x + \frac{1}{4b}\text{sen } 2bx + \frac{3}{64b}\text{sen } 4bx - \frac{1}{48b}\text{sen}^3 2bx + C$

25. $\frac{5}{16}x + \frac{1}{2}\text{sen } x + \frac{3}{32}\text{sen } 2x - \frac{1}{24}\text{sen}^3 x + C$

26. $\frac{5}{16}x + \frac{5}{8}\text{sen} \frac{4}{5}x + \frac{15}{128}\text{sen} \frac{8}{5}x - \frac{5}{96}\text{sen}^3 \frac{4}{5}x + C$

27. $\frac{5}{16}x + \frac{1}{4}\text{sen } 2x + \frac{3}{64}\text{sen } 4x - \frac{1}{48}\text{sen}^3 2x + C$

28. $\frac{3}{8}x - \frac{1}{12}\text{sen } 6x + \frac{1}{96}\text{sen } 12x + C$

29. $\frac{1}{2}y - \frac{1}{4}\text{sen } 2y + C = \frac{3}{8}y - \frac{1}{2}\text{sen } y + \frac{1}{16}\text{sen } 2y + C$

30. $\frac{1}{2}(x - \text{sen } x \cos x) + C$

31. $\frac{3}{8}x + \frac{1}{12}\text{sen } 6x + \frac{1}{96}\text{sen } 12x + C$

32. $x + \text{sen } x + C$

33. $\frac{19}{2}\alpha - 6 \text{sen } \alpha + \frac{1}{4}\text{sen } 2\alpha + C$

34. $\frac{5}{2}x - \frac{3}{4}\text{sen } 2x - 4 \cos x + \frac{1}{3}\cos^3 x + C$

35. $\frac{x}{8} - \frac{b}{32}\text{sen}\left(\frac{4x}{b}\right) + C$

36. $\frac{\theta}{2} - \frac{3}{4}\text{sen}\left(\frac{2\theta}{3}\right) + 4 \cos^{\frac{3}{2}}\left(\frac{\theta}{3}\right) + 3 \text{sen}\left(\frac{\theta}{3}\right) + C$

37. $\frac{35}{128}x + \frac{1}{4}\text{sen } 2x + \frac{7}{128}\text{sen } 4x - \frac{1}{24}\text{sen}^3 2x + \frac{1}{1024}\text{sen } 8x + C$

EJERCICIO 12

1. $\frac{1}{10}[5 \text{sen } x - \text{sen } 5x] + C = \frac{\text{sen } x}{2} - \frac{\text{sen } 5x}{10} + C$

2. $-\frac{1}{8}[\cos 4x - 2 \cos 2x] + C = -\frac{\cos 4x}{8} + \frac{\cos 2x}{4} + C$

3. $\frac{1}{8}\text{sen } 4x - \frac{1}{12}\text{sen } 6x + C$

4. $\frac{1}{20}\text{sen } 10y + \frac{1}{8}\text{sen } 4y + C$

5. $-\frac{1}{14}\cos 7x + \frac{1}{6}\cos 3x + C$

6. $-\frac{3}{7}\cos\left(\frac{7\alpha}{6}\right) - 3\cos\left(\frac{\alpha}{6}\right) + C$

7. $\frac{10}{17}\text{sen}\left(\frac{17}{20}w\right) + \frac{10}{7}\text{sen}\left(\frac{7}{20}w\right) + C$

8. $\frac{x \cos 2b}{2} - \frac{\text{sen } 2mx}{4m} + C$

9. $\frac{x \cos 8}{2} - \frac{\text{sen } 6x}{12} + C$

10. $\frac{1}{24}\cos 6w - \frac{1}{16}\cos 4w - \frac{1}{8}\cos 2w + C$

CAPÍTULO 9**EJERCICIO 13**

1. $\frac{1}{6} \ln \left| \frac{\sqrt{x^2 + 36} - 6}{x} \right| + C$

2. $\frac{w}{5\sqrt{w^2 + 5}} + C$

3. $-\frac{y}{\sqrt{y^2 + 3}} + \ln(\sqrt{y^2 + 3} + y) + C$

4. $8 \arcsen\left(\frac{x}{4}\right) - \frac{x\sqrt{16 - x^2}}{2} + C$

5. $-\frac{\sqrt{y^2 + 25}}{25y} + C$

6. $-\frac{\sqrt{(36 - 25x^2)^5}}{180x^5} + C$

7. $6 \arcsen\left(\frac{\alpha - 2}{2}\right) - \frac{(\alpha + 6)\sqrt{4\alpha - \alpha^2}}{2} + C$

8. $\frac{1}{4} \ln \left| \frac{\sqrt{25x^2 + 16} - 4}{5x} \right| + C$

9. $\frac{(x^2 + 32)\sqrt{x^2 - 16}}{3} + C$

10. $-\frac{\sqrt{5 - \theta^2}}{\theta} - \arcsen\left(\frac{\sqrt{5} \theta}{5}\right) + C$

11. $\sqrt{x^2 + 16} + 4 \ln \left| \frac{\sqrt{x^2 + 16} - 4}{x} \right| + C$

12. $-\frac{\sqrt{7-x^2}}{7x} + C$

13. $\frac{y}{\sqrt{9-y^2}} - \arcsen \frac{y}{3} + C$

14. $\frac{1}{5}(3-y^2)^{\frac{5}{2}} - (3-y^2)^{\frac{3}{2}} + C$

15. $\frac{27}{2} \arcsen \frac{x-3}{3} - \frac{(x+9)\sqrt{6x-x^2}}{2} + C$

16. $\frac{(w^2-14)\sqrt{w^2+7}}{3} + C$

17. $\frac{27}{8} \arcsen \left(\frac{\sqrt{3}x}{3} \right) - \left(\frac{2x^3+9x}{8} \right) \sqrt{3-x^2} + C$

18. $\frac{\sqrt{11}}{242} \arcsen \left(\frac{\sqrt{11x^2-121}}{11} \right) + \frac{\sqrt{x^2-11}}{22x^2} + C$

19. $\frac{(3x^2-8)(x^2+4)^{\frac{3}{2}}}{15} + C$

20. $2 \arcsen \left[\frac{\sqrt{2}(\ln w - 2)}{4} \right] - \sqrt{4 + 4 \ln w - \ln^2 w} + C$

EJERCICIO 14

1. $\frac{1}{3} e^{3x} \left(x - \frac{1}{3} \right) + C$

2. $\frac{1}{a} e^{ax} \left(x - \frac{1}{a} \right) + C$

3. $3e^{\frac{x}{3}} (x-3) + C$

4. $-\frac{x}{5} \cos 5x + \frac{1}{25} \sen 5x + C$

5. $-\frac{x}{a} \cos ax + \frac{1}{a^2} \sen ax + C$

6. $-4x \cos \frac{x}{4} + 16 \sen \frac{x}{4} + C$

7. $\frac{x}{4} \sen 4x + \frac{1}{16} \cos 4x + C$

8. $\frac{x}{b} \sen bx + \frac{1}{b^2} \cos bx + C$

9. $3x \sen \frac{x}{3} + 9 \cos \frac{x}{3} + C$

10. $\frac{x^3}{3} \left(\ln|x| - \frac{1}{3} \right) + C$

11. $x^2(\ln x^2 - 1) + C$

12. $\frac{x^6}{6} \left(\ln|x| - \frac{1}{6} \right) + C$

13. $\frac{x^5}{5} \left(\ln|5x| - \frac{1}{5} \right) + C$

14. $\frac{x^{n+1}}{n+1} \left(\ln x - \frac{1}{n+1} \right) + C$

15. $e^x(x^2 - 2x + 2) + C$

16. $\frac{e^{3y}}{3} \left(y^2 - \frac{2}{3}y + \frac{2}{9} \right) + C$

17. $\frac{e^{4x}}{4} \left(x^3 - \frac{3}{4}x^2 + \frac{3}{8}x - \frac{3}{32} \right) + C$

18. $-\frac{x^2}{3} \cos 3x + \frac{2}{27} \cos 3x + \frac{2}{9} x \sen 3x + C$

19. $-\frac{x^2}{b} \cos bx + \frac{2}{b^3} \cos bx + \frac{2}{b^2} x \sen bx + C$

20. $2x^3 \sen \frac{x}{2} + 12x^2 \cos \frac{x}{2} - 96 \cos \frac{x}{2} - 48x \sen \frac{x}{2} + C$

21. $-\frac{1}{a} x \cot ax + \frac{1}{a^2} \ln|\sen ax| + C$

22. $\frac{1}{m} y \tan my - \frac{1}{m^2} \ln|\sec my| + C$

23. $x \arcsen ax - \frac{1}{a} \sqrt{1-a^2x^2} + C$

24. $x \arcsen bx + \frac{1}{b} \sqrt{1-b^2x^2} + C$

25. $x \arcsen ax - \frac{1}{2a} \ln(1+a^2x^2) + C$

26. $x \arcsen mx - \frac{1}{m} \ln|mx + \sqrt{m^2x^2-1}| + C$

27. $x \arcsen \frac{x}{n} + \frac{n}{2} \ln|n^2+x^2| + C$

28. $\frac{1}{4} e^{2\theta} (\sen 2\theta - \cos 2\theta) + C$

29. $\frac{1}{25} e^{3x} (4 \sen 4x + 3 \cos 4x) + C$

30. $\frac{2(5t-6)\sqrt{5t+3}}{75} + C$

31. $-\frac{(3ax+b)}{6a^2(ax+b)^3} + C$

32. $-\frac{24x^2+8x+1}{96(2x+1)^4} + C$

33. $\ln y [\ln(\ln|y|) - 1] + C$

34. $-\frac{3}{8} (2x^2 - 2x + 1)e^{2x} + \frac{1}{2} x^3 e^{2x} + C$

35. $2\sqrt{x} \arccos \sqrt{x} - 2\sqrt{1-x} + C$

36. $\frac{2}{5}e^{2x} \cos x + \frac{1}{5}e^{2x} \sin x + C$

37. $y(\arccos y)^2 - 2(\arccos y)\sqrt{1-y^2} - 2y + C$

38. $-\frac{\arccos x}{x} - \ln \left| \frac{1-\sqrt{1-x^2}}{x} \right| + C$

39. $-\frac{1}{2}w\sqrt{16-w^2} + 8 \arcsin \left(\frac{w}{4} \right) + C$

40. $\frac{1}{2}x - \frac{1}{10}x \cos 2(\ln x) - \frac{1}{5}x \sin 2(\ln x) + C =$

$$\frac{2}{5}x \cos(\ln x^2) + x \sin^2(\ln|x|) - \frac{1}{5}x \sin(\ln x^2) + C$$

EJERCICIO 15

1. $\ln \frac{x^2(x+2)}{(x+1)^3} + C$

2. $\ln \frac{(2x+1)^{\frac{3}{2}}(2x-1)^{\frac{1}{2}}}{x} + C$

3. $\ln \frac{(x-3)^4(x-2)^2}{x^3} + C$

4. $\ln \frac{(x-2)^3}{x^3(x+2)^2} + C$

5. $\ln \frac{x(x+3)}{(x-3)^2} + C$

6. $\ln x^2(x-1)(x+2)^4 + C$

7. $\ln x^5(2x-1)^2(x-3) + C$

8. $\ln \frac{(2x+3)^{\frac{5}{2}}}{(x+2)^3} - \frac{2}{x+2} + C$

9. $\ln(x-2)^2 - \frac{3}{(x-2)} - \frac{1}{(x-2)^2} + C$

10. $\ln(x-3)^2 - \frac{2}{(x-3)} - \frac{1}{(x-3)^2} + C$

11. $\ln \frac{(x+1)^2}{x} - \frac{1}{x+1} + C$

12. $\frac{1}{m-n} \ln \left| \frac{y-m}{y-n} \right| + C$

13. $w - 5 \ln \left| \frac{w-4}{w-5} \right| + C$

14. $\frac{1}{2} \ln \left| \frac{(y-3)(y-1)}{(y-2)^2} \right| + C$

15. $\frac{4}{x-3} + \frac{1}{3} \ln \left| \frac{x}{x-3} \right| + C$

16. $3 \ln \left| \frac{\sqrt{w^2-1}}{w} \right| + C$

17. $\frac{1}{2} \ln |(x-2)^6(2x+1)^3| + C$

18. $\frac{1}{4} \ln[(w-6)^3(w+6)] - \frac{3}{w-6} + C$

19. $\frac{1}{3} \ln \left| \frac{(4x-1)^3}{3x-1} \right| + C$

20. $\frac{1}{10} \ln \left| \frac{1}{(x+4)^3(3x+2)^{\frac{1}{3}}} \right| - \frac{2}{x+4} + C$

21. $-5 \ln \left| \frac{(x-3)^2}{(x-5)^3} \right| + C$

22. $\frac{x^3}{6} + \frac{27}{16}x^2 + \frac{211}{32}x + \frac{595}{128} \ln|4x-1| + C$

23. $\frac{1}{32} \ln \left| \frac{x^2}{16-x^2} \right| + C$

24. $\frac{1}{30} \ln \left[\frac{x^{25}(2-x)^9}{(x+3)^{34}} \right] + C$

25. $\frac{1}{1-m} + \ln|1-m| + C$

26. $\frac{1}{20} \ln \left| \frac{y-5}{y+5} \right| - \frac{1}{2(y+5)} + C$

27. $\frac{1}{18} \ln \left| \frac{x}{x+6} \right| - \frac{2}{3(x+6)} + C$

28. $\frac{1}{8} \ln|2x-1| - \frac{8x+1}{16(2x-1)^2} + C$

29. $\frac{x^2}{2} + 4x - \frac{60x^2 - 105x + 49}{6(x-1)^3} + 10 \ln|x-1| + C$

30. $\ln \sqrt{x^2-9} - \frac{9}{2x^2-18} + C$

31. $\frac{1}{8x^2} + \frac{1}{4x} + \frac{7}{8(x-2)} + \frac{3}{16} \left[\ln \left| \frac{x-2}{x} \right| \right] + C$

EJERCICIO 16

- $\ln \left| \frac{m+1}{m} \right| - \frac{1}{m} + C$
- $\frac{1}{2} \ln \left| \frac{m^2}{m^2+1} \right| + C$
- $\frac{x^3}{3} + \frac{1}{3} \ln \left| \frac{x^4}{(x^2-6)^{11}} \right| + C$
- $2x + \frac{1}{3} \arctan \left(\frac{x}{3} \right) + \ln \left(\frac{x^2}{\sqrt{x^2+9}} \right) - \frac{1}{2(x^2+9)} + C$
- $\frac{1}{4} \ln \left| \frac{y-2}{y+2} \right| - \frac{1}{2} \arctan \left(\frac{y}{2} \right) + C$
- $\frac{x^2}{2} + x - 4 \ln |x^2 + 9| - \frac{8}{3} \arctan \left(\frac{x}{3} \right) + C$
- $2 \ln \left| \frac{2+x}{2-x} \right| + 2 \arctan \left(\frac{x}{2} \right) + C$
- $\frac{1}{2} \ln |y^2 + 1| - \frac{2}{y^2 + 1} + C$
- $\frac{1}{6} \ln \left| \frac{(x-2)^6 (x+2)^2 (x+1)^3}{(x-1)^5} \right| + C$
- $\frac{1}{24} \ln \left| \frac{(x-2)^2}{x^2 + 2x + 4} \right| - \frac{\sqrt{3}}{12} \arctan \left(\frac{\sqrt{3}(x+1)}{3} \right) + C$
- $\frac{1}{4} \ln \left| \frac{1+y^2}{1-y^2} \right| - \frac{y^2}{2} + C$
- $2 \ln |x| + \frac{5\sqrt{2}}{2} \arctan \left(\frac{\sqrt{2}x}{2} \right) + C$
- $\ln |(x^2+1)(x-1)^3| - \frac{1+2x}{2(x^2+1)} + C$
- $\frac{9\sqrt{2}}{16} \ln \left(\frac{x+1-\sqrt{2}}{x+1+\sqrt{2}} \right) - \frac{1}{4} \left(\frac{3x+1}{x^2+2x-1} \right) + C$
- $\ln \left| \frac{x-4}{x-2} \right| + \frac{3}{4(x-2)} + \frac{1}{4(x-4)} + C$
- $\frac{1}{32} \ln \left| \frac{(x+2)^2}{x^2+2x+4} \right| + \frac{5\sqrt{3}}{144} \arctan \left(\frac{\sqrt{3}(x+1)}{3} \right) + \frac{x+4}{24(x^2+2x+4)} + C$
- $\frac{x-8}{8(x^2+4)} + \frac{1}{16} \arctan \left(\frac{x}{2} \right) + \ln \left| \sqrt{x^2+4}(x+1)^3 \right| + C$
- $\frac{1}{2} \ln |x^4(x^2+5)| + \frac{\sqrt{5}}{5} \arctan \left(\frac{\sqrt{5}x}{5} \right) + \frac{3}{2(x^2+5)} + C$
- $-\frac{(3x^2+10)}{50x(x^2+5)} + \frac{3\sqrt{5}}{250} \arctan \left(\frac{\sqrt{5}x}{5} \right) + C$
- No se incluye solución por ser demostración.

EJERCICIO 17

- $\frac{9}{2} \left[x^{\frac{2}{3}} - \ln \left| x^{\frac{2}{3}} + 1 \right| \right] + C$
 - $\frac{5}{3} x^{\frac{3}{5}} - \frac{5}{3} \ln \left| x^{\frac{3}{5}} + 1 \right| + C$
 - $\frac{(3x+1)^{\frac{5}{3}}}{15} - \frac{(3x+1)^{\frac{2}{3}}}{6} + C$
 - $\sqrt{1+x^3} \left[\frac{1}{5} (1+x^3)^2 - \frac{2}{3} (1+x^3) + 1 \right] + C$
 - $6 \left(x^{\frac{1}{6}} - \arctan x^{\frac{1}{6}} \right) + C$
 - $x^{\frac{5}{6}} \sqrt{x^{\frac{1}{3}} + 4} - 5x^{\frac{1}{6}} \left(x^{\frac{1}{3}} - 6 \right) \sqrt{x^{\frac{1}{3}} + 4} - 120 \ln \left| x^{\frac{1}{6}} + \sqrt{x^{\frac{1}{3}} + 4} \right| + C$
 - $2\sqrt{x} + 3x^{\frac{1}{3}} + 6x^{\frac{1}{6}} + 6 \ln \left| x^{\frac{1}{6}} - 1 \right| + C$
 - $\frac{3}{2} x^{\frac{2}{3}} + 2x^{\frac{1}{2}} - 3x^{\frac{1}{3}} - 18x^{\frac{1}{6}} + \ln \left| \frac{ce^{\frac{66\sqrt{7}}{7} \arctan \frac{2x^{\frac{1}{6}}-1}{\sqrt{7}}}}{\left(x^{\frac{1}{3}} - x^{\frac{1}{6}} + 2 \right)^3} \right| + C$
 - $2x^{\frac{1}{4}} \left(x^{\frac{1}{4}} + 4 \right) + 14 \ln \left| x^{\frac{1}{2}} - 2x^{\frac{1}{4}} - 3 \right| + 13 \ln \left| \frac{x^{\frac{1}{4}} - 3}{x^{\frac{1}{4}} + 1} \right| + C$
 - $\frac{3}{7} x^{\frac{7}{6}} - \frac{3}{10} x^{\frac{5}{6}} + \frac{1}{4} x^{\frac{1}{2}} - \frac{3}{8} x^{\frac{1}{6}} + \frac{3\sqrt{2}}{16} \arctan \sqrt{2} x^{\frac{1}{6}} + C$
 - $4\sqrt{x} - 2\sqrt{5} \arctan \frac{\sqrt{5}\sqrt{x}}{5} + C$
 - $2(x-3)^{\frac{1}{2}} - 4(x-3)^{\frac{1}{4}} + 4 \ln \left| (x-3)^{\frac{1}{4}} + 1 \right| + C$
 - $2\sqrt{t+2} - \frac{\sqrt{2}}{2} \ln \left| \frac{\sqrt{t+2} - \sqrt{2}}{\sqrt{t+2} + \sqrt{2}} \right| + C$
- 14 a 15. No se incluye solución por ser demostraciones.

EJERCICIO 18

- $-\frac{4+3y^2}{3\sqrt{(2+y^2)^3}} + C$
- $-\frac{1}{375} (15x^2+14)(7-5x^2)^{\frac{3}{2}} + C$
- $\frac{4}{9} \left[\frac{x^3+36}{\sqrt[4]{90+x^3}} \right] + C$

$$4. \frac{3}{1280}(20x^2 - 9)(3 + 4x^2)^{\frac{5}{3}} + C$$

$$5. \frac{x\sqrt{x^2+1}}{2} - \frac{1}{2}\ln|\sqrt{x^2+1}+x| + C$$

$$6. 2\ln\left(\frac{\sqrt{4+3x^4}-2}{\sqrt{4+3x^4}+2}\right)e^{\frac{\sqrt{4+3x^4}(16+3x^4)}{12}} + C$$

$$7. \frac{1}{2}\left[\ln\left|\frac{\sqrt[4]{x^5+16}-2}{\sqrt[4]{x^5+16}+2}\right| + \arctan\left(\frac{\sqrt[4]{x^5+16}}{2}\right)\right] + C$$

$$8. -\frac{(4-x^4)^{\frac{1}{4}}}{4x} + C$$

$$9. (3+x)^{\frac{8}{3}}\left[\frac{3}{14}(3+x)^2 - \frac{18}{11}(3+x) + \frac{27}{8}\right] + C$$

EJERCICIO 19

$$1. \frac{1}{3}\ln\left|\frac{3+\tan\frac{\theta}{2}}{3-\tan\frac{\theta}{2}}\right| + C$$

$$2. \frac{\sqrt{3}}{3}\ln\left|\frac{\sqrt{3}+\tan\frac{\theta}{2}}{\sqrt{3}-\tan\frac{\theta}{2}}\right| + C$$

$$3. \frac{1}{8}\ln\left|\frac{\tan\alpha}{\tan\alpha+8}\right| + C$$

$$4. \ln\left|\frac{\tan\frac{x}{2}}{\tan\frac{x}{2}+1}\right| + C$$

$$5. -\frac{2\left[3\tan^2\left(\frac{\beta}{2}\right)+3\tan\left(\frac{\beta}{2}\right)+2\right]}{\left[\tan\left(\frac{\beta}{2}\right)+1\right]^3} + C$$

$$6. \ln\left|\frac{1}{1-\cot\frac{w}{2}}\right| + C$$

$$7. \frac{1}{2}\ln\left|\frac{\tan^2\frac{\theta}{2}+1}{1-2\tan\frac{\theta}{2}-\tan^2\frac{\theta}{2}}\right| + \frac{\theta}{2} + C$$

$$8. \frac{\sqrt{10}}{10}\ln\left|\frac{3-\sqrt{10}+\tan\frac{\theta}{2}}{3+\sqrt{10}+\tan\frac{\theta}{2}}\right| + C$$

$$9. \frac{1}{2}\ln|1+2\tan\theta| + C$$

$$10. \frac{8}{15}\sqrt{15}\arctan\left[\frac{\sqrt{15}\tan\left(\frac{\theta}{2}\right)}{3}\right] - \theta + C$$

$$11. \frac{2\sqrt{11}}{11}\arctan\left[\frac{\sqrt{11}\left(2\tan\left(\frac{\alpha}{2}\right)-3\right)}{11}\right] + C$$

$$12. \frac{x}{2} - \frac{3\sqrt{5}}{5}\arctan\left(\frac{\sqrt{5}\tan\frac{x}{2}}{5}\right) + C$$

$$13. \ln\left[\cos^2\left(\frac{\beta}{2}\right)\right] \cdot \left[\tan\left(\frac{\beta}{2}\right)+\sqrt{2}-1\right] \cdot \left[\tan\left(\frac{\beta}{2}\right)-\sqrt{2}-1\right] + C$$

$$14. \frac{1}{2}\ln\left|\frac{\tan^2\left(\frac{\theta}{2}\right)+2\tan\left(\frac{\theta}{2}\right)-1}{\tan^2\left(\frac{\theta}{2}\right)+1}\right| + \frac{\theta}{2} + C$$

$$15. \ln\left|\frac{\left[\tan\left(\frac{\theta}{2}\right)+3\right]\left[3\tan\left(\frac{\theta}{2}\right)-1\right]}{\sec^2\left(\frac{\theta}{2}\right)}\right| + C$$

$$16. \frac{\sqrt{21}}{21}\ln\left|\frac{2\tan w - \sqrt{21}-5}{2\tan w + \sqrt{21}-5}\right| + C$$

CAPÍTULO 10**EJERCICIO 20**

$$1. 2y = x^2 + 6x - 8$$

$$2. f(x) = \sin\left(x - \frac{\pi}{2}\right) + 2$$

$$3. y = e^x(x-1) - e^3$$

$$4. x\left(y+3\arcsen\frac{3x}{2a}-3\pi\right) + \sqrt{4a^2-9x^2} = 0$$

$$5. x = y^3 - 2y^2 - 2$$

$$6. x = \frac{3}{2-y} - \ln(2-y)(y+1)^2 - 3$$

7. $y = \frac{(x^2 - 9)^{\frac{3}{2}}}{3} - \frac{62}{3}$

8. $16x = 28 - 3\pi + 6y - 8 \operatorname{sen} y + \operatorname{sen} 2y$

9. $y = \frac{4 + 3x}{2 - x}$

10. $y = 4e^{2(x - \arcsin x)}$

11. $x^3 + 3 \cot y - 3 = 0$

12. $s(t) = 11t - 15$

13. $60 \frac{\text{m}}{\text{s}}$

14. $10 \frac{2}{3} \text{m}$

15. $T = 64^\circ - 2t^2$

16. 176.4 m

17. 75.776 m; $39.36 \frac{\text{m}}{\text{s}}$

EJERCICIO 21

1. $-\frac{4}{3}$

2. 20

3. $\frac{88}{3}$

4. 6

5. $-\frac{1}{2}$

6. 6

7. $-\ln \sqrt[4]{7}$

8. $\ln 2 - \frac{1}{2}$

9. $\sqrt{2}$

10. $\ln \sqrt{\frac{8}{5}}$

11. $\frac{2}{e} \left(e^{\frac{5}{2}} - 1 \right)$

12. $4e^5$

13. $-\frac{1}{4}$

14. $\ln \left(\frac{8}{5} \right)$

15. $\frac{\pi}{3}$

16. $\operatorname{sen}(2) - \operatorname{sen}(1)$

17. $\frac{\sqrt{2}}{2}$

18. $\ln(432)$

19. $\frac{\pi + 2}{8}$

20. $\frac{1}{2} \left(\frac{3}{2} - \ln(2) \right)$

EJERCICIO 22

1. $18u^2$

2. $9u^2$

3. $\frac{609}{4} u^2$

4. $18u^2$

5. $\frac{32}{3} u^2$

6. $9u^2$

7. $\frac{16}{3} u^2$

8. $18u^2$

9. $1u^2$

10. $\frac{16}{3} u^2$

11. $6u^2$

12. $\frac{14}{3} u^2$

13. $8u^2$

14. $36u^2$

15. $\ln(16) = 2.77u^2$

16. $\frac{1}{2} u^2$

17. $\frac{8}{a} u^2$ con $a \neq 0$

18. $(2 - \ln 3)u^2 = 0.901u^2$

19. $9u^2$

20. $1.388u^2$

21. $(\ln 256 - 3)u^2 = 2.54u^2$

22. $\frac{\pi}{12} = 0.261u^2$

23. $2(3 - \sqrt{5})u^2$

24. $6u^2$

25. $\frac{1}{2}(e - 1) = 0.859u^2$

26. $\sqrt{3} - \frac{\pi}{3} = 0.684u^2$

27. $2\pi u^2$

28. $\frac{\pi^2 - 8}{4} = 0.467u^2$

29. $\ln \left(\frac{147}{25} \right) = 1.77u^2$

30. $\ln \left(\frac{16}{3} \right) = 1.673u^2$

31. $(3e^{-2} - 1)u^2$

32. $\left(2 + \ln \left(\frac{3}{2} \right) \right) = 2.405u^2$

33. $3(e^2 - e)u^2$

34. $(ab\pi)u^2$

EJERCICIO 23

1. $8.72u^2$

2. $10u^2$

3. $0.836u^2$

4. $2.413u^2$

5. $1.519u^2$

6. $2.6439u^2$

7. $685.0499u^2$

EJERCICIO 24

1. $1.139u^2$

2. $14.226u^2$

3. $3.5226u^2$

4. $3.2069u^2$

5. $1.2499u^2$

EJERCICIO 25

- $\frac{9}{2}u^2$
- $\frac{5}{12}u^2$
- $\frac{8}{3}u^2$
- $9u^2$
- $\frac{103}{18}u^2$
- $3\left(\frac{3\pi}{2}-1\right)u^2$
- $21.849u^2$
- $13.33u^2$
- $(8\pi-16)u^2$
- $\left[\frac{11}{4}-6\ln\left(\frac{3}{2}\right)\right]u^2$
- $1.94u^2$
- $\frac{4}{3}(3\pi-2)u^2$
- $32u^2$

EJERCICIO 26

- $8\pi u^3$
- $\frac{81}{2}\pi u^3$
- $\frac{243}{5}\pi u^3$
- $\frac{32}{5}\pi u^3$
- $\frac{96}{5}\pi u^3$
- $128\pi u^3$
- $8\pi u^3$
- $\frac{512}{15}\pi u^3$
- $\frac{28}{3}\pi u^3$
- $\frac{51}{8}\pi u^3$
- $60\pi u^3$
- $\frac{3}{10}\pi u^3$
- $\frac{3}{10}\pi u^3$
- $\frac{384}{5}\pi u^3$
- $\frac{108}{5}\pi u^3$
- $\frac{81}{5}\pi u^3$
- $6\pi^2 u^3$
- $90\pi u^3$
- $128\pi^2 u^3$
- $4\pi^2 u^3$

EJERCICIO 27

- $7.6337u$
- $1.4789u$
- $4.66u$
- $4.1493u$
- $4u$
- $\ln|\sqrt{2}+1| \approx .8813u$
- $-\ln|2-\sqrt{3}| \approx 1.3169u$
- $5.2563u$
- $1.2027u$
- $\frac{393}{20}u$

EJERCICIO 28

- a) $C(x) = 4 + 20x - \frac{x^2}{2} - \frac{x^3}{3}$
b) \$49.83
- $I(x) = x^3 - x^2 + 5x$
- a) $C(x) = 800(1.00501)^x + 200$
b) \$9945.99
- $\begin{cases} I(x) = 4x^3 - 18x^2 + 35x \\ p(x) = 4x^2 - 18x + 35 \end{cases}$
- a) $C(x) = 5\sqrt{2x+1} + 8$
b) \$113.00
- a) $P(t) = \frac{2720}{3t+2}$
b) \$160.00
- \$64.00

CAPÍTULO 11**EJERCICIO 29**

- $3x^4 - 4y^3 = C$
- $(1-x^3)^2 = Ce^{-y^2}$
- $y^3 - 6x^3 + 15y = C$
- $\frac{(x-2)(y+2)}{(x+2)(y-2)} = C$, o $\frac{(x+2)(y-2)}{(x-2)(y+2)} = C$
- $x(9+y^2)^2 = C$
- $(x+2)^2 + (y+2)^2 = C - \ln[(y-2)(x-2)]^8$
- $\sqrt{x^2-2} + \sqrt{y^2-2} = C$
- $2 - 3e^{3y} = Ce^{-9x}$
- $\tan y - \operatorname{sen} x \cdot \cos x = C$
- $\frac{1}{\operatorname{sen}(x+y)} - \cot(x+y) = x + C$
- $\left(\frac{x}{x-6}\right)^2 \left(\frac{y-4}{y}\right)^3 = C$

12. $4x^4 - y^4 = C$

13. $y^4 + 4y = 4x^2 + 4x + C$

14. $y = Ce^{e^x}$

15. $x^3y^2 = C$

16. $3y + 12 \ln y = x^3 - 3x + C$

17. $\sqrt{\csc 2y - \cot 2y} = Ce^{\frac{x}{3}}$

18. $2e^{3y} - 3e^{2x} = C$

19. $x = e^{\frac{x}{y}}$

20. $e^y(y-1) + \ln(e^{-x}+1) = C$

EJERCICIO 30

1. $Cx^2 - 2x - y = 0$

2. $y = \frac{2Cx^3}{1-Cx^2}$

3. $Cx^4 - 2x^2 - y^2 = 0$

4. $y = \frac{x - Cx^{\frac{1}{2}}}{3}$

5. $Cx^4 + 3x^2 - y^2 = 0$

6. $y = e^{\frac{2Cy^2 - x^2}{2y^2}}$

7. $\ln x - \frac{x}{y-2x} = C$

8. $y = -\frac{\sqrt{3}}{2} x \tan\left(\frac{\sqrt{3}}{2} \ln Cy\right) + \frac{x}{2}$

9. $y = x \tan(\ln C(y^2 + x^2)^4)$

10. $x^4 = Ce^{\frac{\cos x}{4}}$

11. $y^2 - 2xy + 2x^2 = C$

12. $y = Cx^2 - \sqrt{x^2 + y^2}$

13. $y^2 + 2xy - x^2 = C$

14. $\ln|x| + e^{-\frac{x}{y}} = C$

15. $x^2 - y^2 = C$

16. $x + 2y + 3 \ln|x + y - 2| + C$

17. $x^2 + 2xy - y^2 - 4x + 8y = C$

18. $x + 3y + 2 \ln(2 - x - y) = C$

19. $(4y - x - 3)(y + 2x - 3)^2 = C$