**33** 36 min **35** 27
**37** **(a)** 40.96°F **(b)** 6909 pies **39** 37°F

### EJERCICIOS 2.3

**1** $-\frac{3}{2}, \frac{4}{3}$ **3** $-\frac{6}{5}, \frac{2}{3}$ **5** $-\frac{9}{2}, \frac{3}{4}$ **7** $-\frac{2}{3}, \frac{1}{5}$
**9** $-\frac{5}{2}$ **11** $-\frac{1}{2}$ **13** $-\frac{34}{5}$
**15** **(a)** No, $-4$ no es una solución de $x = 4$. **(b)** Sí
**17** $\pm 13$ **19** $\pm\frac{3}{5}$ **21** $3 \pm \sqrt{17}$ **23** $-2 \pm \frac{1}{2}\sqrt{11}$
**25** **(a)** $\frac{81}{4}$ **(b)** 16 **(c)** $\pm 12$ **(d)** $\pm 7$
**27** $-3 \pm \sqrt{2}$ **29** $\frac{3}{2} \pm \sqrt{5}$ **31** $-\frac{1}{2}, \frac{2}{3}$
**33** $-2 \pm \sqrt{2}$ **35** $\frac{3}{4} \pm \frac{1}{4}\sqrt{41}$ **37** $\frac{4}{3} \pm \frac{1}{3}\sqrt{22}$
**39** $\frac{5}{2} \pm \frac{1}{2}\sqrt{15}$ **41** $\frac{9}{2}$ **43** No hay soluciones reales
**45** $(x + 6)(x - 5)$ **47** $(2x - 3)(6x + 1)$
**49** **(a)** $x = \dfrac{y \pm \sqrt{2y^2 - 1}}{2}$ **(b)** $y = -2x \pm \sqrt{8x^2 + 1}$
**51** $v = \sqrt{\dfrac{2K}{m}}$ **53** $r = \dfrac{-\pi h + \sqrt{\pi^2 h^2 + 2\pi A}}{2\pi}$
**55** $r = r_0\sqrt{1 - (V/V_{\max})}$ **57** $\sqrt{150/\pi} \approx 6.9$ cm
**59** **(a)** Después de 1 s y después de 3 s **(b)** Después de 4 s
**61** **(a)** 4320 m **(b)** 96.86°C **63** 2 pies
**65** 12 pies por 12 pies
**67** $3 + \frac{1}{2}\sqrt{14} \approx 4.9$ mi o $3 - \frac{1}{2}\sqrt{14} \approx 1.1$ mi
**69** **(a)** $d = 100\sqrt{20t^2 + 4t + 1}$ **(b)** 3:30 p.m.
**71** 14 pulg por 27 pulg **73** 7 mi/h **75** 300 pares
**77** 2 pies **79** 15.89 s
**81** **(a)** 0; $-4{,}500{,}000$ **(b)** $2.13 \times 10^{-7}$
**83** **(a)** (2) **(b)** 47.65°F

### EJERCICIOS 2.4

**1** $2 + 4i$ **3** $18 - 3i$ **5** $41 - 11i$ **7** $17 - i$
**9** $21 - 20i$ **11** $-24 - 7i$ **13** 25 **15** **(a)** $-i$
**(b)** 1 **17** **(a)** $i$ **(b)** $-1$ **19** $\frac{3}{10} - \frac{3}{5}i$ **21** $\frac{1}{2} - i$
**23** $\frac{34}{53} + \frac{40}{53}i$ **25** $\frac{2}{5} + \frac{4}{5}i$ **27** $-142 - 65i$
**29** $-2 - 14i$ **31** $-\frac{44}{113} + \frac{95}{113}i$ **33** $\frac{21}{2}i$
**35** $x = 4, y = -1$ **37** $x = 3, y = -4$ **39** $3 \pm 2i$
**41** $-2 \pm 3i$ **43** $\frac{5}{2} \pm \frac{1}{2}\sqrt{55}\,i$ **45** $-\frac{1}{8} \pm \frac{1}{8}\sqrt{47}\,i$
**47** $-5, \frac{5}{2} \pm \frac{5}{2}\sqrt{3}\,i$ **49** $\frac{5}{2}, -\frac{25}{26} \pm \frac{15}{26}\sqrt{3}\,i$
**51** $\pm 4, \pm 4i$ **53** $\pm 2i, \pm\frac{3}{2}i$ **55** $0, -\frac{3}{2} \pm \frac{1}{2}\sqrt{7}\,i$
**57** $\overline{z + w} = \overline{(a + bi) + (c + di)}$
$= \overline{(a + c) + (b + d)i} = (a + c) - (b + d)i$
$= (a - bi) + (c - di) = \overline{z} + \overline{w}$
**59** $\overline{z \cdot w} = \overline{(a + bi) \cdot (c + di)}$
$= \overline{(ac - bd) + (ad + bc)i}$
$= (ac - bd) - (ad + bc)i$
$= ac - adi - bd - bci$
$= a(c - di) - bi(c - di)$
$= (a - bi) \cdot (c - di) = \overline{z} \cdot \overline{w}$
**61** Si $\overline{z} = z$, entonces $a - bi = a + bi$ y por tanto $-bi = bi$, o $2bi = 0$. Así, $b = 0$ y $z = a$ es real. Inversamente, si $z$ es real, entonces $b = 0$ y por tanto $\overline{z} = \overline{a + 0i} = a - 0i = a + 0i = z$.

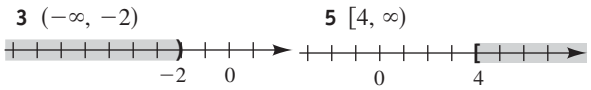
### EJERCICIOS 2.5

**1** $-15, 7$ **3** $-\frac{2}{3}, 2$ **5** No hay solución **7** $\pm\frac{2}{3}, 2$
**9** $\pm\frac{1}{2}\sqrt{6}, -\frac{5}{2}, 0$ **11** $0, 25$ **13** $-\frac{57}{5}$ **15** $\frac{9}{5}$
**17** $\pm\frac{1}{2}\sqrt{62}$ **19** 6 **21** 6 **23** $5, 7$ **25** $-3$
**27** $-1$ **29** $-\frac{5}{4}$ **31** 3 **33** $0, 4$ **35** $\pm 3, \pm 4$
**37** $\pm\frac{1}{10}\sqrt{70 \pm 10\sqrt{29}}$ **39** $\pm 2, \pm 3$ **41** $\frac{8}{27}, -8$
**43** $\frac{16}{9}$ **45** $-\frac{8}{27}, \frac{1}{125}$ **47** $-\frac{4}{3}, -\frac{2}{3}$ **49** $0, 4096$
**51** **(a)** 8 **(b)** $\pm 8$ **(c)** No hay solución real **(d)** 625
**(e)** No hay solución
**53** $l = \dfrac{gT^2}{4\pi^2}$ **55** $h = \dfrac{1}{\pi r}\sqrt{S^2 - \pi^2 r^4}$ **57** $h \approx 97\%$ of $L$
**59** 9.16 pies/sec **61** \$4.00 **63** $2\sqrt[3]{\dfrac{432}{\pi}} \approx 10.3$ cm
**65** 53.4%
**67** Hay dos posibles rutas, correspondientes a $x \approx 0.6743$ millas y $x \approx 2.2887$ millas
**69** **(a)** (2) **(b)** 860 min **71** $3.7 \times 3.7 \times 1.8$

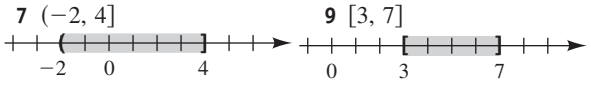
### EJERCICIOS 2.6

**1** **(a)** $-2 < 2$ **(b)** $-11 < -7$ **(c)** $-\frac{7}{3} < -1$
**(d)** $1 < \frac{7}{3}$

**3** $(-\infty, -2)$ **5** $[4, \infty)$




**7** $(-2, 4]$ **9** $[3, 7]$




**11** $[-2, 5)$


**13** $-5 < x \leq 8$ **15** $-4 \leq x \leq -1$ **17** $x \geq 4$

**19** $x < -5$ **21** $\left(\frac{16}{3}, \infty\right)$ **23** $\left(-\infty, -\frac{4}{3}\right]$

**25** $(12, \infty)$ **27** $[-6, \infty)$ **29** $(1, 6)$ **31** $[9, 19)$

**33** $\left(-\frac{26}{3}, \frac{16}{3}\right]$ **35** $(6, 12]$ **37** $\left(-\infty, \frac{8}{53}\right]$

**39** $\left(-\infty, \frac{4}{5}\right)$ **41** $\left(-\frac{2}{3}, \infty\right)$ **43** $\left(\frac{4}{3}, \infty\right)$

**45** Todos los números reales excepto 1 **47** $(-3, 3)$

**49** $(-\infty, -5] \cup [5, \infty)$ **51** $(-3.01, -2.99)$

**53** $(-\infty, -2.1] \cup [-1.9, \infty)$ **55** $\left(-\frac{9}{2}, -\frac{1}{2}\right)$

**57** $\left[\frac{3}{5}, \frac{9}{5}\right]$ **59** $(-\infty, \infty)$ **61** $(-\infty, 3) \cup (3, \infty)$

**63** $\left(-\infty, -\frac{8}{3}\right] \cup [4, \infty)$ **65** $\left(-\infty, \frac{7}{4}\right) \cup \left(\frac{13}{4}, \infty\right)$

**67** $(-4, 4)$ **69** $(-2, 1) \cup (3, 6)$

**71** **(a)** $-8, -2$ **(b)** $-8 < x < -2$
**(c)** $(-\infty, -8) \cup (-2, \infty)$

**73** $|w - 148| \leq 2$ **75** $5 < |T_1 - T_2| < 10$

**77** $86 \leq F \leq 104$ **79** $R \geq 11$ **81** $4 \leq p < 6$

**83** $6\frac{2}{3}$ años **85** **(a)** 5 pies 8 pulg. **(b)** $65.52 \leq h \leq 66.48$

### *EJERCICIOS 2.7*

**1** $\left(-\frac{1}{3}, \frac{1}{2}\right)$ **3** $[-2, 1] \cup [4, \infty)$ **5** $(-2, 3)$

**7** $(-\infty, -2) \cup (4, \infty)$ **9** $\left(-\infty, -\frac{5}{2}\right] \cup [1, \infty)$

**11** $(2, 4)$ **13** $(-4, 4)$ **15** $\left(-\frac{3}{5}, \frac{3}{5}\right)$

**17** $(-\infty, 0] \cup \left[\frac{9}{16}, \infty\right)$ **19** $(-\infty, -2] \cup [2, \infty)$

**21** $\{-2\} \cup [2, \infty)$ **23** $(-\infty, -2) \cup (-2, -1) \cup \{0\}$

**25** $(-2, 0) \cup (0, 1]$ **27** $(-2, 2] \cup (5, \infty)$

**29** $(-\infty, -3) \cup (0, 3)$ **31** $\left(\frac{3}{2}, \frac{7}{3}\right)$

**33** $(-\infty, -1) \cup \left(2, \frac{7}{2}\right]$ **35** $\left(-1, \frac{2}{3}\right) \cup [4, \infty)$

**37** $\left(1, \frac{5}{3}\right) \cup [2, 5]$ **39** $(-1, 0) \cup (1, \infty)$

**41** $[0, 2] \cup [3, 5]$ **43** $\frac{1}{2}$ s **45** $0 \leq v < 30$

**47** $0 < S < 4000$ **49** altura $> 25{,}600$ km

**51** $70.5 \leq V \leq 81.4$ **53** $(-3, -2) \cup (2, 4)$

### *CAPÍTULO 2 EJERCICIOS DE REPASO*

**1** $-\frac{5}{6}$ **2** 5 **3** $-32$ **4** No hay solución

**5** Toda $x > 0$ **6** $-4, \frac{3}{2}$ **7** $-\frac{2}{3} \pm \frac{1}{3}\sqrt{19}$

**8** $\frac{5}{2} \pm \frac{1}{2}\sqrt{29}$ **9** $\frac{1}{2} \pm \frac{1}{2}\sqrt{21}$ **10** $\pm\frac{5}{2}, \pm\sqrt{2}$

**11** $-27, 125$ **12** $\pm\frac{1}{2}\sqrt{7}, -\frac{2}{5}$ **13** $\frac{1}{5} \pm \frac{1}{5}\sqrt{14}\,i$

**14** $-\frac{1}{6} \pm \frac{1}{6}\sqrt{71}\,i$ **15** $\pm\frac{1}{2}\sqrt{14}\,i, \pm\frac{2}{3}\sqrt{3}\,i$

**16** $\pm\frac{1}{2}\sqrt{6 \pm 2\sqrt{5}}$ **17** $-\frac{3}{2}, 2$ **18** $-5, 4$

**19** $\frac{1}{4}, \frac{1}{9}$ **20** $\frac{13}{4}$ **21** 2 **22** $-3, 1$ **23** 5

**24** $\pm 8$ **25** $2 \pm \sqrt{3}$ **26** $-5 \pm \sqrt{13}\,i$ **27** 3

**28** $\left(\frac{2}{3}, \infty\right)$ **29** $\left(-\frac{11}{4}, \frac{9}{4}\right)$ **30** $\left[\frac{13}{23}, \infty\right)$

**31** $\left(-\infty, -\frac{3}{10}\right)$ **32** $\left(-7, \frac{7}{2}\right)$

**33** $(-\infty, 1) \cup (5, \infty)$ **34** $[0, 6]$

**35** $\left(-\infty, \frac{11}{3}\right] \cup [7, \infty)$ **36** $(2, 4) \cup (8, 10)$

**37** $\left(-\infty, -\frac{3}{2}\right) \cup \left(\frac{2}{5}, \infty\right)$ **38** $[-2, 5]$

**39** $(-\infty, -2) \cup \{0\} \cup [3, \infty)$ **40** $(-3, -1) \cup (-1, 2]$

**41** $\left(-\infty, -\frac{3}{2}\right) \cup (2, 9)$ **42** $(-\infty, -5) \cup [-1, 5)$

**43** $(1, \infty)$ **44** $(0, 1) \cup (2, 3)$ **45** $C = \dfrac{2}{P + N - 1}$

**46** $D = \dfrac{CB^3}{(A + E)^3}$ **47** $r = \sqrt[3]{\dfrac{3V}{4\pi}}$

**48** $R = \sqrt[4]{\dfrac{8FVL}{\pi P}}$ **49** $h = R \pm \frac{1}{2}\sqrt{4R^2 - c^2}$

**50** $r = \dfrac{-\pi hR + \sqrt{12\pi hV - 3\pi^2 h^2 R^2}}{2\pi h}$ **51** $15 + 2i$