3. True **4.** Pythagorean Theorem

5. False. There may be no solution, one solution, or two solutions.

6. Direction and magnitude **7.** **A, C**

8. a. The angle between the vectors is acute.

9. If $k > 0$, the direction is the same and the magnitude is k times as great.

If $k < 0$, the result is a vector in the opposite direction and the magnitude is k times as great.

10. The diagonal of the parallelogram with **u** and **v** as its adjacent sides

11. b. Visualize the sum of **u** and $-\mathbf{v}$.

12. $z_1 z_2 = -4$, $\dfrac{z_1}{z_2} = -\dfrac{1}{4}z_1^2$

13. (a) 3

(b) On the circle 120°, 210°, and 300° from the positive x-axis

Review Exercises *(page 567)*

1. $A \approx 29.7°$, $B \approx 52.4°$, $C \approx 97.9°$

3. $C = 110°$, $b \approx 20.4$, $c \approx 22.6$

5. $A = 35°$, $C = 35°$, $b \approx 6.6$

7. No solution **9.** $A \approx 25.9°$, $C \approx 39.1°$, $c \approx 10.1$

11. $B \approx 31.2°$, $C \approx 133.8°$, $c \approx 13.9$

$B \approx 148.8°$, $C \approx 16.2°$, $c \approx 5.39$

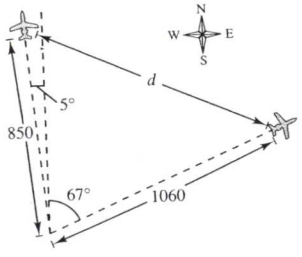
13. $A \approx 9.9°$, $C \approx 20.1°$, $b \approx 29.1$

15. $A \approx 40.9°$, $C \approx 114.1°$, $c \approx 8.6$

$A \approx 139.1°$, $C \approx 15.9°$, $c \approx 2.6$

17. 9.798 **19.** 9.08 **21.** 31.1 meters **23.** 31.0 feet

25.

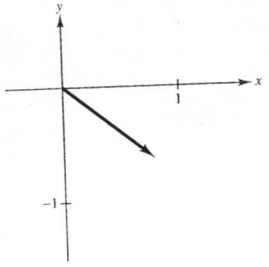


1135 miles

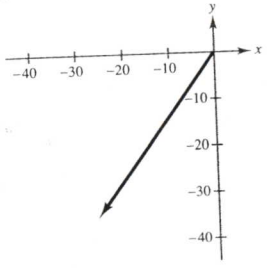
27. $\langle 7, -5 \rangle$ **29.** $\langle 7, -7 \rangle$ **31.** $\langle -4, 4\sqrt{3} \rangle$

33. $10\sqrt{2}(\mathbf{i} \sin 135° + \mathbf{j} \cos 135°)$

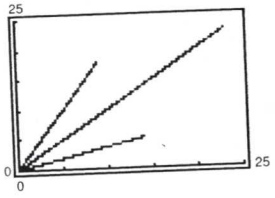
35. $\left\langle \dfrac{6}{\sqrt{61}}, -\dfrac{5}{\sqrt{61}} \right\rangle$



37. $\langle -26, -35 \rangle$



39.



Magnitude: 32.62

Direction: 44.72°

41. 92.2 pounds, 79.9° **43.** 180 pounds

45. 740.5 kilometers per hour, N 32.1° E

47. $\dfrac{1}{\sqrt{34}}\langle -5, 3 \rangle$ **49.** Parallel **51.** $\dfrac{11\pi}{12}$

53. 160.5° **55.** $-\frac{13}{17}\langle 4, 1 \rangle$ **57.** $-\frac{5}{2}\langle 1, -1 \rangle$

59. $5\sqrt{2}(\cos 315° + i \sin 315°)$

61. $13(\cos 67.38° + i \sin 67.38°)$ **63.** $-50 - 50\sqrt{3}\,i$

65. 13

67. (a) $z_1 = 4(\cos 330° + i \sin 330°)$

$z_2 = 10(\cos 270° + i \sin 270°)$

(b) $z_1 z_2 = 40(\cos 240° + i \sin 240°)$

$\dfrac{z_1}{z_2} = \dfrac{2}{5}(\cos 60° + i \sin 60°)$

69. $\frac{625}{2} + \frac{625\sqrt{3}}{2}i$ **71.** $2035 - 828i$

73. (a) $4(\cos 60° + i \sin 60°)$

$4(\cos 180° + i \sin 180°)$

$4(\cos 300° + i \sin 300°)$

(b) -64

75. $3\left(\cos \frac{\pi}{4} + i \sin \frac{\pi}{4}\right)$

$3\left(\cos \frac{7\pi}{12} + i \sin \frac{7\pi}{12}\right)$

$3\left(\cos \frac{11\pi}{12} + i \sin \frac{11\pi}{12}\right)$

$3\left(\cos \frac{5\pi}{4} + i \sin \frac{5\pi}{4}\right)$

$3\left(\cos \frac{19\pi}{12} + i \sin \frac{19\pi}{12}\right)$

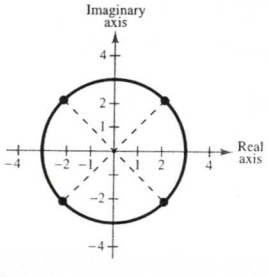
$3\left(\cos \frac{23\pi}{12} + i \sin \frac{23\pi}{12}\right)$

77. $3\left(\cos \frac{\pi}{4} + i \sin \frac{\pi}{4}\right) = \frac{3\sqrt{2}}{2} + \frac{3\sqrt{2}}{2}i$

$3\left(\cos \frac{3\pi}{4} + i \sin \frac{3\pi}{4}\right) = -\frac{3\sqrt{2}}{2} + \frac{3\sqrt{2}}{2}i$

$3\left(\cos \frac{5\pi}{4} + i \sin \frac{5\pi}{4}\right) = -\frac{3\sqrt{2}}{2} - \frac{3\sqrt{2}}{2}i$

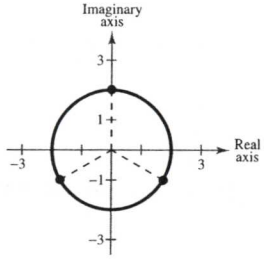
$3\left(\cos \frac{7\pi}{4} + i \sin \frac{7\pi}{4}\right) = \frac{3\sqrt{2}}{2} - \frac{3\sqrt{2}}{2}i$



79. $2\left(\cos \frac{\pi}{2} + i \sin \frac{\pi}{2}\right) = 2i$

$2\left(\cos \frac{7\pi}{6} + i \sin \frac{7\pi}{6}\right) = -\sqrt{3} - i$

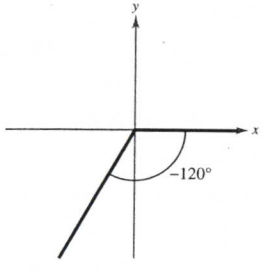
$2\left(\cos \frac{11\pi}{6} + i \sin \frac{11\pi}{6}\right) = \sqrt{3} - i$



Cumulative Test for Chapters 4–6

(page 572)

1. (a)



(b) 240°

(c) $-\frac{2\pi}{3}$

(d) 60°

(e) $\sin(-120°) = -\frac{\sqrt{3}}{2}$

$\cos(-120°) = -\frac{1}{2}$

$\tan(-120°) = \sqrt{3}$

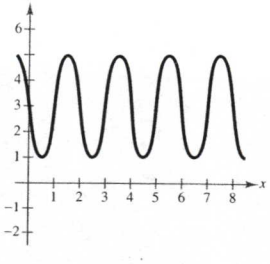
$\csc(-120°) = -\frac{2\sqrt{3}}{3}$

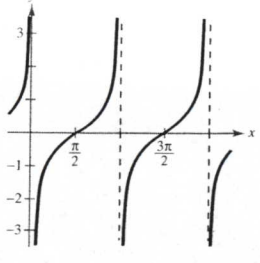
$\sec(-120°) = -2$

$\cot(-120°) = \frac{\sqrt{3}}{3}$

2. 134.6° **3.** $\frac{3}{5}$

4. (a) (b)





5. $h(x) = -3 \cos(\pi x)$ **6.** $\sqrt{1 - 4x^2}$ **7.** $2 \tan \theta$