IM2 Book 3 Selected Answers

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1. $10\sqrt{2}$

2. (a) $A = \left(\frac{\sqrt{2}}{2}, \frac{\sqrt{2}}{2}\right)$, $B = \left(\frac{\sqrt{3}}{2}, \frac{1}{2}\right)$

   (b) $\cos()$

   (c) $\sin()$

3. (a) $\cos(40°)$

   (b) $\sin(40°)$

4. (a) $m_{OA} = 1$, $m_{OB} = \frac{\sqrt{3}}{3}$

   (b) $\tan()$

5. 470 ft

6. $\frac{3}{5}$

7. Length of line: 3.42 ft
   Distance to bobber: 9.40 ft

8. 23.82 ft

9. (a) π; $(-1, 0)$

   (b) $\frac{\pi}{2}$; $(0, 1)$

10. –

11. –

12. –

13. $\cos A = \frac{\sqrt{21}}{5}$, $\tan A = \frac{2}{\sqrt{21}}$, $\sin^2 A + \cos^2 A = 1$

14. (a) 79 ft

    (b) 7,873 ft^2

    (c) 135 ft

15. 67°

16. 21.6°

17. No

18. 54.8 ft

19. $\frac{2\pi}{3}$

20. $\frac{6\pi}{5}$, $\frac{9\pi}{5}$

21. $\sin^2\theta + \cos^2\theta = 1$

22. length = 5.22; Area = 12.68

23. $\frac{ab\sin C}{2}$

24. 9.9 in^2

25. $(-1,0)$, $(-1,0)$

26. –

27. $\pi - \alpha$

28. (a) $(0,1)$

  (b) $\left(\frac{\sqrt{2}}{2}, \frac{\sqrt{2}}{2}\right)$

  (c) $\left(\frac{-1}{2}, \frac{\sqrt{3}}{2}\right)$

  (d) $\left(\frac{-\sqrt{3}}{2}, \frac{-1}{2}\right)$

29. (a) $\left(\frac{1}{2}, \frac{\sqrt{3}}{2}\right)$; $\cos\theta$ gives the x-coordinate; $\sin\theta$ gives the y-coordinate

  (b) $\cos\frac{3\pi}{4} = \frac{-\sqrt{2}}{2}$, $\sin\frac{3\pi}{4} = \frac{\sqrt{2}}{2}$

30. (a) $AD = b - x$, $BD = \sqrt{a^2 - x^2}$

  (b) $c^2 = a^2 + b^2 - 2bx$

  (c) $c^2 = a^2 + b^2 - 2ab\cos C$

31. 5.01 in.

32. (a) $\left(\frac{1}{2}, \frac{\sqrt{3}}{2}\right)$, $m = \sqrt{3}$

  (b) $\tan\theta$

33. 205°

34. (a) $\sin\frac{2\pi}{3} = \frac{\sqrt{3}}{2}$, $\cos\frac{2\pi}{3} = \frac{-1}{2}$, $\tan\frac{2\pi}{3} = -\sqrt{3}$

  (b) $\sin\frac{4\pi}{3} = \frac{-\sqrt{3}}{2}$, $\cos\frac{4\pi}{3} = \frac{-1}{2}$, $\tan\frac{4\pi}{3} = \sqrt{3}$

35. (a) $\sin 135° = \frac{\sqrt{2}}{2}$, $\cos 135° = \frac{-\sqrt{2}}{2}$, $\tan 135° = -1$

(b) $\sin 225° = -\frac{\sqrt{2}}{2}$, $\cos 225° = \frac{-\sqrt{2}}{2}$, $\tan 225° = 1$

36. (a) $\left(\frac{\sqrt{3}}{2}, -\frac{1}{2}\right)$, $m = -\frac{\sqrt{3}}{3}$

    (b) $\sin\left(-\frac{\pi}{6}\right) = -\frac{1}{2}$, $\cos\left(-\frac{\pi}{6}\right) = \frac{\sqrt{3}}{2}$, $\tan\left(-\frac{\pi}{6}\right) = -\frac{\sqrt{3}}{3}$

37. $\sin\left(-\frac{2\pi}{3}\right) = -\frac{\sqrt{3}}{2}$, $\cos\left(\frac{5\pi}{2}\right) = 0$, $\tan\left(\frac{2\pi}{3}\right) = -\sqrt{3}$

38. $\cos A = -\frac{\sqrt{91}}{10}$, $\tan A = -\frac{3}{\sqrt{91}}$

39. 2.52 km

40. side length = 16.8 cm, Area = 91.3 cm^2

41. 78.5°, 57.1°, 44.4°

42. (a) $c = p + q$

    (b) $c = |p - q|$

    (c) $c = \sqrt{p^2 + q^2}$

43. (a) $\sin 60° = \sin 120° = \frac{\sqrt{3}}{2}$

    (b) $\sin 30° = \sin 150° = \frac{1}{2}$

    (c) –

44. $\sin\theta = \sin(\pi - \theta)$

45. $\cos\theta = -\cos(\pi - \theta)$

46. $\tan\theta = \tan(\theta + \pi)$

47. $\cos x = -\frac{\sqrt{4-a^2}}{2}$, $\tan x = -\frac{a}{\sqrt{4-a^2}}$

48. (a) $\frac{\pi}{6}$, $\frac{5\pi}{6}$

    (b) $\sin(x) = \frac{1}{2}$

49. $\frac{\pi}{3}$, $\pi - \frac{\pi}{3}$

50. $\cos 280° \approx 0.174$, $\cos 100° = \cos 260° \approx -0.174$

51. (a) $\cos 310° < \cos 311°$

    (b) $\sin 76° > \sin 106°$

    (c) $\sin 81° = \sin 99°$

    (d) $\tan 89° > \tan 71°$

52. $BC = 4.01$