

## 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)  $\cos(40^\circ)$   
(b)  $\sin(40^\circ)$
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)  $\pi$ ;  $(-1, 0)$   
(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)  $7,873 \text{ ft}^2$   
(c) 135 ft
15.  $67^\circ$

16.  $21.6^\circ$
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.  $9.9 \text{ in}^2$
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.  $205^\circ$
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)  $\sin 135^\circ = \frac{\sqrt{2}}{2}, \cos 135^\circ = \frac{-\sqrt{2}}{2}, \tan 135^\circ = -1$

- (b)  $\sin 225^\circ = -\frac{\sqrt{2}}{2}$ ,  $\cos 225^\circ = -\frac{\sqrt{2}}{2}$ ,  $\tan 225^\circ = 1$
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 =  $91.3 \text{ cm}^2$
41.  $78.5^\circ$ ,  $57.1^\circ$ ,  $44.4^\circ$
42. (a)  $c = p + q$   
 (b)  $c = |p - q|$   
 (c)  $c = \sqrt{p^2 + q^2}$
43. (a)  $\sin 60^\circ = \sin 120^\circ = \frac{\sqrt{3}}{2}$   
 (b)  $\sin 30^\circ = \sin 150^\circ = \frac{1}{2}$   
 (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.  $\cos 280^\circ \approx 0.174$ ,  $\cos 100^\circ = \cos 260^\circ \approx -0.174$ ,  $\sin 190^\circ \approx -0.174$
51. (a)  $\cos 310^\circ < \cos 311^\circ$   
 (b)  $\sin 76^\circ > \sin 106^\circ$   
 (c)  $\sin 81^\circ = \sin 99^\circ$   
 (d)  $\tan 89^\circ > \tan 71^\circ$
52.  $BC = 4.01$