Section 7.3 – Practice Problems

Find the reference angle for each given angle.

1. 300° Q4 : 60°	2. 135° Q2 : 45°
3. 240° Q3 : 60°	4. 120° Q2 : 60°
5. 330° Q4 : 30°	6. 150° Q2 : 30°
7. 111° Q2 : 69°	8. 200° Q3 : 20°
9. 280° Q3 : 80°	10. 180° NO QUAD 0°
11. 73° Q1 : 73°	12. 91° Q2 : 89°
13. 179° Q2 : 1°	14. 270° NO QUAD 90°

Find the angle θ, for each reference angle in the desired Quadrant

15. 30°, $Q2$ 180 − 30 150°	16. 45°, $Q3$ 180 + 45 225°
17. 60°, $Q4$ 360 − 60 = 300°	18. 30°, $Q3$ 180 + 30 210°
19. 45°, $Q2$ 180 − 45 135°	20. 60°, $Q2$ 180 − 60 120°

21. 30°, $Q4$ $360 - 30 = 330°$

22. 45°, $Q4$ $360 - 45 \quad 315°$

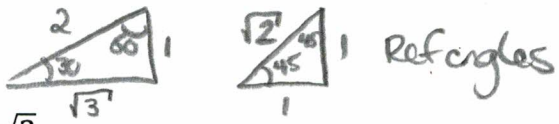
23. 60°, $Q3$ $180 + 60 \quad 240°$

24. 37°, $Q2$ $180 - 37 \quad 143°$

25. 37°, $Q3$ $180 + 37 \quad 217°$

26. 37°, $Q4$ $360 - 37 \quad 323°$

Find all θ, $0° \leq \theta < 360°$, which satisfy each equation



Ref angles

27. $\sin\theta = \frac{\sqrt{3}}{2}$ Positive Q1 and Q2

$60°$ and $120°$

28. $\cos\theta = \frac{\sqrt{3}}{2}$ Positive Q1 and Q4

$30°$ and $330°$

29. $\tan\theta = -\frac{1}{\sqrt{3}}$ Neg Q2 and Q4

$150°$ and $330°$

30. $\sin\theta = -\frac{1}{\sqrt{2}}$ Neg Q3 and Q4

$225°$ and $315°$

31. $\cos\theta = -\frac{1}{\sqrt{2}}$ Q2 and Q3

$135°$ and $225°$

32. $\tan\theta = -1$ Q2 and Q4

$135° \quad 315°$

33. $\sin\theta = 0$

$0°$ and $180°$

34. $\cos\theta = 0$

$90°$ and $270°$

35. $\tan\theta = 0$ opposite is 0

0° 180°

36. $\sin\theta = -1$

opposite neg 1

270°

37. $\cos\theta = -\frac{1}{2}$ Q2 and Q3

120° 240°

38. $\tan\theta = \sqrt{3}$ Q1 and Q3

60° 240°

Find to one decimal place, all θ, $0^\circ \le \theta < 360^\circ$, which satisfy each equation

39. $\sin\theta = 0.253$ Ref angle is 0.253

$\sin^{-1}(0.253) = 14.7^\circ$

$Q2 = 180 - 14.7 = 165.3^\circ$

40. $\cos\theta = 0.425$

$\cos^{-1}(0.425) = 64.8^\circ$

Q1 and Q4

$360 - 64.8 = 295.2^\circ$

41. $\tan\theta = 2$

$\tan^{-1}(2) = 63.4^\circ$

$Q3: 180 + 63.4 = 243.4^\circ$

42. $\sin\theta = -0.625$ ref value 0.625

$\sin^{-1}(0.625) = 38.7$

$Q3: 180 + 38.7 = 218.7^\circ$

$Q4: 360 - 38.7 = 321.3^\circ$

43. $\cos\theta = -0.738$ ref value 0.738

$\cos^{-1}(0.738) = 42.4^\circ$

$Q2: 180 - 42.4 = 137.6^\circ$

$Q3: 180 + 42.4 = 222.4^\circ$

44. $\tan\theta = -0.543$ ref = 0.543

$\tan^{-1}(0.543) = 28.5$

$Q2: 180 - 28.5 = 151.5^\circ$

$Q4: 360 - 28.5 = 331.5^\circ$

Find the smallest positive angle θ, $0^\circ \le \theta < 360^\circ$, which satisfy each equation

45. $\sin\theta = -\frac{1}{2}$ Smallest in Q3

ref angle of 30°

$180 + 30 = 210^\circ$

46. $\cos\theta = -\frac{1}{2}$ Smallest in Q2

ref angle of 60°

$180 - 60 = 120^\circ$

47. $\tan\theta = -1$ smallest in Q2

ref angle 45°

180 − 45 = 135°

48. $\sin\theta = -\frac{1}{\sqrt{2}}$ smallest Q3

ref angle 45°

180 + 45 = 225°

49. $\cos\theta = -\frac{1}{\sqrt{2}}$ smallest Q2

ref angle 45

180 − 45 = 135°

50. $\tan\theta = -\sqrt{3}$ smallest Q2

ref angle 60°

180 − 60 = 120°

51. $\sin\theta = -\frac{\sqrt{3}}{2}$ smallest Q3

ref angle 60°

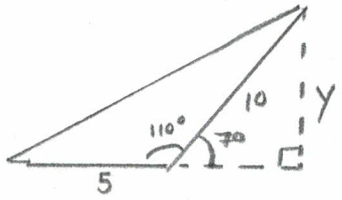
180 + 60 = 240°

52. $\cos\theta = -\frac{\sqrt{3}}{2}$ smallest Q2

ref angle 30°

180 − 30 = 150°

53. Find the area of a triangle with sides of length $5cm$ *and* $10cm$, and an angle of 110° between them.



$\sin 70° = \frac{y}{10}$ $y = 10\sin 70$

$y = 9.4$

$A = \frac{1}{2}(5)(9.4)$

$= 23.49\,cm^2$

54. A triangle has an area of $15mm^2$, and two sides of the triangle are $6mm$ *and* $8mm$. Find the acute angle between the two sides of the triangle.

$\frac{8 \cdot h}{2} = 15$ $4h = 15$ $h = \frac{15}{4}$

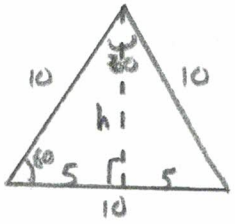
$\sin\theta = \frac{h}{6}$

$\sin\theta = 15/4/6$

$\sin\theta = 0.625$

$\theta = 38.7°$

55. Find the area of an equilateral triangle (all sides and angles the same) with sides of $10cm$ in length. (Give an exact answer, no decimals)



$\sin 60 = \frac{h}{10}$ $h = 5\sqrt{3}$

$10\sin 60 = h$

$10\left(\frac{\sqrt{3}}{2}\right) = h$

$A = \frac{1}{2}(10)(5\sqrt{3})$

$= 25\sqrt{3}\,cm^2$

Answer Key – Section 7.3

1. $60°$
2. $45°$
3. $60°$
4. $60°$
5. $30°$
6. $30°$
7. $69°$
8. $20°$
9. $80°$
10. $0°$
11. $73°$
12. $89°$
13. $1°$
14. $90°$
15. $150°$
16. $225°$
17. $300°$
18. $210°$
19. $135°$
20. $120°$
21. $330°$
22. $315°$
23. $240°$
24. $143°$
25. $217°$
26. $323°$
27. $60°, 120°$
28. $30°, 330°$
29. $150°, 330°$
30. $225°, 315°$
31. $135°, 225°$
32. $135°, 315°$
33. $0°, 180°$
34. $90°, 270°$
35. $0°, 180°$
36. $270°$
37. $120°, 240°$
38. $60°, 240°$

39. $14.7°, 165.3°$
40. $64.8°, 295.2°$
41. $63.4°, 243.4°$
42. $218.7°, 321.3°$
43. $137.6°, 222.4°$
44. $151.5°, 331.5°$
45. $210°$
46. $120°$
47. $135°$
48. $225°$
49. $135°$
50. $120°$
51. $240°$
52. $150°$
53. $23.49cm^2$
54. $38.7°$
55. $25\sqrt{3}cm^2$

Extra Work Space