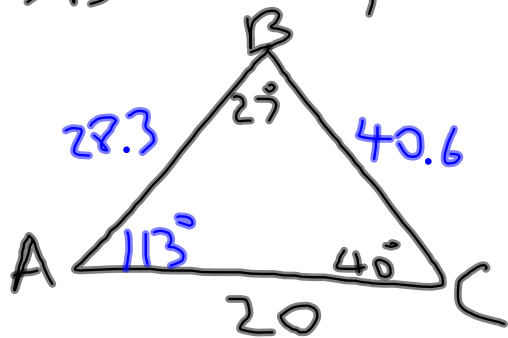


# Chapter 14 Review

Pg. 930-932 #2-44 even

$$2) B = 27^\circ, C = 40^\circ, b = 20$$



$$A = 113^\circ$$
$$a = 40.6$$
$$c = 28.3$$

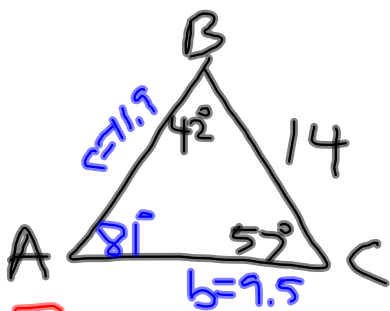
$$\left[ \frac{a}{\sin 113^\circ} = \frac{20}{\sin 27^\circ} \right] \sin 113^\circ$$

$$a = \frac{20 \sin 113^\circ}{\sin 27^\circ} \approx 40.6$$

$$\left[ \frac{c}{\sin 40^\circ} = \frac{20}{\sin 27^\circ} \right] \sin 40^\circ$$

$$c = \frac{20 \sin 40^\circ}{\sin 27^\circ} \approx 28.3$$

4)  $B = 42^\circ$ ,  $a = 14$ ,  $C = 57^\circ$



$A = 81^\circ$

$b = 9.5$

$c = 11.9$

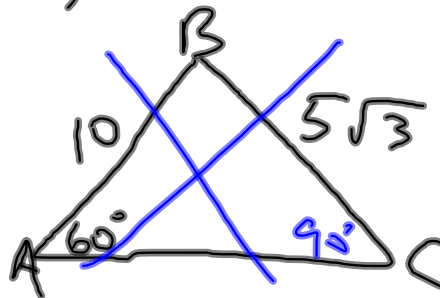
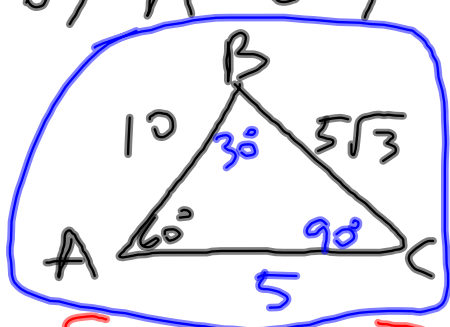
$\sin 42^\circ \left[ \frac{b}{\sin 42^\circ} = \frac{14}{\sin 81^\circ} \right]$

$b = \frac{14 \sin 42^\circ}{\sin 81^\circ} \approx 9.5$

$\left[ \frac{c}{\sin 57^\circ} = \frac{14}{\sin 81^\circ} \right] \sin 57^\circ$

$c = \frac{14 \sin 57^\circ}{\sin 81^\circ} \approx 11.9$

6)  $A = 60^\circ, c = 10, a = 5\sqrt{3}$

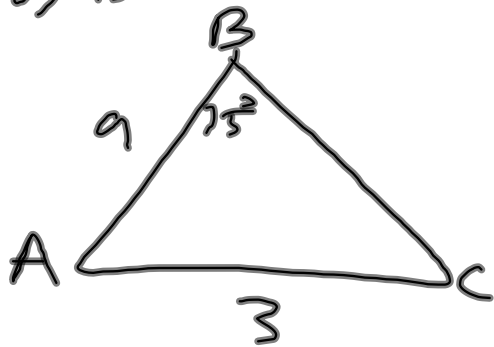


1 Triangle

$$10 \left[ \frac{\sin C}{10} = \frac{\sin 60^\circ}{5\sqrt{3}} \right]$$

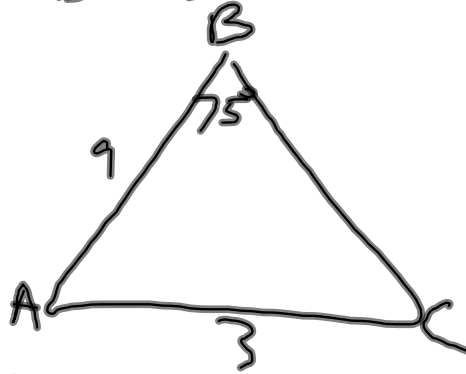
$$C = \sin^{-1} \left( \frac{10 \sin 60^\circ}{5\sqrt{3}} \right) = 90^\circ$$

8)  $B = 75^\circ$   $c = 9$



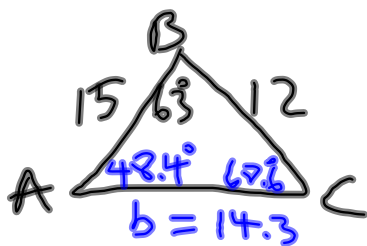
$\uparrow \left[ \frac{\sin C}{9} = \frac{\sin 75^\circ}{3} \right]$   
 $C = \sin^{-1} \left( \frac{9 \sin 75^\circ}{3} \right) =$

$b = 3$



○ Triangles

10)  $B = 63^\circ$ ,  $a = 12$ ,  $c = 15$



SAS  
 $A = 48.4^\circ$   
 $C = 68.6^\circ$   
 $b = 14.3$

$$b^2 = a^2 + c^2 - 2ac \cos B$$

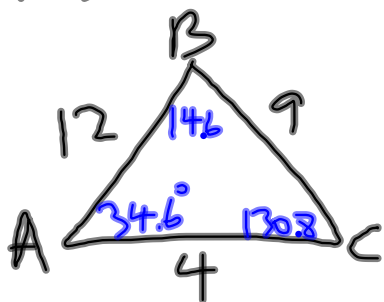
$$b = \sqrt{12^2 + 15^2 - 2(12)(15) \cos 63^\circ}$$
$$b = 14.3$$

$$\left[ \frac{\sin A}{12} = \frac{\sin 63^\circ}{14.3} \right] 12$$

$$A = \sin^{-1} \left( \frac{12 \sin 63^\circ}{14.3} \right)$$

$$A = 48.4^\circ$$

$$12) a=9, b=4, c=12$$



$$A = \cos^{-1} \left( \frac{9^2 - 4^2 - 12^2}{(-2)(4)(12)} \right)$$

$$A = 34.6^\circ$$

$$4 \left[ \frac{\sin B}{4} = \frac{\sin 34.6^\circ}{9} \right]$$

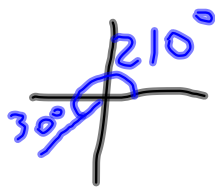
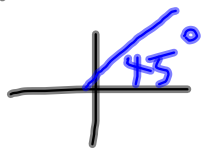
$$B = \sin^{-1} \left( \frac{4 \sin 34.6^\circ}{9} \right) = 14.6$$

$$14) \sec \theta \cos^2 \theta$$

$$\frac{1}{\cancel{\cos \theta}} \cdot \frac{\overset{\cancel{\cos \theta}}{\cos \theta}}{1} = \boxed{\cos \theta}$$

$$16) \frac{2\cos^2\theta}{1-\sin^2\theta} = \frac{\cancel{2\cos^2\theta}}{\cancel{\cos^2\theta}} = \boxed{2}$$

$$18) \sin(45^\circ - 210^\circ)$$



$$\sin 45^\circ \cos 210^\circ - \cos 45^\circ \sin 210^\circ$$

$$\frac{\sqrt{2}}{2} \cdot -\frac{\sqrt{3}}{2} - \frac{\sqrt{2}}{2} \cdot -\frac{1}{2}$$

$$\frac{-\sqrt{6}}{4} + \frac{\sqrt{2}}{4}$$

$$\frac{-\sqrt{6} + \sqrt{2}}{4}$$

$$20) \cos(90^\circ + 60^\circ)$$

$$\cos 90^\circ \cos 60^\circ - \sin 90^\circ \sin 60^\circ$$

$$0 \cdot \frac{1}{2} - 1 \cdot \frac{\sqrt{3}}{2}$$

$$\boxed{-\frac{\sqrt{3}}{2}}$$

$$\cos 150^\circ$$

$$\boxed{-\frac{\sqrt{3}}{2}}$$

$$22) \sin 195^\circ$$

$$\sin(150^\circ + 45^\circ)$$

$$\begin{array}{c} \cancel{30} \quad 150^\circ \\ | \\ \hline \end{array} \quad \begin{array}{c} | \\ \hline \quad 45^\circ \end{array}$$

$$\sin 150^\circ \cos 45^\circ + \cos 150^\circ \sin 45^\circ$$

$$\frac{1}{2} \cdot \frac{\sqrt{2}}{2} + -\frac{\sqrt{3}}{2} \cdot \frac{\sqrt{2}}{2}$$

$$\boxed{\frac{\sqrt{2} - \sqrt{6}}{4}}$$

$$24) \cos(-210^\circ)$$



$$-\frac{\sqrt{3}}{2}$$

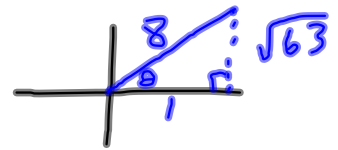
26)  $(3, -5)$  after  $120^\circ$  rotation

$$\begin{bmatrix} \cos 120^\circ & -\sin 120^\circ \\ \sin 120^\circ & \cos 120^\circ \end{bmatrix} \begin{bmatrix} 3 \\ -5 \end{bmatrix} = \begin{bmatrix} 2.8 \\ 5.1 \end{bmatrix}$$

$(2.8, 5.1)$

$$0 \leq \theta \leq 90^\circ; \quad \cos \theta = \frac{1}{8}$$

$$\sin \theta = \frac{\sqrt{63}}{8}$$



$$\begin{aligned} 28) \cos 2\theta &= \cos^2 \theta - \sin^2 \theta \\ &= \left(\frac{1}{8}\right)^2 - \left(\frac{\sqrt{63}}{8}\right)^2 \\ &= \frac{1}{64} - \frac{63}{64} \\ &= -\frac{62}{64} = -\frac{31}{32} \end{aligned}$$

$$0 \leq \theta \leq 90^\circ; \quad \cos \theta = \frac{1}{8}$$

$$0 \leq \frac{\theta}{2} \leq 45^\circ$$

$$30) \quad \cos \frac{\theta}{2} = + \sqrt{\frac{1 + \cos \theta}{2}}$$

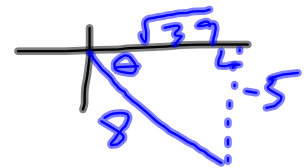
$$= \sqrt{\frac{\frac{8}{8} + \frac{1}{8}}{2}}$$

$$= \sqrt{\frac{9}{16}}$$

$$= \sqrt{\frac{9}{16}} = \frac{3}{4}$$

$$270^\circ \leq \theta \leq 360^\circ ; \sin \theta = -\frac{5}{8}$$

$$\cos \theta = \frac{\sqrt{39}}{8}$$



$$32) \sin 2\theta = 2 \sin \theta \cos \theta$$

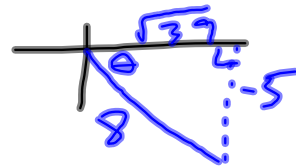
$$= \frac{2}{1} \cdot \frac{-5}{8} \cdot \frac{\sqrt{39}}{8}$$

$$= \boxed{\frac{-5\sqrt{39}}{32}}$$

$$270^\circ \leq \theta \leq 360^\circ ; \sin \theta = -\frac{5}{8}$$

$$~~135^\circ \leq \frac{\theta}{2} \leq 180^\circ~~$$

$$\cos \theta = \frac{\sqrt{39}}{8}$$



$$34) \sin \frac{\theta}{2} = + \sqrt{\frac{1 - \cos \theta}{2}}$$

$$= \sqrt{\frac{\frac{8}{8} - \frac{\sqrt{39}}{8}}{2}}$$

$$= \sqrt{\frac{\frac{8 - \sqrt{39}}{8}}{2}}$$

$$= \sqrt{\frac{8 - \sqrt{39}}{16}}$$

$$36) \sin 2\theta + \cos 2\theta$$

$$2 \sin \theta \cos \theta + \cos^2 \theta - \sin^2 \theta$$

$$38) 2\cos\theta - \sqrt{2} = 0$$

$$x = \cos\theta$$

$$2x - \sqrt{2} = 0$$
$$\frac{+ \sqrt{2} \quad + \sqrt{2}}{\hline}$$

$$\frac{2x = \sqrt{2}}{\frac{2}{2} \quad \frac{\sqrt{2}}{2}}$$

$$x = \frac{\sqrt{2}}{2}$$

$$\cos\theta = \frac{\sqrt{2}}{2}$$

$$\cancel{\theta = 45^\circ}$$

$$\cancel{\theta = 315^\circ}$$

$$\theta = 45^\circ, 315^\circ$$

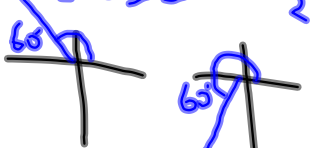
$$40) 2\cos^2\theta - \cos\theta - 1 = 0$$

$$x = \cos\theta$$

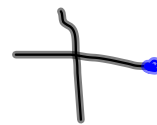
$$2x^2 - x - 1 = 0$$

$$(2x+1)(x-1) = 0$$

$$x = -\frac{1}{2}, 1$$

$$\cos\theta = -\frac{1}{2}$$


$$\cos\theta = 1$$



$$\theta = 120^\circ, 240^\circ, 0^\circ$$

$$42) 4 \sin^2 \theta + 4 \cos \theta - 1 = 0$$

$$4(1 - \cos^2 \theta) + 4 \cos \theta - 1 = 0$$

$$4 - 4 \cos^2 \theta + 4 \cos \theta - 1 = 0$$

$$-1[-4 \cos^2 \theta + 4 \cos \theta + 3 = 0]$$

$$4 \cos^2 \theta - 4 \cos \theta - 3 = 0$$

$$X = \cos \theta$$

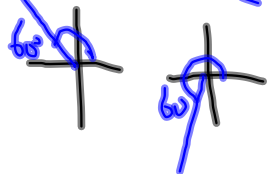
$$4X^2 - 4X - 3 = 0$$

$$(2X + 1)(2X - 3) = 0$$

$$X = -\frac{1}{2}, \frac{3}{2}$$

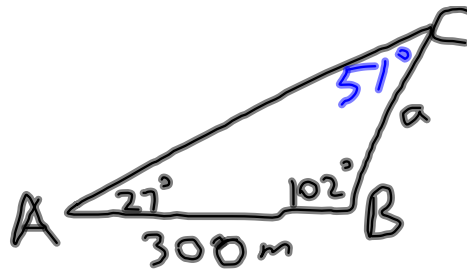
$$\cos \theta = -\frac{1}{2}$$

~~$$\cos \theta = \frac{3}{2}$$~~



$$\theta = 120^\circ, 240^\circ$$

44)



$$\sin 27^\circ \left[ \frac{a}{\sin 27^\circ} = \frac{300}{\sin 51^\circ} \right]$$

$$a = \frac{300 \sin 27^\circ}{\sin 51^\circ} \approx 175.3 \text{ m}$$