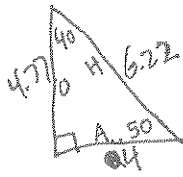


Chapter: 5-4 to 5-8

Topic 1: Right triangle Trigonometry – use the following diagram to solve the following triangles:

1.  $a = 4, C = 50$

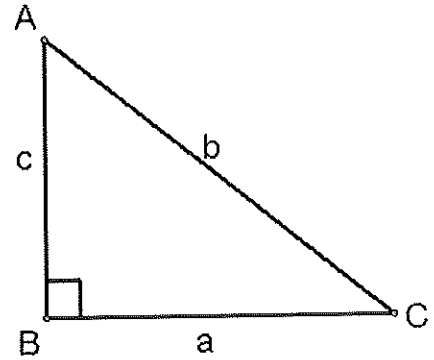


$$\cos 50 = \frac{4}{c} \quad c = 6.22$$

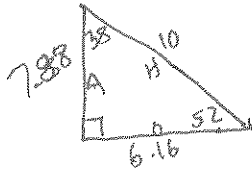
$$0^2 + 4^2 = 6.22^2$$

$$0^2 = 22.7$$

$$0 = 4.77$$

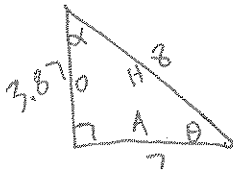


2.  $b = 10, A = 38$



$$\sin 38 = \frac{a}{10} \quad a = 6.16$$

3.  $a = 7, b = 8$



$$\cos \theta = \frac{7}{8}$$

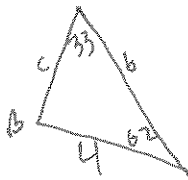
$$\theta = \cos^{-1}\left(\frac{7}{8}\right)$$

$$\theta = 28.96$$

$$\alpha = 61.04$$

Topic 2: Non-Right triangle Trig – use the following diagram to solve the following triangles:

4.  $a = 4, A = 33, C = 62$

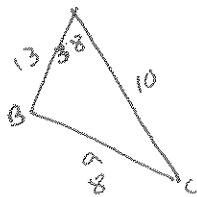


$$\frac{4}{\sin 33} = \frac{c}{\sin 62} \quad c = 6.48$$

$$\angle B = 85$$

$$\frac{4}{\sin 33} = \frac{b}{\sin 85} \quad b = 7.32$$

5.  $b = 10, A = 38, c = 13$



$$a^2 = b^2 + c^2 - 2bc \cos A$$

$$a^2 = 10^2 + 13^2 - 2(10)(13) \cos 38$$

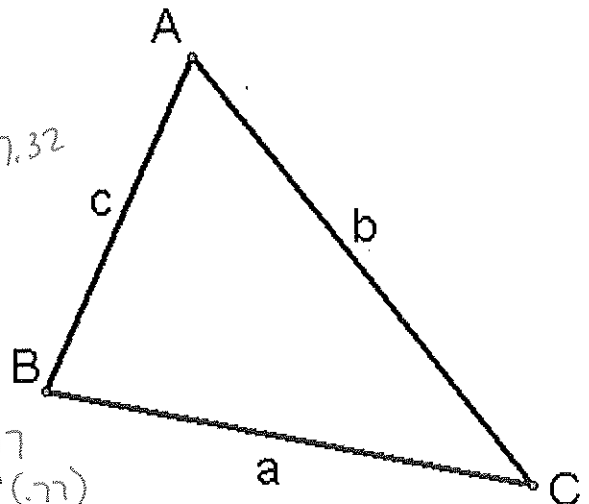
$$a^2 = 64.1 \quad a = 8$$

$$\frac{8}{\sin 38} = \frac{10}{\sin B} \quad \sin B = 0.77$$

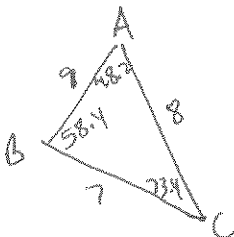
$$B = \sin^{-1}(0.77)$$

$$B = 50.32$$

$$C = 91.68$$



6.  $a = 7, b = 8, c = 9$



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

$$9^2 = 7^2 + 8^2 - 2(7)(8) \cos C$$

$$-32 = -112 \cos C$$

$$.28 = \cos C$$

$$C = \cos^{-1}(0.28) \quad C = 73.4$$

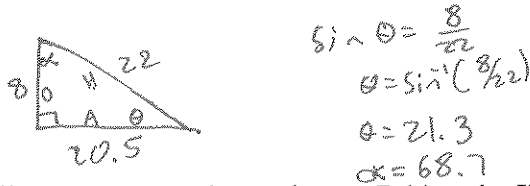
$$\frac{9}{\sin 73.4} = \frac{8}{\sin B}$$

$$B = \sin^{-1}(0.85)$$

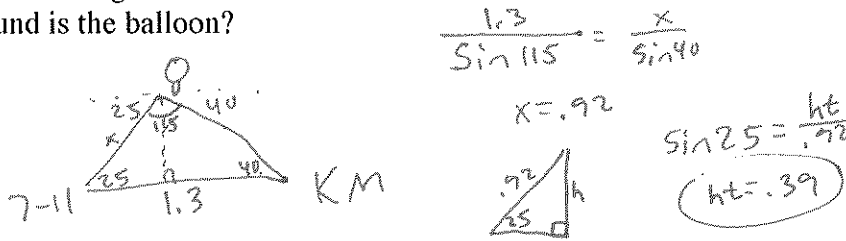
$$B = 58$$

### Topic 3: Applications

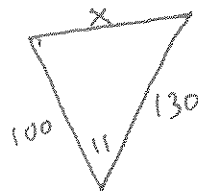
7. A 30 ft flagpole snaps due to the wind 8 ft above the ground. The top of the flagpole falls to the ground such that the flagpole now forms a right triangle with the ground. How far is the tip of the pole from the base and what is the greatest acute angle in the triangle?



8. A hot air balloon measures the angle to a 7-11 and a K-mart. The angle to the 7-11 is 25 degrees and the angle to the K-mart is 40 degrees. If the distance between the 7-11 and the K-mart is 1.3 miles, then how high above the ground is the balloon?



9. A tank fires a shell 100 meters at an enemy bunker. Then the tank cannon rotates 11 degrees and fires a shell 130 meters at an enemy helicopter that is on the ground. How far apart are the bunker and the helicopter?



$x^2 = 100^2 + 130^2 - 2(100)(130)\cos 11$   
 $x^2 = 1377.7$   
 $x = 37.1$

### ACT/SAT Problems

10. The number  $n$  is 16 less than  $2k$ , and  $k$  is 2 more than  $n$ . What is the value of  $n$ ?

$n = 2k - 16$

$k = n + 2$

$n = 2(n+2) - 16$   
 $n = 2n + 4 - 16$

$-n = -12$   
 $n = 12$

11. For all numbers  $a$  and  $b$ , let the operation  $\$$  be defined by  $a \$ b = b^2 + ab$ . What is the value of  $(a \$ b) \$ c$ ?

$(b^2 + ab) \$ c$   
 $c^2 + (b^2 + ab) \cdot c$

12. If  $8\sqrt{8} = x\sqrt{y}$  and  $x$  and  $y$  are different positive integers, what is one possible value of  $x + y$ ?

$\frac{8\sqrt{8}}{x} = \sqrt{y}$

$(\frac{8\sqrt{8}}{x})^2 = y$

$\frac{8 \cdot 8 \cdot 8}{x^2} = \frac{512}{x^2} = y$

x	y
<del>8</del>	<del>8</del>
<del>4</del>	<del>32</del>
<del>2</del>	<del>128</del>
2	128
4	32
<del>8</del>	<del>8</del>
16	2

130  
 36  
 18