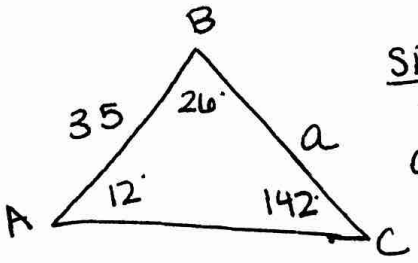
Chapter 12 White Board Problems

Find the missing piece.

1. $A = 12^\circ$, $B = 26^\circ$, $c = 35$mm, a=?



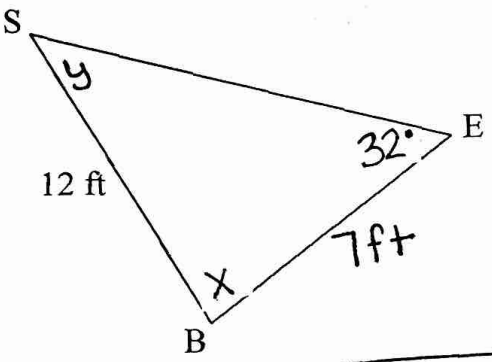
$\frac{\sin 142}{35} = \frac{\sin 12}{a}$

$a\sin 142 = 35\sin 12$

$a = \frac{35\sin 12}{\sin 142}$

$\boxed{a = 11.82\text{mm}}$

2.



$\frac{\sin y}{7} = \frac{\sin 32}{12}$ $\boxed{X = 130^\circ}$

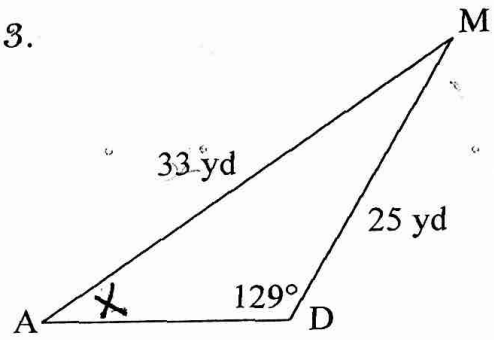
$12\sin y = 7\sin 32$

$\sin y = \frac{7\sin 32}{12}$

$\sin y = 0.31 \rightarrow y = \sin^{-1}(0.31)$

$y = 18^\circ$

3.



$\frac{\sin 129}{33} = \frac{\sin x}{25}$

$25\sin 129 = 33\sin x$

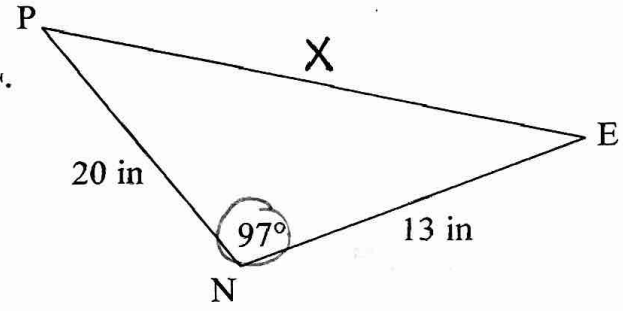
$\frac{25\sin 129}{33} = \sin x$

$0.59 = \sin x$

$\sin^{-1}(0.59) = x$

$\boxed{36.1^\circ = x}$

4.



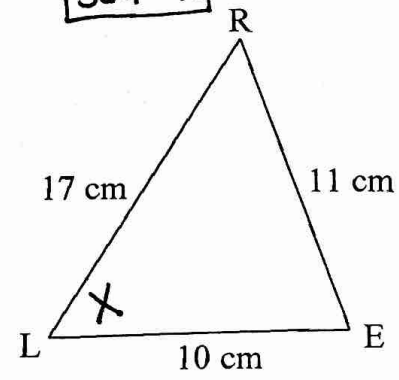
$x^2 = 20^2 + 13^2 - 2(20)(13)\cos 97$

$x^2 = 400 + 169 - (-63.37)$

$x^2 = 632.37$

$\boxed{x = 25.15\text{in}}$

5.



$11^2 = 17^2 + 10^2 - 2(17)(10)\cos X$

$121 = 289 + 100 - 340\cos X$

$121 = 389 - 340\cos X$

$-268 = -34\cos X$

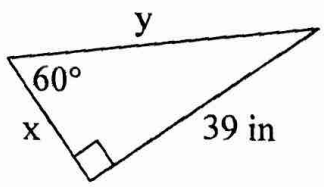
$0.79 = \cos X$

$\cos^{-1}(0.79) = X$ $\boxed{X = 37.98^\circ}$

Right Triangles – Find the unknown value(s)

D = special rt. Δs

1.



$39 = x\sqrt{3}$

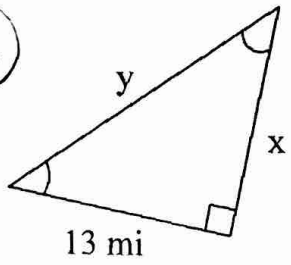
$\frac{39}{\sqrt{3}} = x$

$\frac{39\sqrt{3}}{3} = x$

$13\sqrt{3}$ in $= x$

$y = 26\sqrt{3}$ in

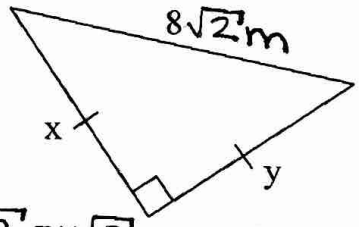
2.



$x = 13$ mi

$y = 13\sqrt{2}$ mi

3.

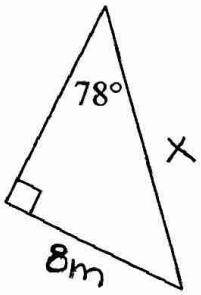


$8\sqrt{2} = x\sqrt{2}$

8 m $= x$

$y = 8$ m

5.



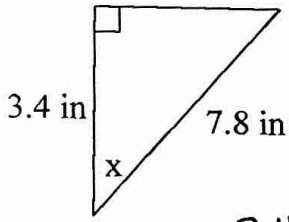
$\sin 78 = \frac{8}{x}$

$x \sin 78 = 8$

$x = \frac{8}{\sin 78}$ exact

$x = 8.2$m approx

6.



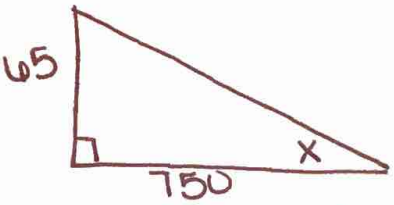
$\cos x = \frac{3.4}{7.8}$

$x = \cos^{-1}\left(\frac{3.4}{7.8}\right)$

$x = 64.2°$

Applications

1. A slope rises vertically 65 ft over a horizontal distance of 750ft. What is the angle of elevation?

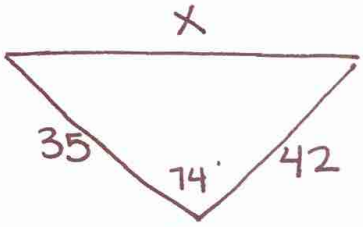


$\tan x = \frac{65}{750}$

$x = \tan^{-1}(65/750)$ exact

$x = 4.95°$ approx

2. A construction crew is working on a triangular site. One length is 35ft and the other is 42ft. The angle between these two sides is 74° , what is the perimeter of the triangle?



$x^2 = 35^2 + 42^2 - 2(35)(42)\cos 74$

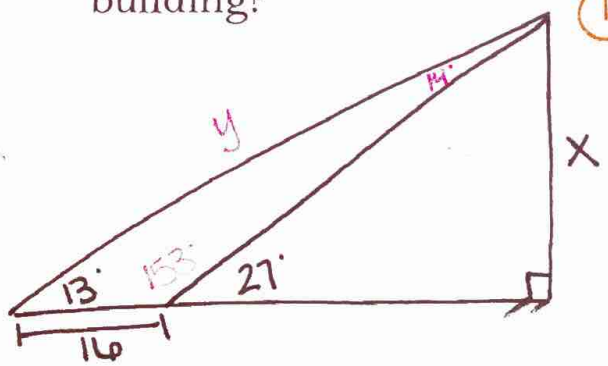
$x^2 = 1225 + 1764 - 810.37$

$x^2 = 2178.63$

$x = 46.68$

$P = 123.68ft$

3. You are trying to measure the height of a building. The first spot you measure from has an angle of elevation of 27° with the top of the building. Then you move 16ft back and your angle of elevation is 13° with the top of the building. What is the height of the building?



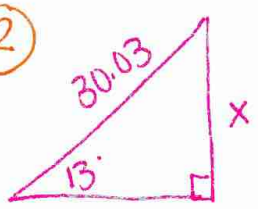
① $\frac{\sin 14}{16} = \frac{\sin 153}{y}$

$16\sin 153 = y\sin 14$

$\frac{16\sin 153}{\sin 14} = y$

$30.03 = y$

②

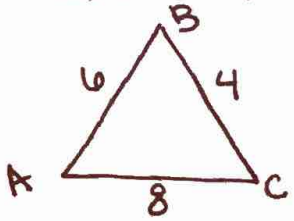


$\sin 13 = \frac{x}{30.3}$

$6.8ft = x$

Non-Right Triangles – Solve the triangle

1. $a = 4\text{in}$, $b = 8\text{in}$, $c = 6\text{in}$



$8^2 = 6^2 + 4^2 - 2(6)(4)\cos B$

$12 = -48\cos B$

$-.25 = \cos B$

$\cos^{-1}(-.25) = B$

$104.5° = B$

$\frac{\sin 104.5}{8} = \frac{\sin A}{4}$

$4\sin 104.5 = 8\sin A$

$0.484 = \sin A$

$28.95° = A$

$C = 45.55°$