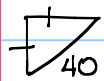
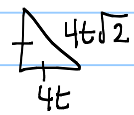
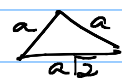
Note Title 3/10/2015

45-45-90

5. 

then $\frac{40}{\sqrt{2}} = \frac{x\sqrt{2}}{\sqrt{2}}$, $x = \frac{40}{\sqrt{2}}\cdot\frac{\sqrt{2}}{\sqrt{2}} = \frac{\overset{20}{\cancel{40}}\sqrt{2}}{\underset{1}{\cancel{2}}} = 20\sqrt{2}$

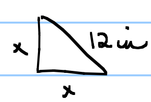
6. 

9. $\frac{2x\sqrt{5}}{\sqrt{2}} = \frac{a\sqrt{2}}{\sqrt{2}}$ 

$\frac{\sqrt{2}}{\sqrt{2}}\cdot\frac{2\sqrt{5}\,x}{\sqrt{2}}$

$\frac{\cancel{2}\sqrt{10}\,x}{\cancel{2}} = a$

$x\sqrt{10} = a$

18. 

| 45 | 45 | 90 |
|---|---|---|
| $x$ | $x$ | $x\sqrt{2}$ |
| | | 12 |

$x\sqrt{2} = 12$

$x = \frac{12\sqrt{2}}{2} = 6\sqrt{2}$

Pyth Theorem

$x^2 + x^2 = 12^2$

$2x^2 = 12^2$

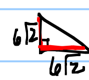
$x^2 = 72$

$x = 6\sqrt{2}$

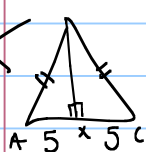
Perimeter

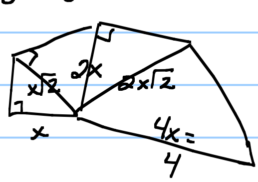
$6\sqrt{2} + 6\sqrt{2} + 12$

$(12\sqrt{2} + 12)$

Area  $= \frac{1}{2}b\cdot h$

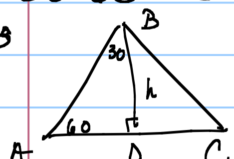
$\frac{1}{2}\cdot 6\cdot\sqrt{2}\cdot 6\cdot\sqrt{2} = 18\sqrt{4} = 36$

~~24~~ 

21. 

$x = 1$

30-60-90 #8 24 25 26

8 

| 30 | 60 | 90 |
|---|---|---|
| $x$ | $x\sqrt{3}$ | $2x$ |
| $\frac{h}{3}\sqrt{3}$ | $h$ | |

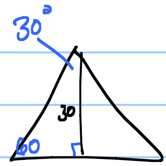
If $h = x\sqrt{3}$

then $\frac{\sqrt{3}\,h}{\sqrt{3}\sqrt{3}} = \frac{x\sqrt{3}}{\sqrt{3}}$

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

$AD = \frac{h}{3}\sqrt{3}$, $DC = \frac{h}{3}\sqrt{3}$, $AB = \frac{2h}{3}\sqrt{3} = BC$

Fin'd P & A

24. 


| 30 | 60 | 90 |
|---|---|---|
| $x$ | $x\sqrt{3}$ | $2x$ |
| $10\sqrt{3}$ | $30$ | $20\sqrt{3}$ |

If $x\sqrt{3} = 30$

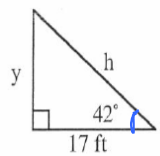
$x = \frac{30}{\sqrt{3}} = \frac{30\sqrt{3}}{3} = 10\sqrt{3}$

$P = 3(20\sqrt{3}) = 60\sqrt{3}$

$A = \frac{1}{\cancel{2}} \cdot \cancel{20}^{10}\sqrt{3} \cdot 30 = 300\sqrt{3}$

**Example 1**

Use trigonometric ratios to find the lengths of each of the missing sides of the triangle below.




The length of the adjacent side with respect to the 42° angle is 17 ft. To find the length y, use the tangent because y is the opposite side and we know the adjacent side.

$$\tan 42° = \frac{y}{17}$$
$$17 \tan 42° = y$$
$$15.307 \text{ ft} \approx y$$

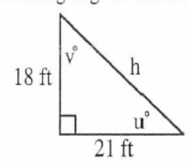
The length of y is approximately 15.31 feet. To find the length h, use the cosine ratio (adjacent and hypotenuse).

$$\cos 42° = \frac{17}{h}$$
$$h \cos 42° = 17$$
$$h = \frac{17}{\cos 42°} \approx 22.876 \text{ ft}$$

The hypotenuse is approximately 22.9 feet long.

**Example 2**

Use trigonometric ratios to find the size of each angle and the missing length in the triangle below.




To find m∠u, use the tangent ratio because you know the opposite (18 ft) and the adjacent (21 ft) sides.

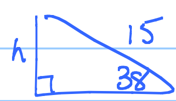
$$\tan u° = \frac{18}{21}$$
$$m\angle u° = \tan^{-1}\frac{18}{21} \approx 40.601°$$

The measure of angle u is approximately 40.6°. By subtraction we know that m∠v ≈ 49.4°.

Use the sine ratio for m∠u and the opposite side and hypotenuse.

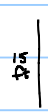
$$\sin 40.6° = \frac{18}{h}$$
$$h \sin 40.6° = 18$$
$$h = \frac{18}{\sin 40.6°} \approx 27.659 \text{ ft}$$

The hypotenuse is approximately 27.7 feet long.

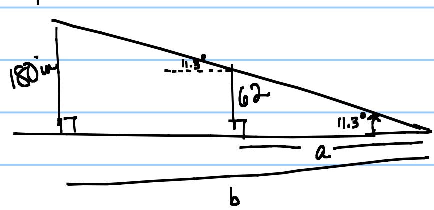
1 


$\frac{h}{15} = \sin 38$, $h = 15(\sin 38)$

$h \approx 9.23$

19. 


$15 \cancel{ft} \cdot \frac{12 \text{ in}}{1 \cancel{ft}} = 180 \text{ in}$




$\tan 11.3 = \frac{62}{a}$

$a = 62/(\tan 11.3)$

$a = 310.28$ in

$\tan 11.3 = \frac{180}{b}$

$b = 180/\tan 11.3 = 900.81$ in

$b - a = c = 900.81 - 310.28$

$= 590.53$ in

$590.53 \cancel{in} \cdot \frac{1 \text{ ft}}{12 \cancel{in}} = 49.21 \text{ ft}.$