Geometry
Name: _____

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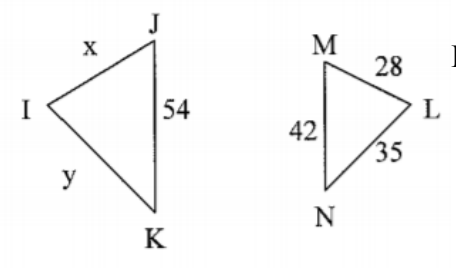
1. Given △IJK~ △LMN. Find *x* and *y*. If the area of △LMN is 438, what is the area of △IJK to the nearest whole number.



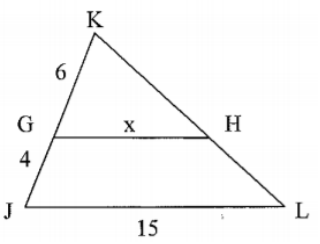
Let $A = Area\ of\ \triangle IJK$

$$\left(\frac{JK}{MN}\right)^2 = \frac{Area\ of\ \triangle IJK}{Area\ of\ \triangle LMN}$$

$$\left(\frac{54}{42}\right)^2 = \frac{A}{438}$$

$$A = 438 \cdot \left(\frac{54}{42}\right)^2 \approx 724$$

3. △JKL~△GKH. Find *x* and *y*.

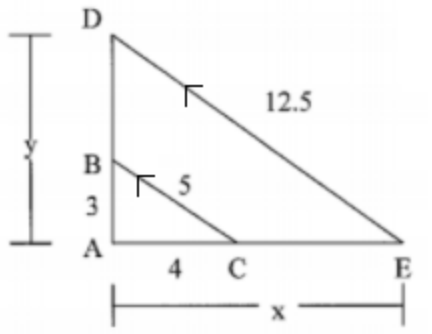


$$\frac{6}{10} = \frac{x}{15}$$

$$10x = 90$$

$$x = 9$$

4. Find *x* and *y*.



$$\frac{4}{x} = \frac{5}{12.5}$$

$$5x = 50$$

$$x = 10$$

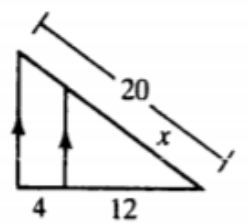
$$\frac{4}{x} = \frac{3}{y}$$

$$\frac{4}{10} = \frac{3}{y}$$

$$4y = 30$$

$$y = \frac{30}{4} = \frac{15}{2}$$

5. Find *x*



$$\frac{x}{20} = \frac{12}{12+4}$$

$$\frac{x}{20} = \frac{12}{16}$$

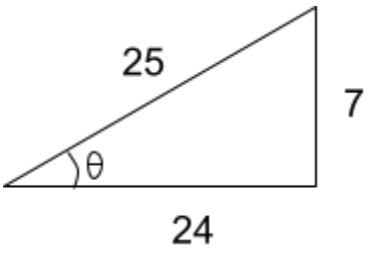
$$\frac{x}{20} = \frac{3}{4}$$

$$4x = 60$$
$$x = \frac{60}{4} = 15$$

6. Consider the conversion factors 12 inches = 1 foot; 3 feet = 1 yard; How many yards is equal to 7 inches? Express your final answer in simplest fraction.

$$7\ inches \cdot \frac{1\ foot}{12\ inches} \cdot \frac{1\ yard}{3\ feet} = \frac{7}{36}\ yards$$

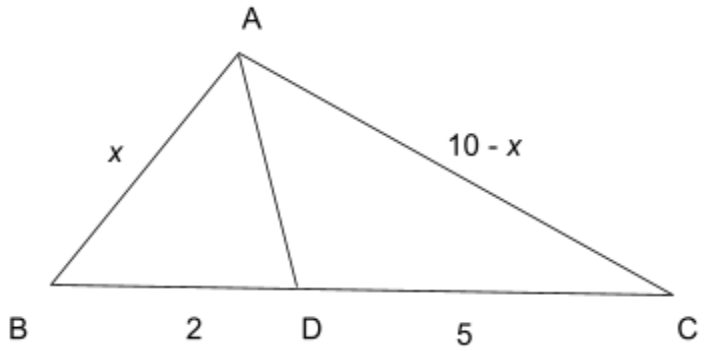
7. If $\sin\theta = \frac{7}{25}$, what is $\tan\theta$?



$$7^2 + x^2 = 25^2$$
$$x = 24$$

$$\tan\theta = \frac{7}{24}$$

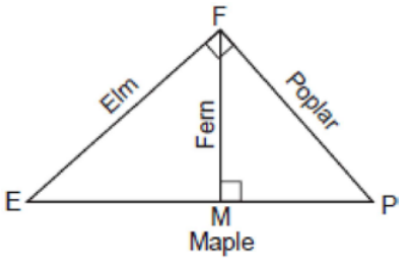
8. Let ABC be a triangle with angle bisector AD with D on line segment BC. If BD = 2, CD = 5, and $AB + AC = 10$, find AB and AC.



Triangle Angle-Bisector Theorem

$$\frac{x}{10-x} = \frac{2}{5}$$
$$5x = 2(10 - x)$$
$$5x = 20 - 2x$$
$$7x = 20$$
$$x = \frac{20}{7}$$
$$AB = \frac{20}{7},\ AC = 10 - \frac{20}{7} = \frac{50}{7}$$

9. Four streets in a town are illustrated in the accompanying diagram. If the distance on Poplar Street from F to P is 12 miles and the distance on Maple Street from E to M is 10 miles, find the distance on Maple Street, in miles, from M to P.



Let $x = MP$

$$\frac{10+x}{12} = \frac{12}{x}$$

$$x(10+x) = 144$$

$$x^2 + 10x - 144 = 0$$

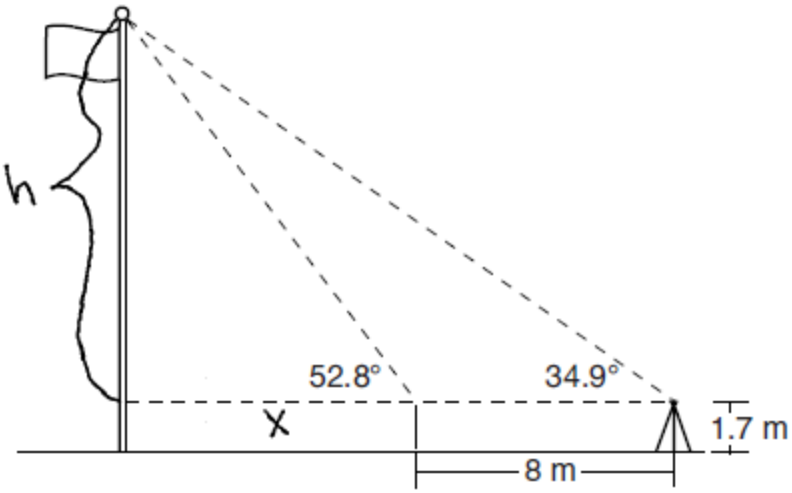
$$(x+18)(x-8) = 0$$

$$x = 8$$

The distance from M to P is 8 miles.

10.

Cathy wants to determine the height of the flagpole shown in the diagram below. She uses a survey instrument to measure the angle of elevation to the top of the flagpole, and determines it to be 34.9°. She walks 8 meters closer and determines the new measure of the angle of elevation to be 52.8°. At each measurement, the survey instrument is 1.7 meters above the ground.



Determine and state, to the nearest tenth of a meter, the height of the flagpole.

$\tan 52.8 = \frac{h}{x}$ | $\tan 34.9 = \frac{h}{x+8}$

$x \tan 52.8 = h$ | $(x+8)\tan 34.9 = h$

$x \tan 52.8 = x \tan 34.9 + 8 \tan 34.9$

$-x \tan 34.9 \quad -x \tan 34.9$

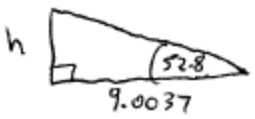
$x \tan 52.8 - x \tan 34.9 = 8 \tan 34.9$

$x(\tan 52.8 - \tan 34.9) = 8 \tan 34.9$

$\frac{.619841\cancel{6839}\,x}{.619841\cancel{6}839} = \frac{8 \tan 34.9}{.619841\cancel{6}839}$

$x = 9.003714087$

$\tan 52.8 = \frac{h}{9.003714087}$



$h = 9.003714087 \tan 52.8$

$h = 11.86195525$

$+ 1.7$

$\text{height} = 13.56195525$

height = 13.6 m

Multiple Choice Answer:

1) 1
2) 1
3) 2
4) 3
5) 2
6) 4
7) 3
8) 2
9) 4
10) 1
11) 4