Geometry Second Semester Review

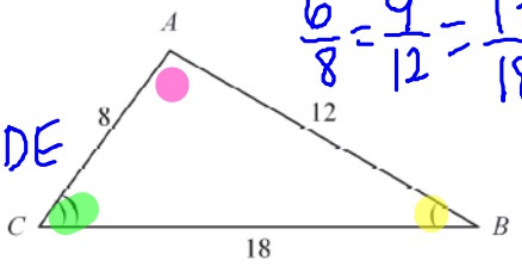
Short Answer

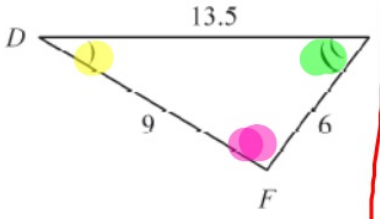
1. Identify the pairs of congruent angles and corresponding sides.

△ similarity

△ABC ~ △FDE

$\frac{6}{8} = \frac{9}{12} = \frac{13.5}{18}$





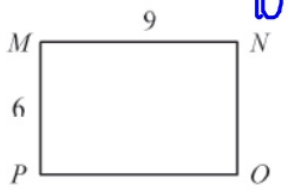
SAS 2 sides prop. and included ∠ ≅

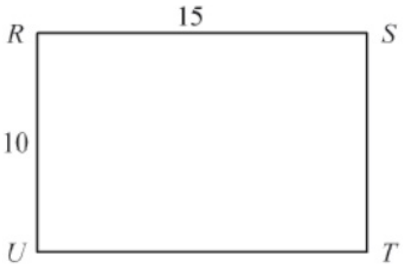
AA similarity: If 2 corr. ∠ are ≅ in a △, the 3rd ∠ is ≅

SSS: If 3 corr. sides are proportionate, the ~△

2. Determine whether the rectangles are similar. If so, write the similarity ratio and a similarity statement.

Yes $\frac{6}{10} = \frac{3}{5}$





Similar polygons

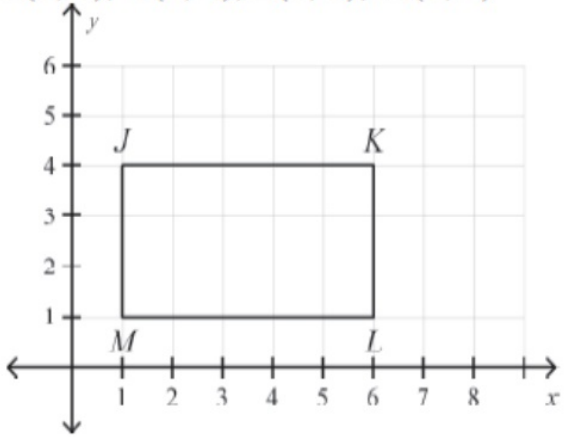
① all corresp. ∠ are ≅

② all corresp. sides are proportionate

□ are similar (MNOP and RSTU) with $\frac{3}{5}$ similarity ratio

3. A video game designer is modeling a tower that is 320 ft high and 260 ft wide. She creates a model so tha the similarity ratio of the model to the tower is $\frac{1}{500}$. What is the height and the width of the model in inch

4. Apply the dilation D to the polygon with the given vertices. Name the coordinates of the image points.
$D: (x, y) \rightarrow (3x, 3y)$
$J(1, 4)$, $K(6, 4)$, $L(6, 1)$, $M(1, 1)$



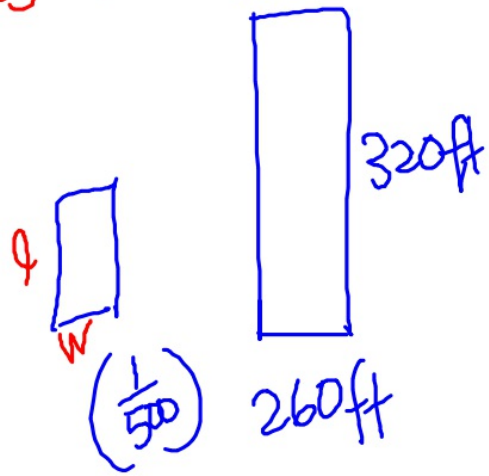
convert units

ft $\frac{13}{25} = \frac{1 \text{ ft}}{12 \text{ in}}$
?? $\frac{x}{}$

$x = \left(\frac{13}{25}\right)(12)$

$W = \frac{13}{25}(12) = 6.24 \text{ in} = w$

$7.68 \text{ in} = l$



$\frac{l}{320} = \frac{1}{500}$

$\frac{1}{500} = \frac{w}{260}$

$500w = 260$

$w = \frac{260}{500} \frac{13}{25}$

answer times 12 inches ← feet

J'(3, 12)

K'(18, 12)

L'(18, 3)

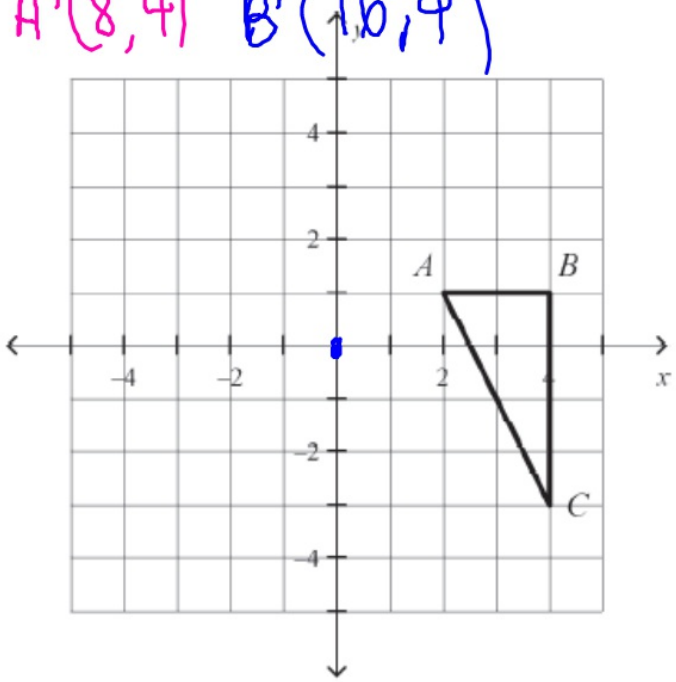
M'(3, 3)

5. Apply the dilation D to the polygon with the given vertices. Name the coordinates of the image points. Identify and describe the transformation.

$D: (x, y) \rightarrow (4x, 4y)$

$A(2, 1), B(4, 1), C(4, -3)$

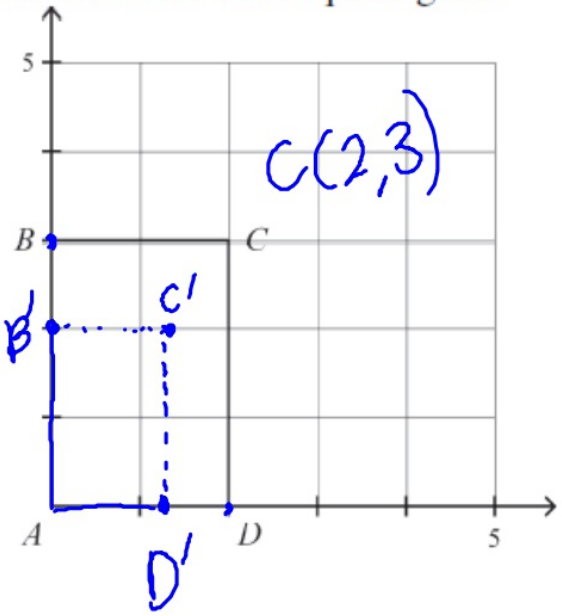
A'(8,4) B'(16,4)



Dilation centered at (0,0)

with a scale factor of (4)

6. Tamika is resizing a photograph with a height of 3 inches and a width of 2 inches.The original phot is shown on a 1-inch square grid.

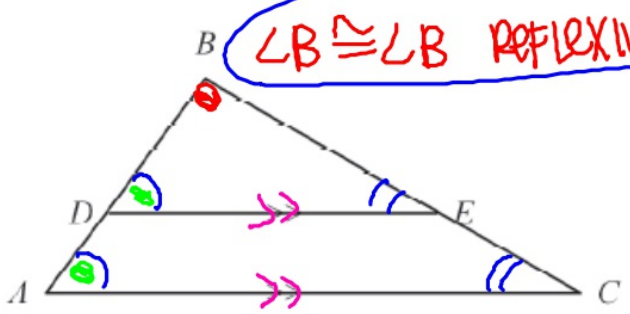


Show the image, $A'B'C'D'$, on the grid after a dilation with scale factor $\frac{2}{3}$.

D (2,0)

$\frac{2}{3}(2) = (\frac{4}{3}, 0)$

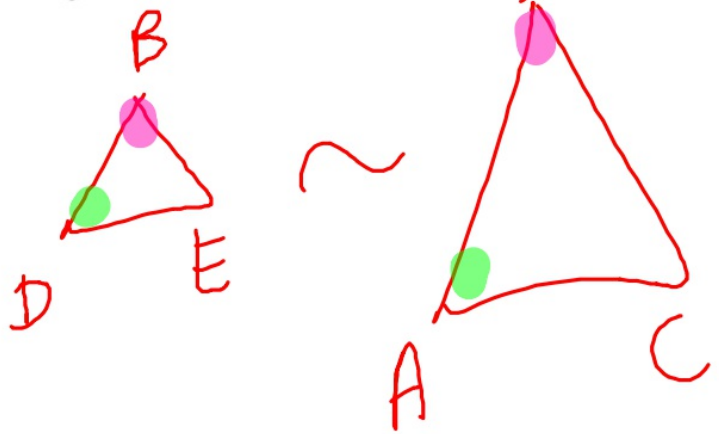
7. Explain why the triangles are similar and write a similarity statement.



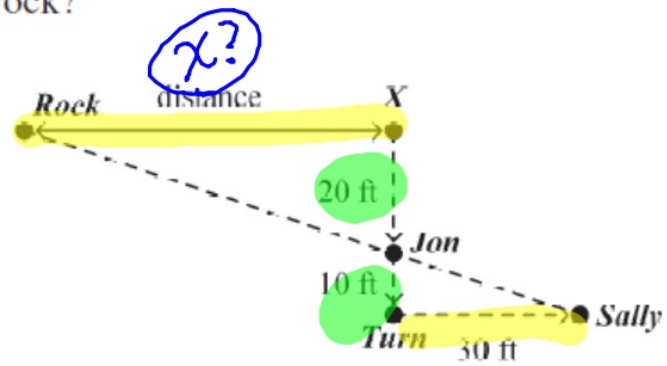
∠B ≅ ∠B REFLEXIVE and ∠D ≅ ∠A corr ∠s ≅ if // lines

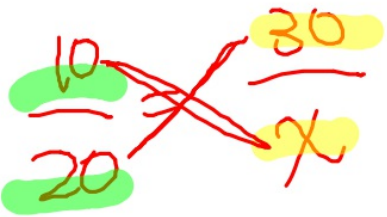
AA 2 ∠s ≅ → △ ~

Break up Triangles



8. To find out how wide a river is, Jon and Sally mark an X at the spot directly across from a big rock on the other side of the river. Then they walk in a straight line along the river, perpendicular to the straight line between the X and the rock. After walking for 20 feet Jon stops while Sally continues along the straight line for another 10 feet. Then she makes a 90 degree turn and walks for 30 feet. When she stops and looks at the rock she sees that the straight line from her to the rock passes through Jon. What is the distance from X to the rock?

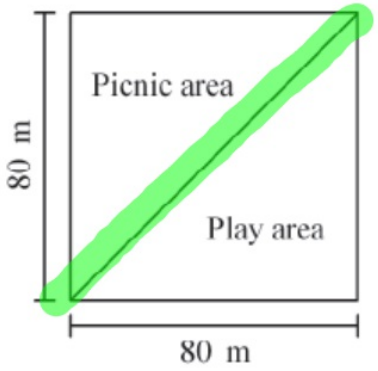




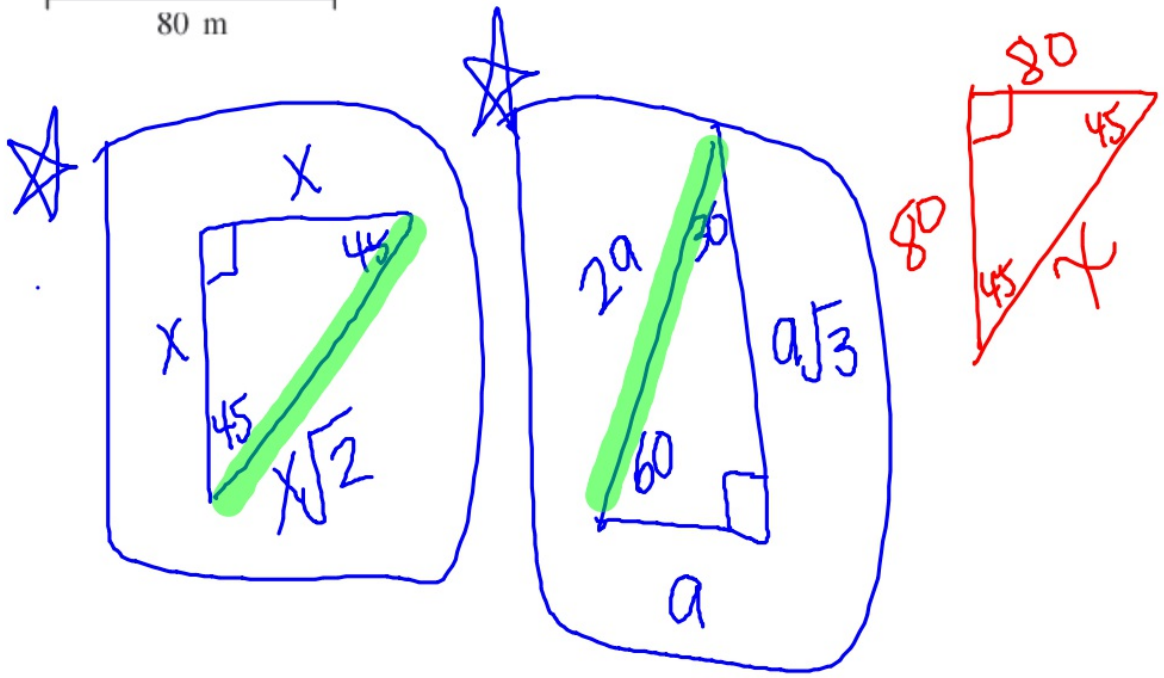
$10x = 600$

$x = 60$

9. A community is building a square park with sides that measure 80 meters. To separate the picnic area from the play area, the park is split by a diagonal line from opposite corners. Determine the approximate length of the diagonal line that splits the square. If necessary, round your answer to the nearest meter.



square with Diagonal
→ 45-45-90 △

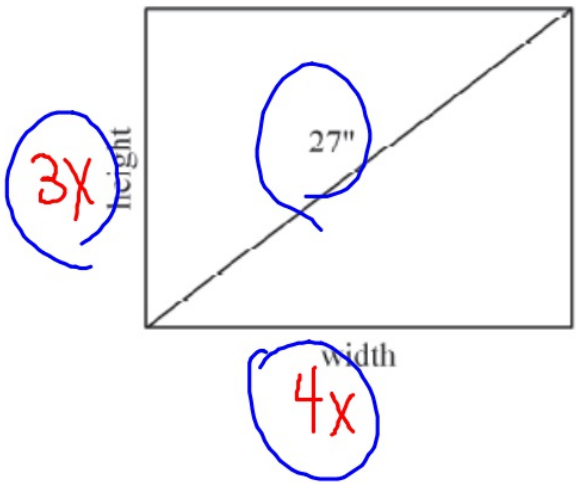


80√2

80 · (1.414)

= 113m

10. The size of a TV screen is given by the length of its diagonal. The screen aspect ratio is the ratio of its width to its height. The screen aspect ratio of a standard TV screen is 4:3. What are the width and height of a 27" TV screen? Round your answers to the nearest tenth of an inch.



ratio

$3x$ $4x$

$3x \cdot 3x = 9x^2$

$4x \cdot 4x = 16x^2$

Pythag. theo.

$$(4x)^2 + (3x)^2 = (27)^2$$

$$16x^2 + 9x^2 = 729$$

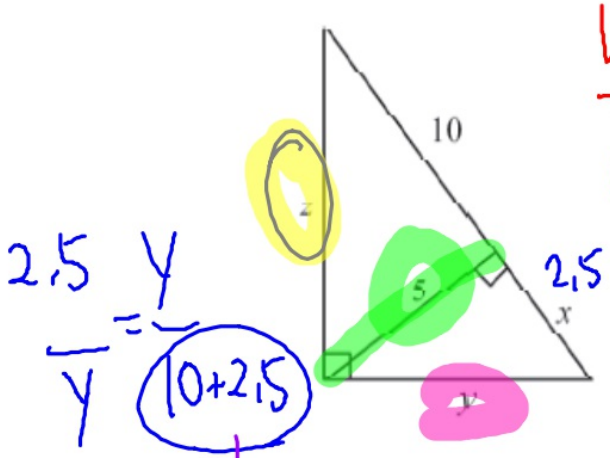
$$\frac{25}{25}x^2 = \frac{729}{25}$$

$$\sqrt{x^2} = \sqrt{\frac{729}{25}} \rightarrow x = \frac{27}{5} = 5.4$$

✱ x is the mean between 9 and 3 $\frac{9}{x}=\frac{x}{3}$

$x^2 = 9 \cdot 3 = \sqrt{27} = 3\sqrt{3}$

11. Find x, y, and z. Give your answers in simplest radical form.



$\frac{10}{5}=\frac{5}{x}$ $10x=25$ $x=\frac{5}{2}$

$\frac{2.5}{y}=\frac{y}{10+2.5}$

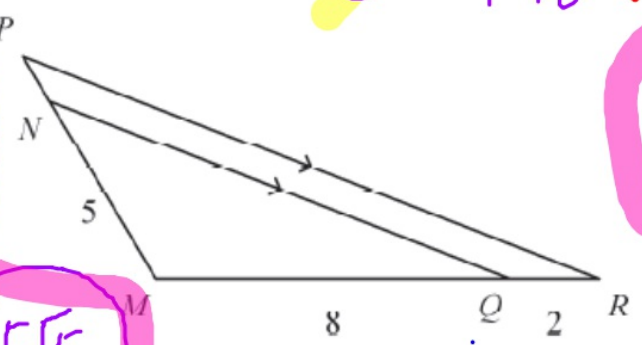
$\frac{10}{z}=\frac{z}{12.5}$ $z^2=\sqrt{125}$ $z=5\sqrt{5}$

Geometric mean

Altitude of RIGHT △

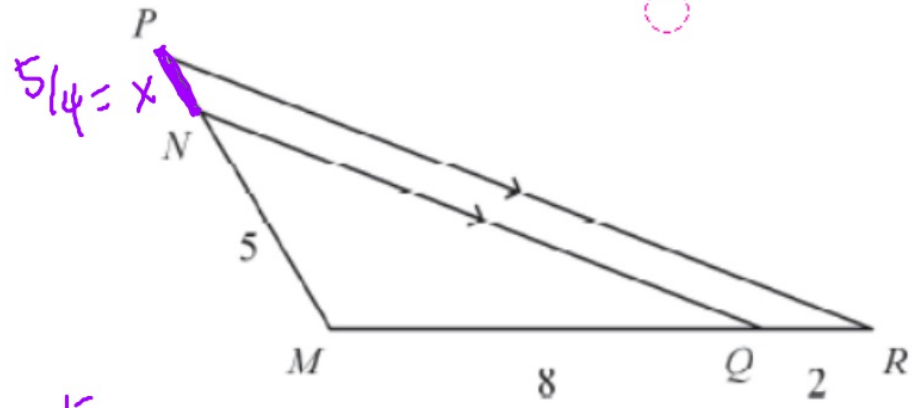
$\frac{a}{x}=\frac{x}{b}$ $\frac{a}{y}=\frac{y}{c}$ $\frac{b}{z}=\frac{z}{c}$

12. Find NP.



$y^2=\frac{5}{2}\left(\frac{25}{2}\right)$ $y^2=\sqrt{\frac{125}{4}}=\frac{5\sqrt{5}}{2}$

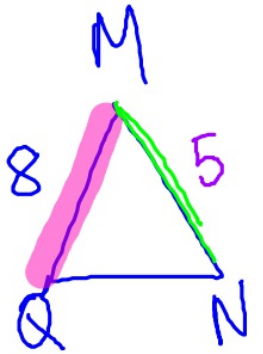
12. Find NP.



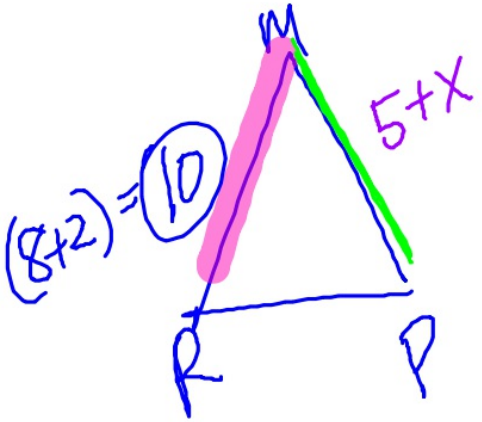
1 1/4

1.25

5/4 = x



$\frac{48}{510} = \frac{5}{5+x}$



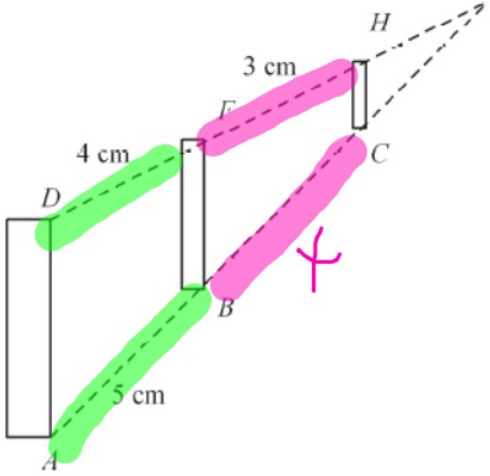
$4(5+x) = 5 \cdot 5$

$20 + 4x = 25$

$4x = 5$

$x = 5/4$

13. An artist used perspective to draw guidelines in her picture of a row of parallel buildings. How many centimeters is it from Point *B* to Point *C*?



$\frac{3}{4} = \frac{x}{5}$

$4x = 15$

$x = \frac{15}{4} = 3\frac{3}{4}$ or 3.75

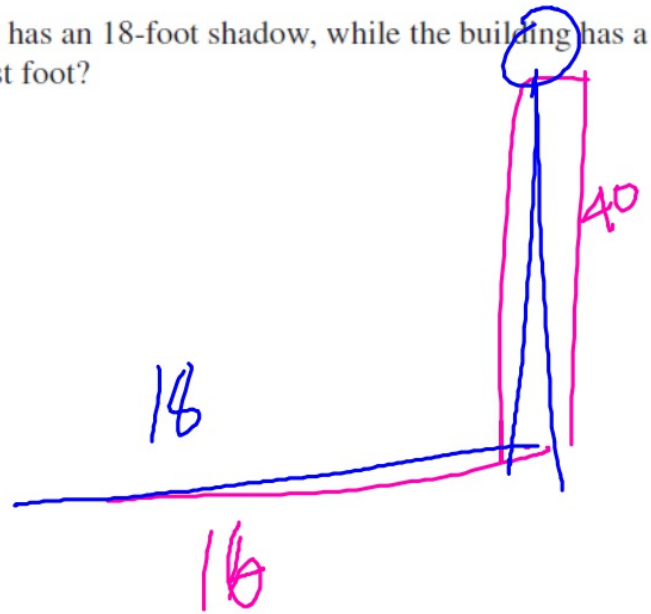
14. A tree is standing next to a 40-foot high building. The tree has an 18-foot shadow, while the building has a 16-foot shadow. How tall is the tree, rounded to the nearest foot?

$\frac{40}{16} = \frac{x}{18}$

$5 \cdot 18 = 2x$

$90 = 2x$

$45 = x$

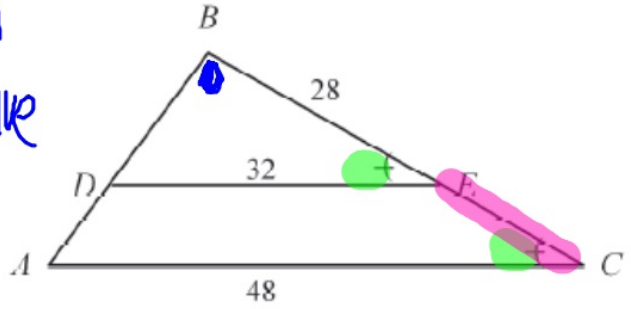


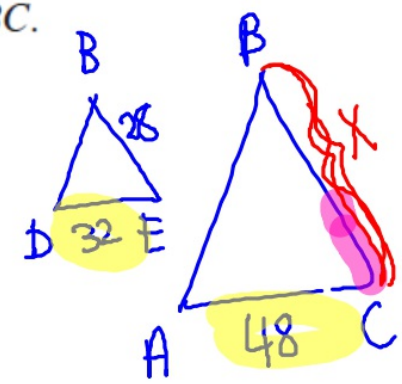
15. Explain why $\Delta ABC \sim \Delta DBE$ and then find BC.

A $\angle E \cong \angle C$ Given

A $\angle B \cong \angle B$ Reflexive

$\Delta \sim \Delta$ AA





$\frac{32}{48} = \frac{28}{X}$

$2X = 3 \cdot 28$

$2X = 84$

$X = 42$

16. Find the geometric mean of the pair of numbers 2 and 8.

$\frac{2}{X} = \frac{X}{8}$

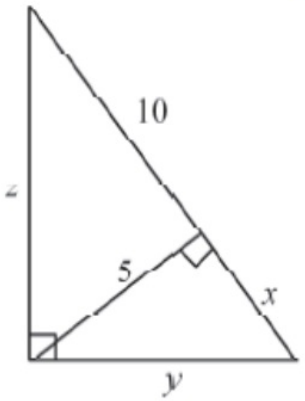
$X^2 = 2 \cdot 8$

$\sqrt{X^2} = \sqrt{16}$

$X = 4$

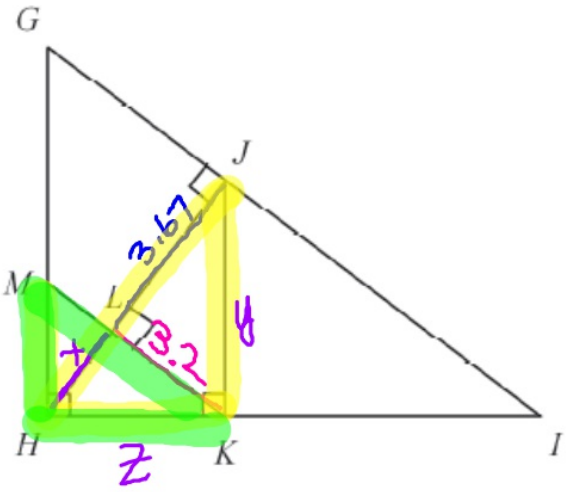
17. Find x, y, and z.

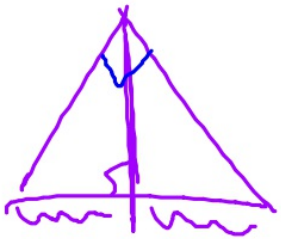
Same as #11



8.57 and 13.04

18. Find *GI* and *GH* to the nearest hundredth. *LK* is 3.20 cm and *LJ* is 3.67 cm.





Pythl.

JK $(3.2)^2 + (3.67)^2 = (JK)^2$

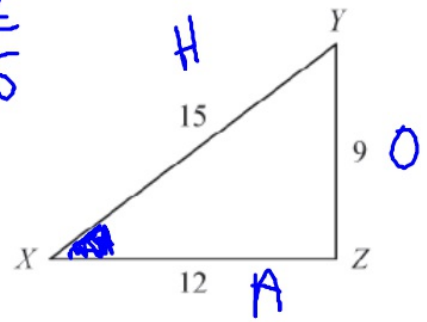
Geometric mean

LK $\frac{x}{3.2} = \frac{3.2}{3.67}$

19. Write the trigonometric ratio for cos X as a fraction and as a decimal rounded to the nearest hundredth.

$\cos X = \frac{12}{15}$

$\frac{4}{5} = .8$

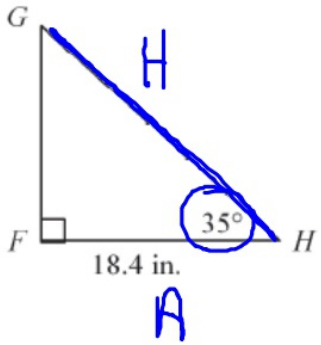


$\sin X = \frac{O}{H}$ SOH

$\cos X = \frac{A}{H}$ CAH

$\tan X = \frac{O}{A}$ TOA

20. Find GH. Round to the nearest hundredth.

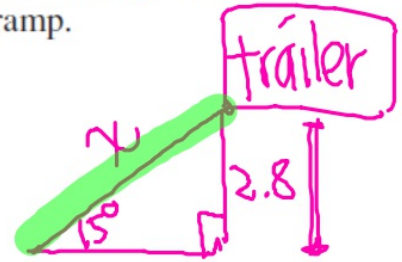


$\frac{.8192}{\cos 35^\circ} = \frac{18.4}{X}$

$\frac{.8192X}{.8192} = \frac{18.4}{.8192}$

$X = 22.46$

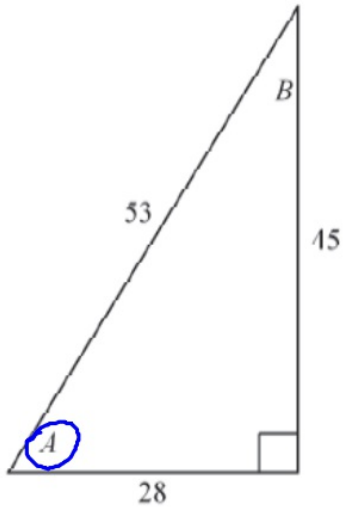
21. Jessie is building a ramp for loading motorcycles onto a trailer. The trailer is 2.8 feet off of the ground. To avoid making it too difficult to push a motorcycle up the ramp, Jessie decides to make the angle between the ramp and the ground 15°. To the nearest hundredth of a foot, find the length of the ramp.



$\sin 15^\circ = \frac{2.8}{x}$

$x = 10.82$

22. Find the sine and cosine of the acute angles in the right triangle.



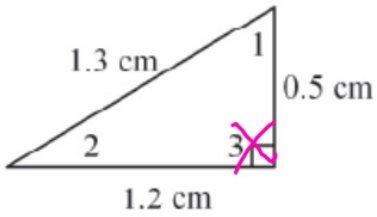
$\sin B = \frac{28}{53}$

$\cos B = \frac{45}{53}$

$\sin A = \frac{45}{53}$

$\cos A = \frac{28}{53}$

23. Use the trigonometric ratio $\sin A = 0.38$ to determine which angle of the triangle is $\angle A$.

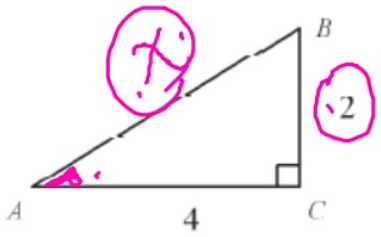


$\sin\angle 1 = \frac{1.2}{1.3}$

.38 ???

$\sin\angle 2 = \frac{.5}{1.3}$

24. Find $\sin \angle A$ to the nearest hundredth.



$\sin A = \frac{2}{\text{HYP}}$

$4^2 + 2^2 = c^2$

$16 + 4 = c^2$

$\sqrt{20} = c^2$

$2\sqrt{5} = c$

$\sin A = \frac{2}{2\sqrt{5}}$

$\frac{2}{4} = .5$

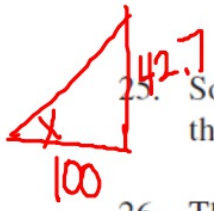
$\tan A = .5$

EITHER WAY

$\angle A = 27^\circ$

$\sin \angle A_{27} = .4540$

.45



25. Some mountains in the Alps are very steep and have a grade of 42.7%. To the nearest degree, what angle do these mountains make with a horizontal line?

23°

26. The largest Egyptian pyramid is 146.5 m high. When Rowena stands far away from the pyramid, her line of sight to the top of the pyramid forms an angle of elevation of 20° with the ground. What is the horizontal distance between the center of the pyramid and Rowena? Round to the nearest meter.

402 m

27. An eagle 300 feet in the air spots its prey on the ground. The angle of depression to its prey is 15°. What is the horizontal distance between the eagle and its prey? Round to the nearest foot.

1120 ft

28. A pilot flying at an altitude of 1.8 km sights the runway directly in front of her. The angle of depression to the beginning of the runway is 31°. The angle of depression to the end of the runway is 23°. What is the length of the runway? Round to the nearest tenth of a kilometer.

1.2 km

Angle of depression = Angle of elevation