Version A

Quiz 3.1

1. Solve for x:

$$\cancel{20}^{5} \cdot \frac{3}{\cancel{4}_{1}} + \frac{x}{\cancel{8}_{2}} = \frac{2x+1}{\cancel{5}_{1}} \cdot \cancel{20}^{4}$$

$$2 \cdot 15 + \frac{5x}{\cancel{2}} \cdot \cancel{2} = 8x + 4 \cdot 2$$

$$30 + 5x = 16x + 8$$

$$30 - 8 = 16x - 5x$$

$$\frac{\cancel{22}^{2}}{\cancel{11}_{1}} = \frac{\cancel{11}x}{\cancel{11}}$$

$$2 = x$$

1. Solve for x:

$$\frac{3}{4} + \frac{x}{8} = \frac{2x+1}{5}$$

$$\frac{3}{4} + \frac{x}{8} = \frac{2x+1}{5}$$

$$\frac{6}{8} + \frac{x}{8} = \frac{2x+1}{5}$$

$$\frac{6+x}{8} = \frac{2x+1}{5}$$

$$5(6+x) = 8(2x+1)$$

$$30 + 5x = 16x + 8$$

$$-5x \qquad -5x$$

$$30 = 11x + 8$$

$$-8 \qquad -8$$

$$\frac{22 = 11x}{11}$$

$$\boxed{x = 2}$$

check:

$$\frac{3}{4} + \frac{x}{8} = \frac{2x+1}{5}$$

$$\frac{3}{4} + \frac{2}{8} = \frac{2(2)+1}{5}$$

$$\frac{3}{4} + \frac{1}{4} = \frac{4+1}{5}$$

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

$$\frac{1}{1} = \frac{1}{1}$$

Version A

Quiz 3.1

1. Solve for x:

$$\overset{\times 10}{\frac{3}{4}}+\overset{\times 5}{\frac{x}{8}}=\overset{\times 8}{\frac{2x+1}{5}}$$

$$\frac{30}{\cancel{40}}+\frac{5x}{\cancel{40}}=\frac{16x+8}{\cancel{40}}$$

$$30+5x=16x+8$$
$$-8 \qquad\qquad -8$$

$$22+5x=16x$$
$$-5x \quad -5x$$

$$\frac{22=11x}{11}$$

$$x=2$$

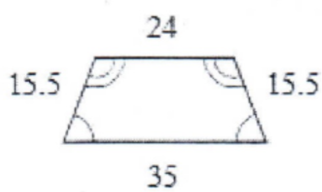
$$x=2$$

$$\frac{3}{4}+\frac{2}{8}=1 \qquad 1=1$$

$$\frac{2x+1}{5}=1$$

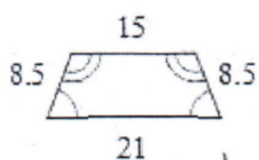
Version A

2. Determine if the polygons are similar. Defend your answer using algebra and appropriate vocabulary.



$\frac{24}{15} = 1.6$

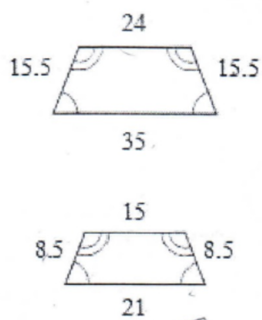
$\frac{16.5}{8.5} = 1.8$



no they are not similar because the corresponding sides don't have the same ratio as eachother

Version A

2. Determine if the polygons are similar. Defend your answer using algebra and appropriate vocabulary.



$\frac{35}{21}$ $\frac{24}{15}$

$\frac{15.5}{8.5}$ $\frac{15.5}{8.5}$

$\frac{24}{15} = \boxed{\frac{8}{5}}$ SLR

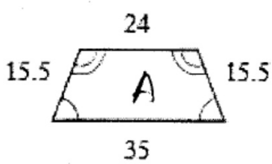
$\frac{3.5}{21} = \boxed{\frac{5}{3}}$ SLR

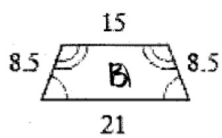
$\frac{15.5}{8.5} = 1.82$

NO, because the side lenghs all have different side length ratio.

Version A

2. Determine if the polygons are similar. Defend your answer using algebra and appropriate vocabulary.





$$\frac{24}{15} = 1.6$$

$$\frac{35}{21} = 1.6\overline{6}$$

$$\frac{15.5}{8.5} = 1.824$$

scale factor is not the same.

$\boxed{\text{NOT SIMILAR}}$

polygons A and B are not similar because the scale factor from the side lengths of B to A varies amongst each side comparison. Because the scale factor doesnt stay the same the two shapes cannot be similar

Version A

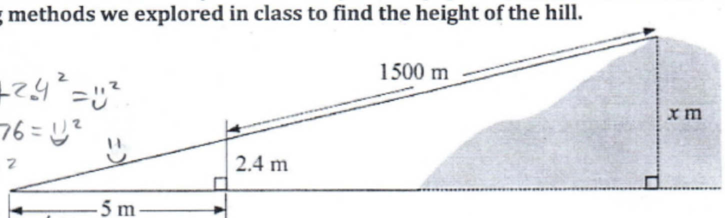
3. Carla and Moses are mountain rangers and are hiking to estimate the height of a nearby hill. Carla stands 5 meters away from Moses on level ground holding a stick vertically. Moses finds a "line of sight" to the top of the hill, and observes this line crosses at 2.4 meters up on the stick. The distance from the stick to the top of the hill is 1500 m (as measured by laser equipment). Diagram NOT to scale.
Show your work using methods we explored in class to find the height of the hill.

$5^2 + 2.4^2 = ☺^2$

$25 + 5.76 = ☺^2$

$30.76 = ☺^2$

$\sqrt{30.76} = 5.54616985$

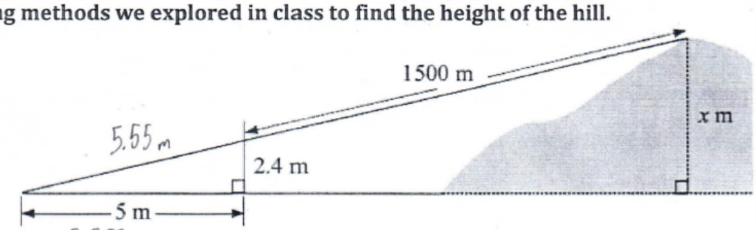


$\dfrac{5.54616985}{2.4} = \dfrac{1505.54616985}{X} \rightarrow \dfrac{36133.10808}{5.54616985X} \quad 36133.10808 \div 5.54616985 = X$

$X = 6514.966013\text{m}$

Version A

3. Carla and Moses are mountain rangers and are hiking to estimate the height of a nearby hill. Carla stands 5 meters away from Moses on level ground holding a stick vertically. Moses finds a "line of sight" to the top of the hill, and observes this line crosses at 2.4 meters up on the stick. The distance from the stick to the top of the hill is 1500 m (as measured by laser equipment). Diagram NOT to scale.
Show your work using methods we explored in class to find the height of the hill.



$5^2 = 25$
$2.4^2 = 5.76$
30.76
$\sqrt{30.76} = 5.55$

$1500 + 5.55 = 1505.55$

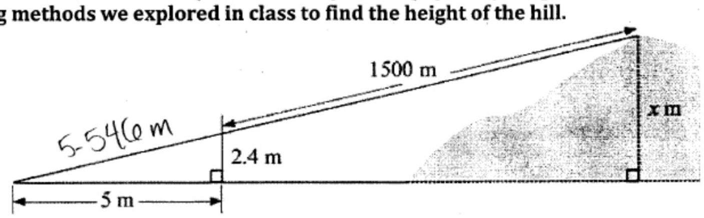
$\frac{5.55}{2.4} = \frac{1505.55}{x}$

$5.55x = 3613.32$

$x = \frac{3613.32}{5.55}$ m OR 651.05 m

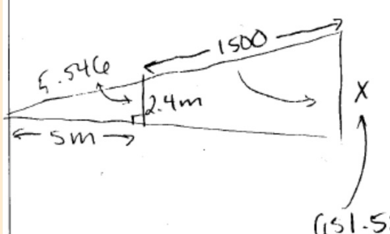
Version A

3. Carla and Moses are mountain rangers and are hiking to estimate the height of a nearby hill. Carla stands 5 meters away from Moses on level ground holding a stick vertically. Moses finds a "line of sight" to the top of the hill, and observes this line crosses at 2.4 meters up on the stick. The distance from the stick to the top of the hill is 1500 m (as measured by laser equipment). <u>Diagram NOT to scale.</u>
Show your work using methods we explored in class to find the height of the hill.



$5^2 + 2.4^2 = 30.76$

$\sqrt{30.76} = 5.546$



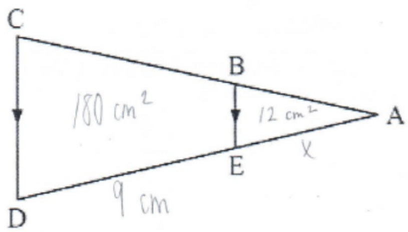
$$\frac{5.546}{2.4} = \frac{1505.546}{X} \qquad \frac{3613.3104}{5.546} = \frac{5.546X}{5.546}$$

$\boxed{X = 651.52m}$

Height of Hill

Version A

4. In the given figure, DE = 9 cm. ΔBAE has area 12 cm^2, $CBED$ has area 180 cm^2. Find the length of AE.



$$\frac{192 \div 3}{12 \div 3} = \frac{\sqrt{64}}{\sqrt{4}} = \frac{8}{2}$$

$$\frac{8}{2} = \frac{9+x}{x}$$

$$8x = 18 + 2x$$
$$-2x \qquad -2x$$

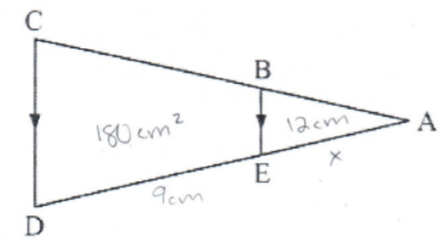
$$\frac{6x}{6} = \frac{18}{6}$$

$$x = 3$$

$$\boxed{x = 3 \text{ cm}}$$

Version A

4. In the given figure, DE = 9 cm. ΔBAE has area 12 cm^2, $CBED$ has area 180 cm^2. Find the length of AE.



$\Delta BAE \sim \Delta CAD$ b/c
$\angle A$ is shared +
$\angle C \cong \angle B$ b/c they are
corressponding
AA triangle similarity
conjecture

$180+12=192$

$\frac{192}{12}=\frac{16}{1}$ $\sqrt{16/1}=4/1$

$\frac{4}{1}=\frac{9+x}{x}$

$4x=9+x$

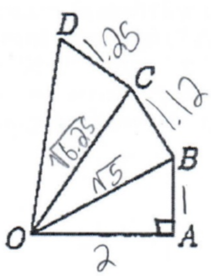
$\frac{3x=9}{3}$

$x=3$cm

$\boxed{AE=3\text{cm}.}$

Version A

5. In the figure, the right triangle $\triangle\, OAB$ has $OA = 2$ and $AB = 1$. Also, $\triangle\, OAB \sim \triangle\, OBC \sim \triangle\, OCD$. Find the length of CD.



$CD = 1.25$

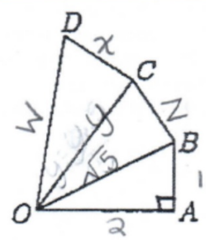
$2^2 + 1^2 = \sqrt{5}$

$\sqrt{5} \cdot .5 = 1.12$ $\quad \sqrt{5}^2 + 1.12^2 = \sqrt{6.25}$

$\sqrt{6.25} \cdot .5 = 1.25 = CD$ $\quad$ $CD = 1.25$ units

Version A

5. In the figure, the right triangle $\triangle OAB$ has $OA = 2$ and $AB = 1$.
Also, $\triangle OAB \sim \triangle OBC \sim \triangle OCD$. Find the length of CD.



$2^2+1^2=OB^2$

$4+1=5$

$5=OB^2$

$OB=\sqrt{5}$

$\frac{2}{\sqrt{5}}=\frac{\sqrt{5}}{y}$ $\quad \frac{2y}{2}=\frac{5}{2}$ $\quad y=2.5$

$2.5^2=\sqrt{5}^2+z^2$

$6.25=5+z^2$

$-5 \qquad -5$

$1.25=z^2$

$z=\sqrt{1.25}$

$\frac{\sqrt{5}}{2.5}=\frac{2.5}{w}$ $\quad \frac{\sqrt{5}w}{\sqrt{5}}=\frac{6.25}{\sqrt{5}}$

$w=2.795084972$

$w^2=y^2+x^2$ $\quad 7.8125=2.5^2+x^2$

$7.8125=6.25+x^2$

$-6.25 \qquad -6.25$

$1.5625=x^2$

$x=\sqrt{1.5625},\ x=1.25$

$CD=1.25$ un.

Version B

1. Solve for x:

$$\left(\frac{2}{3}\right)^{4}+\left(\frac{x}{6}\right)^{2}=\left(\frac{3x+2}{4}\right)3$$

$$\frac{8}{12}+\frac{2x}{12}=\frac{9x+6}{12}$$

$$8+2x=9x+6$$
$$-2x \qquad -2x$$

$$8=7x+6$$
$$-6 \qquad -6$$

$$2=7x$$
$$\div 7 \qquad \div 7$$

$$\boxed{\frac{2}{7}=x \quad \text{OR} \quad .2857=x}$$

Version B

1. Solve for x:

$$\frac{2}{3}+\frac{x}{6}=\frac{3x+2}{4}$$

$$X=2/7$$

$$\frac{2\cdot 2}{3\cdot 2}=\frac{4}{6}$$

$$\frac{4}{6}+\frac{x}{6}=\frac{3x+2}{4}$$

$$\frac{4+x}{6}=\frac{3x+2}{4}$$

$$4(4+x)=6(3x+2)$$

$$16+4x=18x+12$$

$$-4x \qquad -4x$$

$$16=14x+12$$

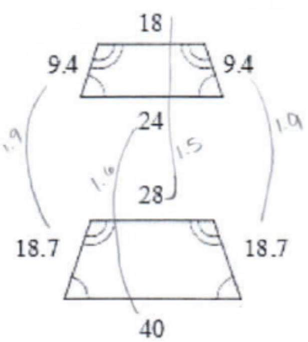
$$-12 \qquad -12$$

$$\frac{4}{14}=\frac{14x}{14}$$

$$\frac{4}{14}=x=\frac{2}{7}$$

Version B

2. Determine if the polygons are similar. Defend your answer using algebra and appropriate vocabulary.

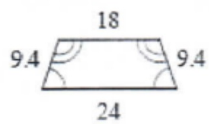


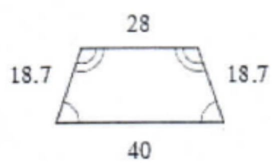
$28 \div 18 = 1.\overline{5}$
$40 \div 24 = 1.\overline{6}$
$18.7 \div 9.4 = 1.9$

The 2 polygons are not Similar because each of the Side pairs divided by eachother are a different number. If all of the numbers were the Same that would show that they are divisible by one another and are Similar.

Version B

2. Determine if the polygons are similar. Defend your answer using algebra and appropriate vocabulary.





$\frac{9.4}{18.7} = 0.503$

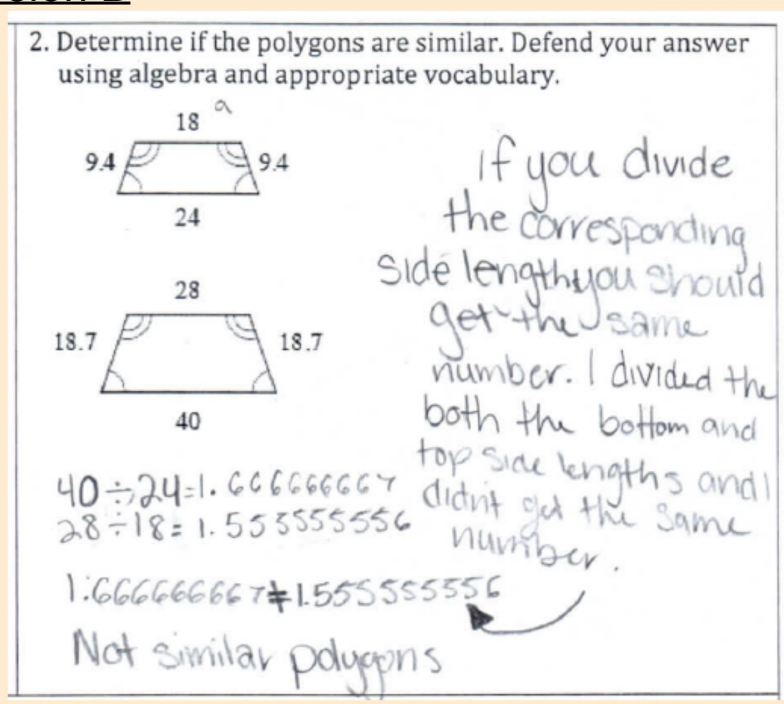
$\frac{18}{28} = 0.643$

$\frac{24}{40} = 0.6$

$\frac{9.4}{18.7} = 0.503$

They are not similar because the corresponding side lengths did not have the same scale factor from one shape to the other.

Version B



2. Determine if the polygons are similar. Defend your answer using algebra and appropriate vocabulary.

If you divide the corresponding side lengths you should get the same number. I divided the both the bottom and top side lengths and I didnt get the same number.

$40 \div 24 = 1.666666667$

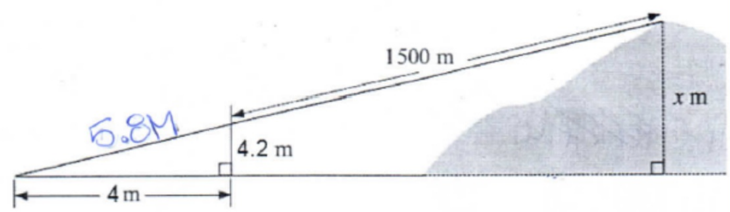
$28 \div 18 = 1.555555556$

$1.666666667 \neq 1.555555556$

Not similar polygons

Version B

3. Carla and Moses are mountain rangers and are hiking to estimate the height of a nearby hill. Carla stands 4 meters away from Moses on level ground holding a stick vertically. Moses finds a "line of sight" to the top of the hill, and observes this line crosses at 4.2 meters up on the stick. The distance from the stick to the top of the hill is 1500 m (as measured by laser equipment). Diagram NOT to scale.
Show your work using methods we explored in class to find the height of the hill.



The hill's height is about 1090.41 meters

$17.64+16=33.64$

$\sqrt{33.64}=5.8$

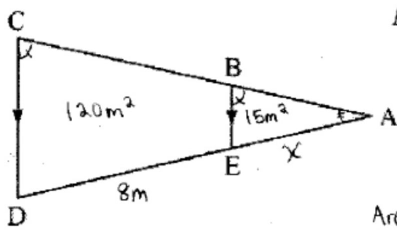
$\frac{5.8}{1505.8}=\frac{4.2}{x}$

$\frac{6324.36}{5.8}=\frac{5.8x}{5.8}$

$1090.41=x$

Version B

4. In the given figure, DE = 8 m. ΔBAE has area 15 m², $CBED$ has area 120 m². Find the length of AE.



$\Delta BAE \sim \Delta CAD$

AA similarity

$\angle A \cong \angle A$ they are the same angle

$\angle ABE \cong \angle ACD$ they are corresponding angles on parallel lines

Area of $\Delta CAD = 120+15$

$120+15 = 135m^2$

$$\frac{\text{Area of } \Delta BAE}{\text{Area of } \Delta CAD} = \frac{15m^2}{135m^2}$$

side lengths ratio $= \frac{\sqrt{15}}{\sqrt{135}} = \frac{1}{3}$

$$\frac{x}{8+x} = \frac{1}{3}$$

$8+x = 3x$

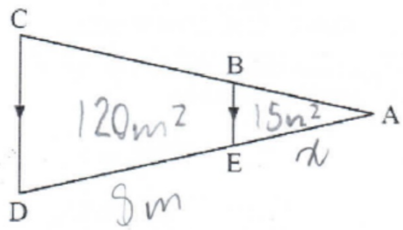
$8 = 2x$

$x = 4$

$\boxed{AE = 4m}$

Version B

4. In the given figure, DE = 8 m. ΔBAE has area 15 m^2, $CBED$ has area 120 m^2. Find the length of AE.



ΔCAD as an area of $135m^2$ so we get the ratio $\frac{15}{135}$ for area. then you need to square root it to get the side lenght ratio.

side ratio → $\frac{\sqrt{15}}{\sqrt{135}} = \frac{1}{3}$

$\frac{1}{3} \times \frac{x}{8+x}$

$3x = 8 + x$

$-x \quad -x$

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

$x = 4$

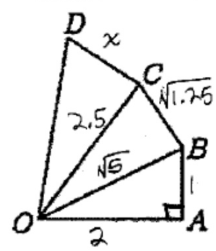
$\frac{2}{3}x = 2\frac{2}{3}$

$x = 2\frac{2}{3} + \frac{1}{3}x$

$2.667 - x$

Version B

5. In the figure, the right triangle $\triangle\, OAB$ has $OA = 2$ and $AB = 1$. Also, $\triangle\, OAB \sim \triangle\, OBC \sim \triangle\, OCD$. Find the length of CD.



$2^2 + 1^2 = \overline{OB}^2$

$4 + 1 = \overline{OB}^2$

$5 = \overline{OB}^2$

$OB = \sqrt{5}$

$\frac{2}{\sqrt{5}} = \frac{1}{CB}$

$\sqrt{5} = 2(CB)$

$CB = \frac{\sqrt{5}}{2} = \sqrt{1.25}$

$\sqrt{5}^2 + \sqrt{1.25}^2 = \overline{CO}^2$

$5 + 1.25 = \overline{CO}^2$

$6.25 = \overline{CO}^2$

$\sqrt{6.25} = \overline{CO}$

$\overline{CO} = 2.5$

$\frac{2.5}{\sqrt{5}} = \frac{x}{\sqrt{1.25}}$

$\sqrt{5}(x) = 2.5\sqrt{1.25}$

$2x = 2.5$

$\boxed{x = 1.25}$

$\boxed{\overline{DC} = 1.25}$