Geo H
8.2 Notes

8.2

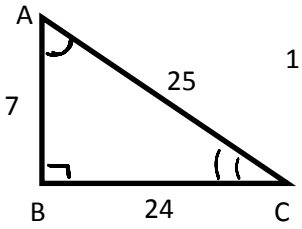
Similarity: Same shape, but not necessarily the same size

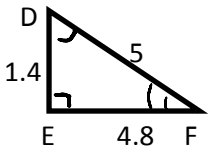
Similar Polygons

1. The ratio of the measures of corresponding sides is =
2. Corresponding angles are ≅

Dilation: Enlargement (scale ↑)

Reduction: opp. of dilation (scale ↓)



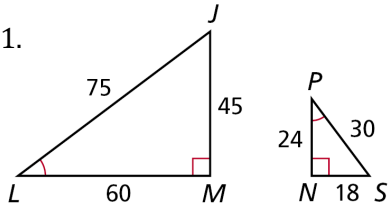


△ ABC ~ △ DEF

$\frac{5}{25}=\frac{1}{5}$ $\frac{1.4}{7}\cdot\frac{5}{5}=\frac{7}{35}=\frac{1}{5}$ $\frac{4.8}{24}=\frac{1}{5}$

Ex 1-2: Determine whether the polygons are similar. If so, write the similarity ratio and a similarity statement.

1.

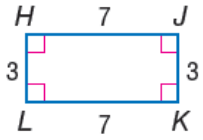


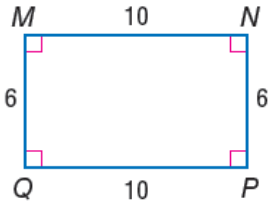
yes!

△JML ~ △SNP

sm: $\frac{18}{45}=\frac{2}{5}$ med: $\frac{24}{60}=\frac{2}{5}$ lar: $\frac{30}{75}=\frac{2}{5}$

2.



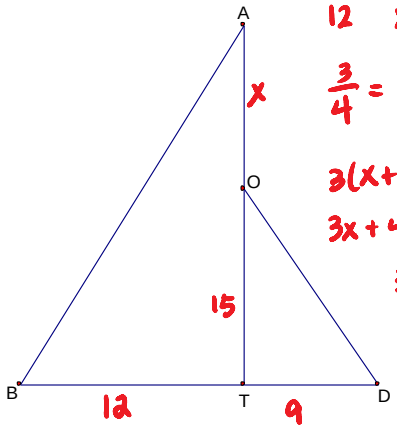


$\frac{3}{6}=\frac{1}{2}$

$\frac{7}{10}$ } not proportional

NO!

3. Given: $\Delta BAT \sim \Delta DOT$
$OT = 15, BT = 12, TD = 9$
Find: The measure of segment AO



$\frac{9}{12}=\frac{15}{x+15}$

$\frac{3}{4}=\frac{15}{x+15}$

$3(x+15)=60$

$3x+45=60$

$3x=15$

$x=5$

or

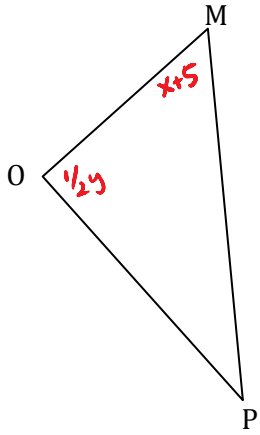
$\frac{9}{12}=\frac{15}{y}$

$\frac{3}{4}=\frac{15}{y}$

$3y=60$

$y=20$

4. Find the values of x and y:
$\Delta JHK \sim \Delta POM, \angle H = 90^\circ, \angle J = 40^\circ$
$\angle M = x+5$, and $\angle O = \frac{1}{2}y$.

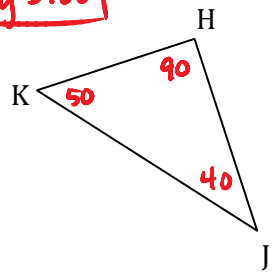


$x+5=50$

$x=45$

$\frac{1}{2}y=90$

$y=180$



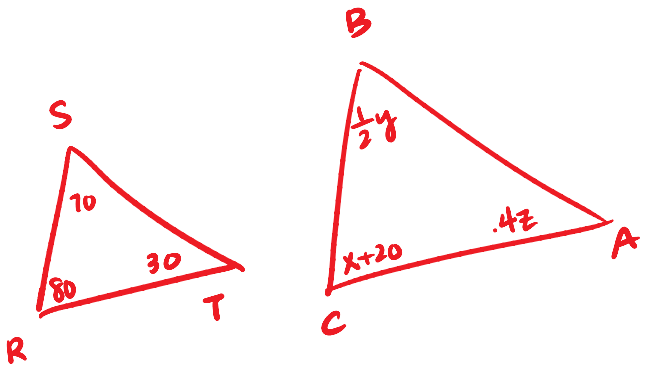
Ex 5:

$\Delta RST \sim \Delta CBA$

$\angle R = 80°, \angle S = 70°$

$m\angle C = x + 20,\ m\angle A = \frac{1}{2}y,\ m\angle B = 0.4z$

Find: $x + y + z$



$x + 20 = 80$

$x = 60$

Discover with a partner!

Ex 6: Given: $\Delta ABCD \sim \Delta EFGH$

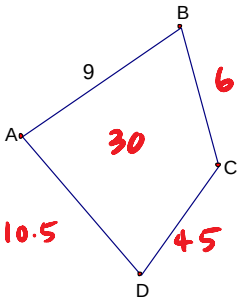
Find the ratio of the perimeter of ABCD to the perimeter of EFGH

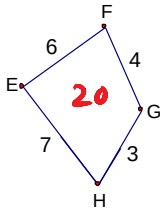
$\frac{6}{9} = \frac{2}{3}$ $\quad \frac{2}{3} = \frac{4}{BC}$ $\quad \frac{2}{3} = \frac{3}{CD}$ $\quad \frac{2}{3} = \frac{7}{AD}$

$2BC = 12$ $\quad 2CD = 9$ $\quad 2AD = 21$

$BC = 6$ $\quad CD = 4.5$ $\quad AD = 10.5$

$\frac{20}{30} = \boxed{\frac{2}{3}}$

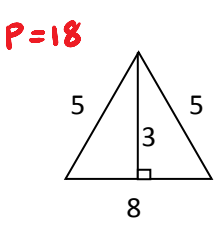


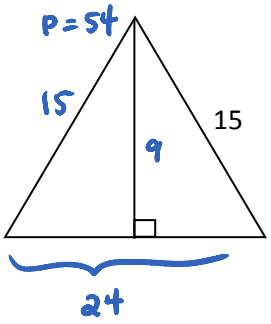


Ex 7: Given: The triangles are similar

a. Find the perimeter of each triangle. What is the ratio of the perimeters?

$\frac{5}{15} = \frac{1}{3}$ $\quad \frac{18}{54} = \frac{3}{9} = \boxed{\frac{1}{3}}$





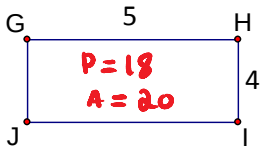
b. Find the area of each triangle. What is the ratio of the areas?

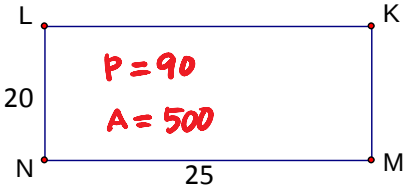
$A_1 = \frac{8 \cdot 3}{2} = 12$ $\quad A_2 = \frac{24 \cdot 9}{2} = 108$ $\quad \frac{12}{108} = \boxed{\frac{1}{9}}$

Ex 8:

a) Are the rectangles similar? Explain why.

Yes ü All $\angle$s $\cong$ and ratio of corresponding sides = (1/5)





b) Find the perimeter of each rectangle. What is the ratio of the perimeters?

$\frac{18}{90} = \frac{1}{5}$ $\quad \frac{20}{500} = \frac{1}{25}$

c) Find the area of each rectangle. What is the ratio of the areas?
How is it related to the ratios of the perimeters and the ratios of the sides?

$\left(\frac{P_1}{P_2}\right)^2 = \frac{A_1}{A_2}$

Conclusion: