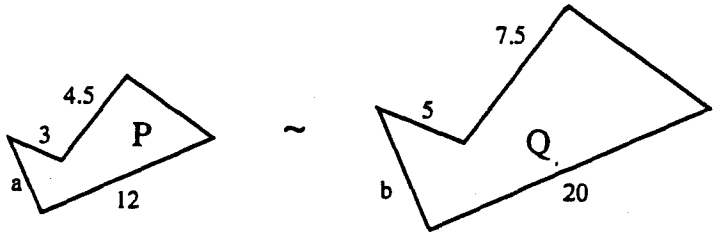
RATIO OF SIMILARITY #16

The **RATIO OF SIMILARITY** between any two <u>similar</u> figures is the ratio of any pair of <u>corresponding</u> sides. Simply stated, once it is determined that two figures are similar, all of their pairs of corresponding sides have the same ratio.

The ratio of similarity of figure P to figure Q, written P : Q or $\frac{P}{Q}$, is $\frac{3}{5}$.

$\frac{4.5}{7.5}$ and $\frac{12}{20}$ have the same ratio.

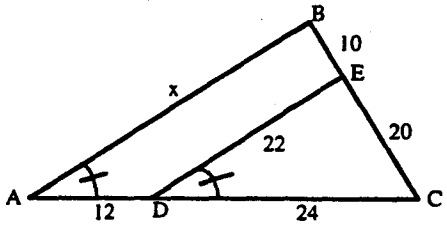


Note that the ratio of similarity is always expressed in lowest possible terms. Also, the <u>order</u> of the statement, P : Q or Q : P, determines which order to state and use the ratios between pairs of corresponding sides.

An equation that sets one ratio equal to another ratio is called a **proportion**. An example is at right. $\frac{3}{5} = \frac{12}{20}$

Example

Find x in the figure. Be consistent in matching <u>corresponding</u> parts of similar figures.



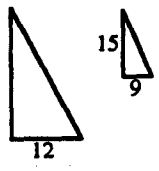
$\Delta ABC \sim \Delta DEC$ by AA ($\angle BAC \cong \angle EDC$ and $\angle C \cong \angle C$).
Therefore the corresponding sides are proportional.

$\frac{DE}{AB} = \frac{CD}{CA}$ ==> $\frac{22}{x} = \frac{24}{36}$ ==> $24x = 22(36)$ ==> $24x = 792$ ==> $x = 33$

Note: This problem also could have been solved with the proportion: $\frac{DE}{AB} = \frac{CE}{CB}$.

For each pair of similar figures below, find the ratio of similarity, for large:small.

1.



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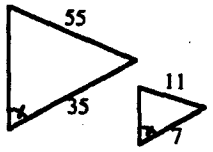

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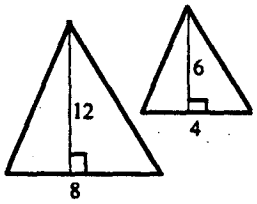

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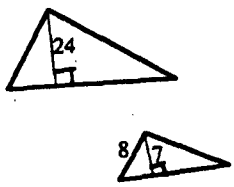

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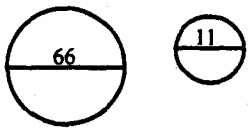

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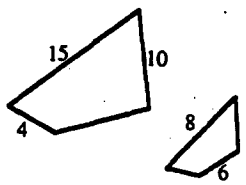
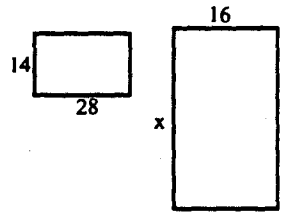
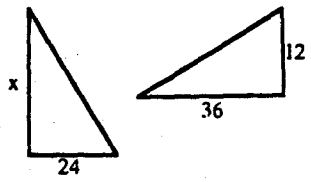


For each pair of similar figures below, state the ratio of similarity, then use it to find x.

7.



8.



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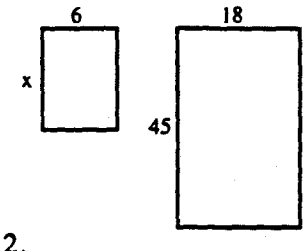

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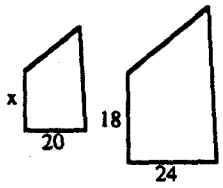

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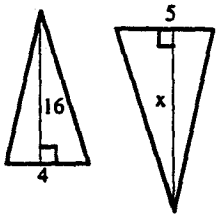
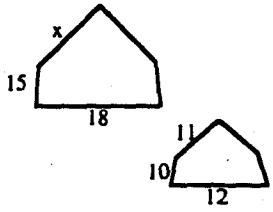
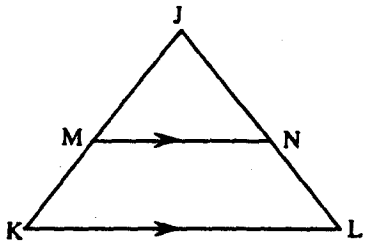


12.



For problems 13 through 18, use the given information and the figure to find each length.

13. JM = 14, MK = 7, JN = 10 Find NL.
14. MN = 5, JN = 4, JL = 10 Find KL.
15. KL = 10, MK = 2, JM = 6 Find MN.
16. MN = 5, KL = 10, JN = 7 Find JL.
17. JN = 3, NL = 7, JM = 5 Find JK.
18. JK = 37, NL = 7, JM = 5 Find JN.



19. Standing 4 feet from a mirror laying on the flat ground, Palmer, whose eye height is 5 feet, 9 inches, can see the reflection of the top of a tree. He measures the mirror to be 24 feet from the tree. How tall is the tree?

20. The shadow of a statue is 20 feet long, while the shadow of a student is 4 ft long. If the student is 6 ft tall, how tall is the statue?