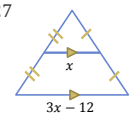
Tuesday, January 15, 2013

Agenda:

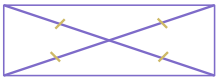
- TISK & 2 MM
- Lesson 7-4: Parallel Lines & Proportional Parts
- Homework: Start §7-4 problems in Ch 7 Packet 2

TISK Problems

1) Factor completely: $14x^2 - 69x + 27$
2) Calculate the value of *x*:



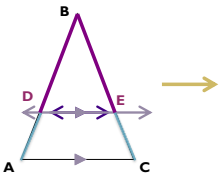
3) Classify the special quadrilateral shown. Provide a theorem, postulate, or definition that supports your answer.



Ex. 3 | Ex 4 | Ex 5

§7.4 Parallel Lines & Proportional Parts

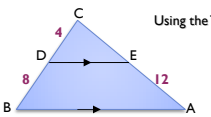
- Theorem: Triangle Proportionality Theorem
  - If a line parallel to one side of a triangle intersects the other two sides, then it divides the two sides proportionally.



$$\frac{EC}{BE} = \frac{AD}{BD}$$

Example

- In the diagram $\overline{AB} \parallel \overline{ED}$, $BD = 8$, $DC = 4$, and $AE = 12$. What is the length of $\overline{EC}$?



Using the Triangle Proportionality Theorem, we have:

$$\frac{\quad}{\quad} = \frac{EC}{\quad}$$

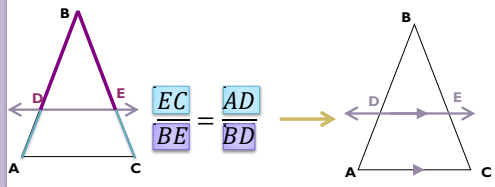
$$\frac{1}{2} = \frac{EC}{12}$$

$$2EC = 12$$

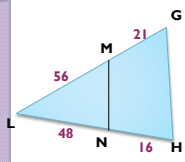
$$EC = 6$$

Theorem: Converse of the Triangle Proportionality Theorem

- If a line divides two sides of a triangle proportionally, then that line is parallel to the third side.



Example 2. Determine whether or not $\overline{MN} \parallel \overline{GH}$.



By the Converse of the Triangle Proportionality Theorem, if $\frac{LM}{MG} = \frac{LN}{NH}$ then $\overline{MN} \parallel \overline{GH}$.

$$\frac{56}{21} \stackrel{?}{=} \frac{48}{16}$$

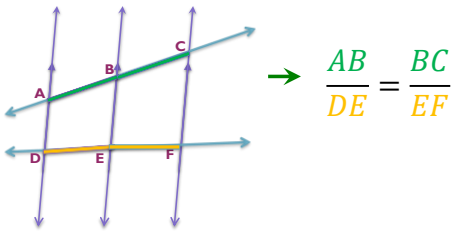
$$\frac{56}{21} \div \frac{7}{7} = \frac{8}{3} \qquad \frac{48}{16} \div \frac{16}{16} = \frac{3}{1}$$

$$\frac{8}{3} \neq \frac{3}{1} \qquad \therefore \overline{MN} \nparallel \overline{GH}$$

Ex. 3 | Ex 4 | Ex 5

Theorem.

- If three parallel lines intersect two transversals, then they divide the transversals proportionally.

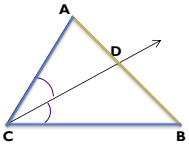


$$\frac{AB}{DE} = \frac{BC}{EF}$$

Ex. 3 | Ex 4 | Ex 5

Theorem

- If a ray bisects an angle of a triangle, then it divides the opposite side into segments whose lengths are proportional to the lengths of the other two sides.

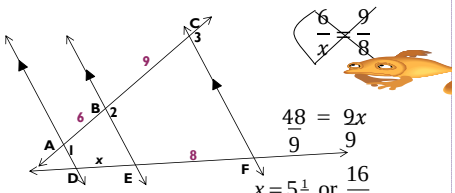


$$\frac{AD}{AC} = \frac{BD}{BC}$$

Triangle Proportionality Theorem | 3 Parallel Lines Intersecting 2 Transversals | A Ray Bisecting an Angle of a Triangle

Example 3

- In the diagram, $\angle 1 \cong \angle 2 \cong \angle 3, AB = 6, BC = 9, EF = 8$. What is x?



$$\frac{6}{x} = \frac{9}{8}$$

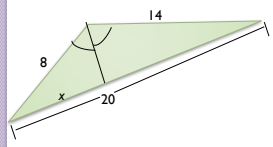
$$\frac{48}{9} = \frac{9x}{9}$$

$$x = 5\frac{1}{3} \text{ or } \frac{16}{3}$$

Triangle Proportionality Theorem | 3 Parallel Lines Intersecting 2 Transversals | A Ray Bisecting an Angle of a Triangle

Example 4

- Find the value of the variable.



$$\frac{x}{8} = \frac{20 - x}{14}$$

$$14x = 160 - 8x$$
$$+8x \qquad +8x$$

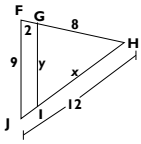
$$\frac{22x}{22} = \frac{160}{22}$$

$$x = \frac{80}{11} \text{ or } 7\frac{3}{11}$$

Example 5

Triangle Proportionality Theorem | 3 Parallel Lines Intersecting 2 Transversals | A Ray Bisecting an Angle of a Triangle

- In the diagram, $\overline{FJ} \parallel \overline{GI}$. Find the values of the variables.



$$\frac{y}{9} = \frac{8}{10}$$

$$\frac{y}{9} = \frac{4}{5}$$

$$\frac{5y}{5} = \frac{36}{5}$$

$$y = \frac{36}{5} \text{ or } 7\tfrac{1}{5}$$

$$\frac{8}{2} = \frac{x}{12-x}$$

$$x = 48 - 4x$$

$$+4x \quad +4x$$

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

$$x = \frac{48}{5} \text{ or } 9\tfrac{3}{5}$$