

Team Problems for Chapter 3

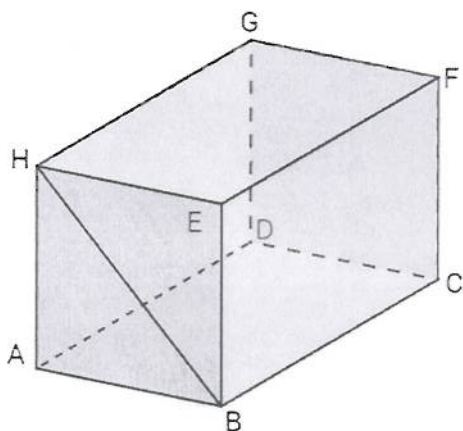
Name: Solutions

Spring 2017

Date: _____

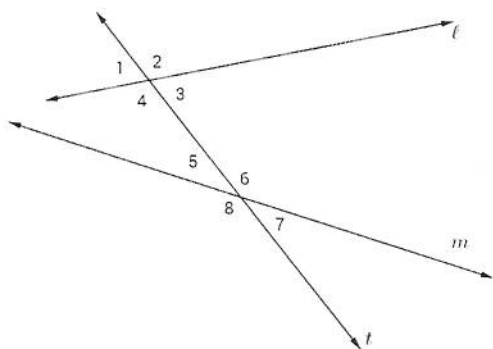
Problem #1: Vocabulary

1. Using the given figure, assume lines (extended segments) and planes that appear to be parallel are parallel. Fill in the blank with "parallel," "perpendicular," "skew," or "none of these."



- \overline{HE} and \overline{AD} are skew.
 - \overline{HB} and \overline{BC} are perpendicular.
 - \overline{DG} and \overline{BE} are parallel.
 - \overline{AB} and \overline{BH} are none of these.
 - \overline{FE} and \overline{AD} are parallel.
 - \overline{BH} and \overline{EF} are skew.
- Plane $ABEH$ and Plane $ABCD$ are perpendicular.
 - Plane $BCFE$ and Plane $ADGH$ are parallel.

2. Fill in the blanks with vocabulary words about the figure below.



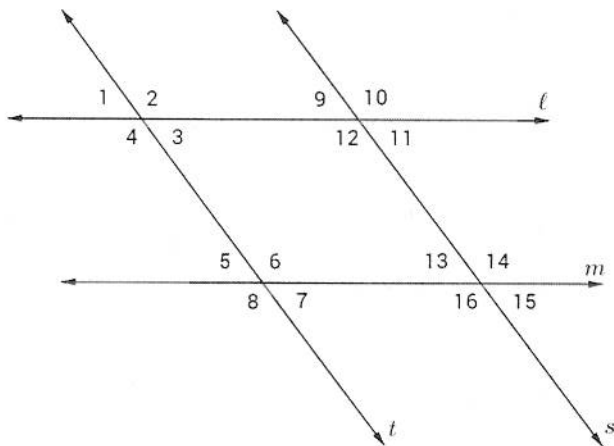
- t is called a transversal of the lines l and m .
- $\angle 1$ and $\angle 7$ are alternate exterior angles.
- $\angle 2$ and $\angle 4$ are vertical angles.
- $\angle 3$ and $\angle 5$ are alternate interior angles.
- $\angle 2$ and $\angle 7$ are same-side exterior angles.
- $\angle 3$ and $\angle 6$ are same-side interior angles.
- $\angle 7$ and $\angle 8$ are a linear pair of angles.

3. True/False: Because $\angle 2$ and $\angle 6$ are corresponding angles, they are congruent. Explain why or why not.

If $l \parallel m$, then it would be true that corresponding angles are congruent. However l is not necessarily parallel to m .

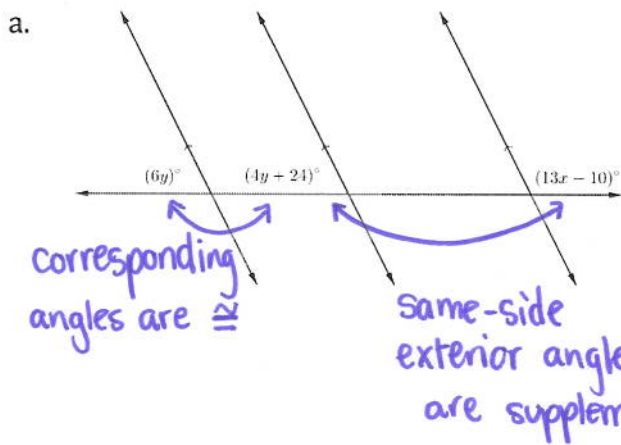
Problem #2: Find the Angle

1. In the figure, $\ell \parallel m$ and $m\angle 2 = 105^\circ$. Fill in the blanks with: A. 105° , B. 75° , or C. Not Enough Info.



- a. $m\angle 1 = \underline{75^\circ}$
- b. $m\angle 6 = \underline{105^\circ}$
- c. $m\angle 10 = \underline{C.}$
- d. $m\angle 5 = \underline{75^\circ}$
- e. $m\angle 16 = \underline{C.}$
- f. $m\angle 8 = \underline{105^\circ}$

2. Find x and y in each figure.



$$6y = 4y + 24$$

$$2y = 24$$

$$\boxed{y = 12}$$

$$(6y)^\circ = 72^\circ$$

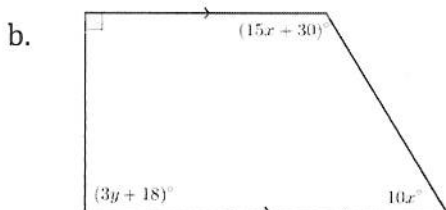
$$13x - 10 + 72 = 180$$

$$13x + 62 = 180$$

$$-62 \quad -62$$

$$13x = 118$$

$$\boxed{x = \frac{118}{13}}$$



$$3y + 18 = 90$$

$$3y = 72$$

$$\boxed{y = 24}$$

$$15x + 30 + 10x = 180$$

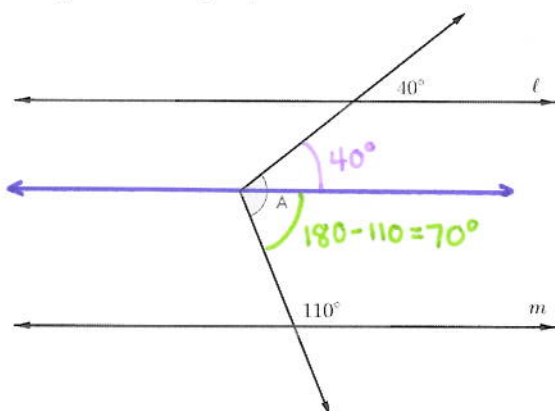
$$25x + 30 = 180$$

$$25x = 150$$

$$\boxed{x = 6}$$

Problem #3: Angles and transversals

1. In the figure below, $\ell \parallel m$. Find $m\angle A$.

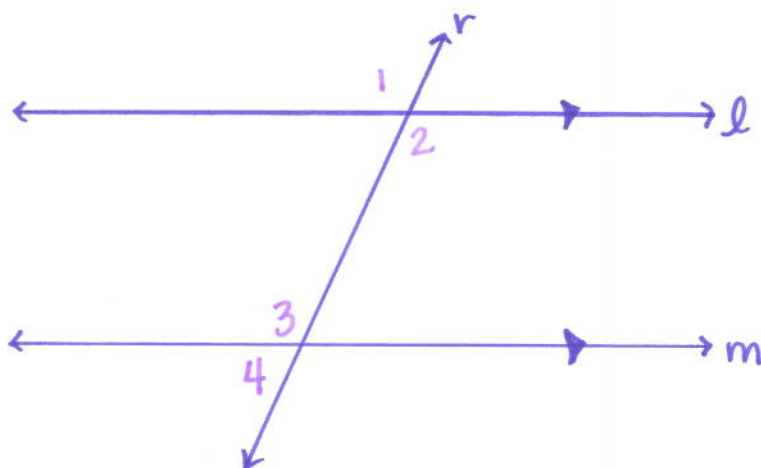


$$70^\circ + 40^\circ = \boxed{110^\circ}$$

Hint: Sketch a line parallel to ℓ and m through point A .

2. A transversal r intersects lines ℓ and m . If ℓ and r form $\angle 1$ and $\angle 2$ and m and r form $\angle 3$ and $\angle 4$, sketch a diagram that meets all of the following conditions:

- $\angle 1 \cong \angle 2$
- $\angle 3$ is an interior angle.
- $\angle 4$ is an exterior angle.
- $\angle 3$ and $\angle 4$ are supplementary.
- $\angle 2$ and $\angle 4$ lie on opposite sides of r .



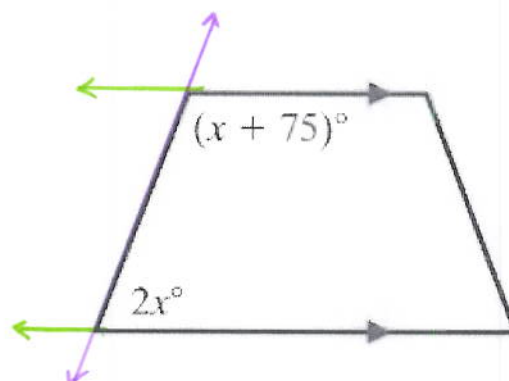
Problem #4: Find the error

1. Explain the error in the following solution.

Solution:

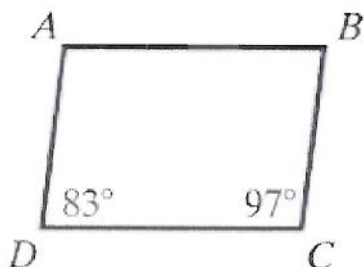
$$2x = x + 75$$

$$x = 75$$



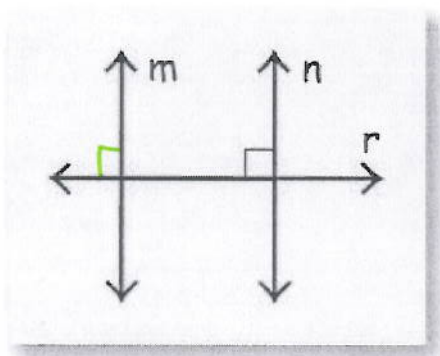
These two angles are same-side interior angles and thus are supplementary, not congruent. Instead, $(x+75)+2x=180$

2. A classmate says that $\overline{AB} \parallel \overline{CD}$ based on the diagram below. Explain your classmate's error.



Since $\angle C$ and $\angle D$ are supplementary and are same side interior angles of \overline{AD} and \overline{BC} with the transversal \overline{CD} , we see that $\overline{AD} \parallel \overline{BC}$.

3. A student sketched coplanar lines m , n , and r on his homework paper. He claims that it shows that lines m and n are parallel. What one other piece of information do you need in order for his claim to be true? Explain.



Also need $r \perp m$.

Problem #5: Slopes

1. **Without actually computing the slopes**, determine whether the slope between the two points is positive, negative, zero, or undefined.

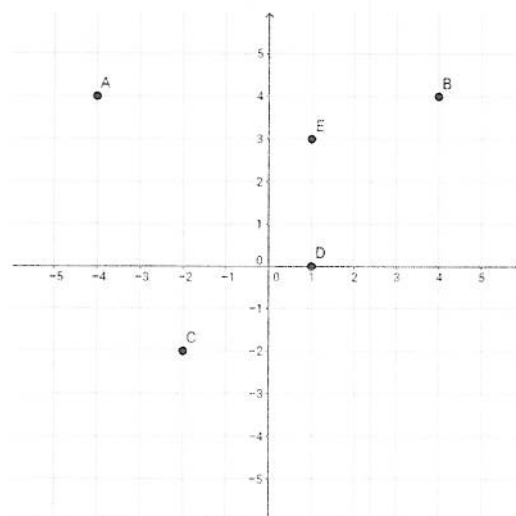
a. A and B: zero

b. B and C: positive

c. C and B: positive

d. D and E: undefined

e. E and A: negative



2. Imagine standing next to straight section of road and watching a car pass by from the left to the right. How would you describe the car's trip if (from your vantage point):

- a. the slope of the road is positive

car is going up a hill



- b. the slope of the road is negative

car is going down the hill

- c. the slope of the road is zero

The road is flat.

- d. the slope of the road is undefined

The car is sucked straight up into the air by a UFO.

(This example is a good way to remember the difference between "slope is zero" and "slope is undefined.")