

1. Use the given figure to answer the following questions.

a. Name four points that are coplanar

Example (more than one correct answer):

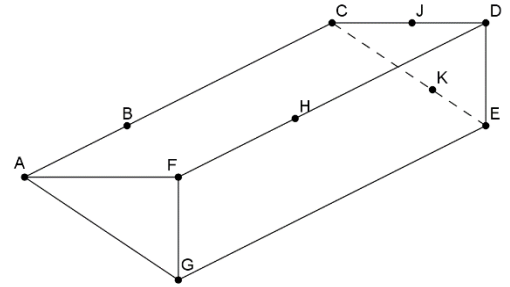
$A, C, D, H$

b. Name the intersection of plane  $KED$  and plane  $CAF$ .

$\overleftrightarrow{CD}$

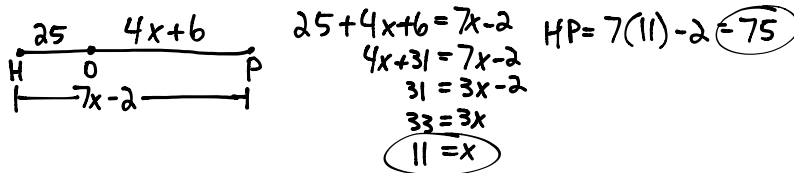
c. Name a plane containing point  $H$ .

Plane  $FGH$  (more than one correct answer)



2. Point  $O$  is between  $H$  and  $P$ .  $HP = 7x - 2$ ,  $OP = 4x + 6$ ,  $OH = 25$ .

Make a sketch of the given information. Write an equation and solve for  $x$ . Determine  $HP$ .



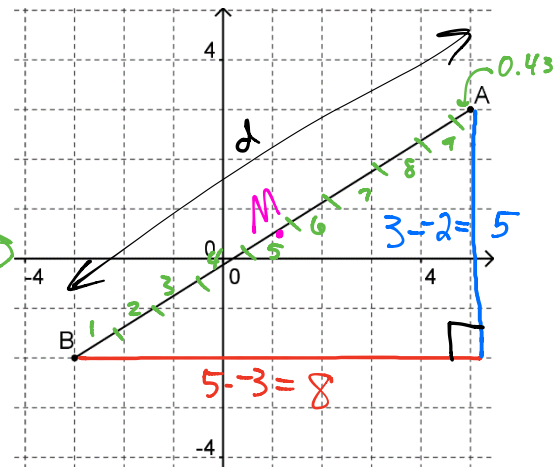
3. Use the given diagram to answer the following questions.

a. What is the distance between points  $A$  and  $B$ ?

$8^2 + 5^2 = d^2$   
 $64 + 25 = d^2$   
 $89 = d^2$   
 $9.43 \approx d$

b. What is the midpoint of  $\overline{AB}$ ?

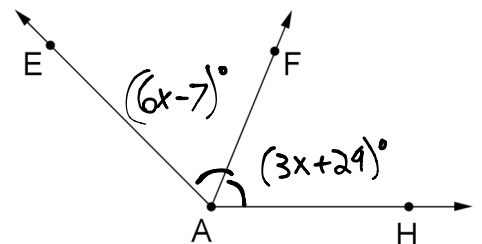
$(\frac{5+3}{2}, \frac{3+2}{2})$   
 $(\frac{2}{2}, \frac{1}{2})$   
 $(1, 0.5)$



4. In the figure,  $\overline{AF}$  bisects  $\angle EAH$ .

If  $m\angle EAF = (6x - 7)^\circ$  and  $m\angle FAH = (3x + 29)^\circ$ , then determine  $m\angle EAF$ .

$6x - 7 = 3x + 29$   
 $-7 = 3x + 29$   
 $36 = 3x$   
 $12 = x$   
 $m\angle EAF = 6(12) - 7 = 72 - 7 = 65^\circ$



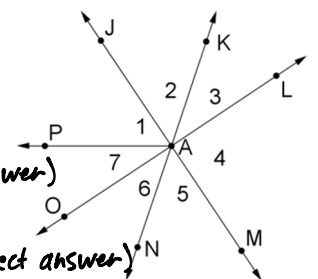
5. Use the given figure to answer the following questions.

a. Name an angle supplementary with  $\angle PAL$ .  $\angle OAP$

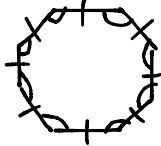
b. If  $m\angle KAM = 130^\circ$ , then what does  $m\angle 2$  equal?  $50^\circ$  (Linear Pair)

c. Name a pair of vertical angles.  $\angle 2$  &  $\angle 5$  (more than one correct answer)

d. Name a linear pair of angles.  $\angle PAN$  &  $\angle PAK$  (more than one correct answer)



6. Two sides of a regular octagon are represented by the expressions  $5x + 4$  and  $2x + 16$
- a. Make a sketch of a regular octagon including appropriate marking to indicate it is regular.



- b. Solve for the value of  $x$ .  
 $5x + 4 = 2x + 16$  (All sides of a regular polygon are congruent)  
 $3x + 4 = 16$   
 $3x = 12$   
 $x = 4$
- c. Determine the side length.  
 $5(4) + 4 = 24$

7. Use the statement below to answer the following questions.

*A number is even if it is divisible by six.*

- a. Rewrite the statement as a conditional statement in if-then form.

If a number is divisible by six, then it is even.

Is your statement true or false? If false, then provide a counterexample.

- b. Write the converse.

If a number is even, then it is divisible by six.

Is your statement true or false? If false, then provide a counterexample.

2 is even, but not divisible by six

- c. Write the inverse.

If a number is not divisible by six, then it is not even.

Is your statement true or false? If false, then provide a counterexample.

2 is not divisible by six, but is even

- d. Write the contrapositive.

If a number is not even, then it is not divisible by six.

Is your statement true or false? If false, then provide a counterexample.

8. If two angles are complementary, then the sum of the measures of the angles is  $90^\circ$ .

- a. Could the statement above be written as a true biconditional?

Yes or No

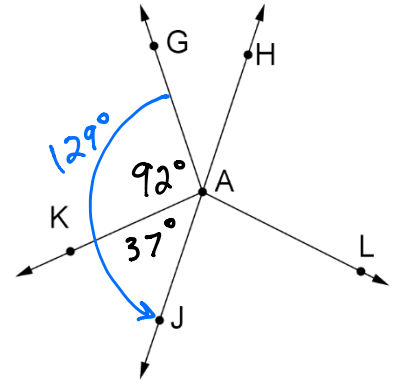
(Both original and converse are true)

- b. If yes, then write the biconditional statement below. If no, then provide a counterexample.

Two angles are complementary if and only if the sum of the measures of the angles is  $90^\circ$ .

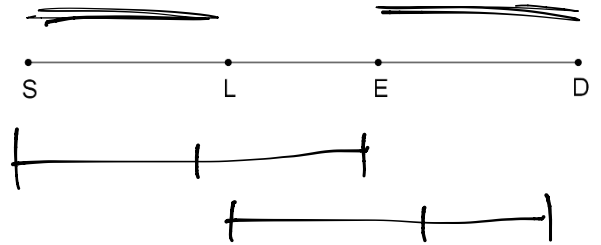
9. Write a proof:  
 Given:  $m\angle JAK = 37^\circ$ ,  $m\angle GAK = 92^\circ$   
 Prove:  $\angle GAJ$  is an obtuse angle

$m\angle JAK = 37^\circ$  Given  
 $m\angle GAK = 92^\circ$  Given  
 $m\angle JAK + m\angle GAK = m\angle GAJ$  Angle Addition Postulate  
 $37^\circ + 92^\circ = m\angle GAJ$  Substitution Property  
 $129^\circ = m\angle GAJ$  Simplify  
 $\angle GAJ$  is an obtuse angle Definition of an obtuse angle ( $90^\circ < m\angle GAJ < 180^\circ$ )



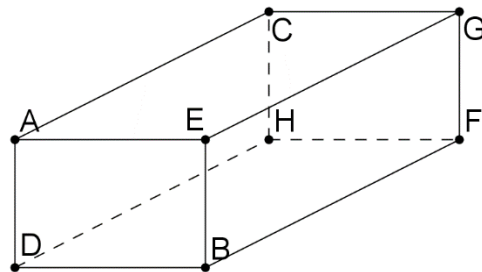
10. Write a proof:  
 Given:  $SE = LD$   
 Prove:  $SL = ED$

$SE = LD$  Given  
 $SL + LE = SE$  Segment Addition Postulate  
 $LE + ED = LD$  Segment Addition Postulate  
 $SL + LE = LE + ED$  Transitive Property  
 $SL = ED$  Subtraction Property of Equality

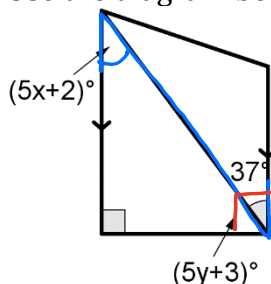


11. Use the diagram at the right to answer the following questions:

- Name two lines that appear parallel to  $\overleftrightarrow{CH}$   
choose two:  $\overleftrightarrow{GF}$ ,  $\overleftrightarrow{EB}$ ,  $\overleftrightarrow{AD}$
- Name two lines that appear perpendicular to  $\overleftrightarrow{CH}$   
choose two:  $\overleftrightarrow{GC}$ ,  $\overleftrightarrow{AC}$ ,  $\overleftrightarrow{FH}$ ,  $\overleftrightarrow{DH}$ ,  $\overleftrightarrow{EC}$ ,  $\overleftrightarrow{BH}$
- Name two lines that appear skew to  $\overleftrightarrow{CH}$   
choose two:  $\overleftrightarrow{AB}$ ,  $\overleftrightarrow{AE}$ ,  $\overleftrightarrow{AF}$ ,  $\overleftrightarrow{AG}$ ,  $\overleftrightarrow{BD}$ ,  $\overleftrightarrow{BF}$ ,  $\overleftrightarrow{BG}$ ,  $\overleftrightarrow{DE}$ ,  $\overleftrightarrow{DF}$ ,  $\overleftrightarrow{DG}$ ,  $\overleftrightarrow{EF}$ ,  $\overleftrightarrow{EG}$



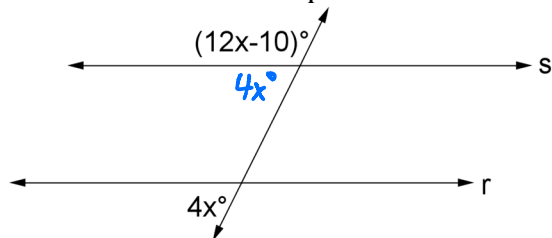
12. Use the diagram below to solve for  $x$  and  $y$ .



$$\begin{aligned} 5x+2 &= 37 \\ 5x &= 35 \\ x &= 7 \end{aligned}$$

$$\begin{aligned} 5y+3+37 &= 90 \\ 5y+3 &= 53 \\ 5y &= 50 \\ y &= 10 \end{aligned}$$

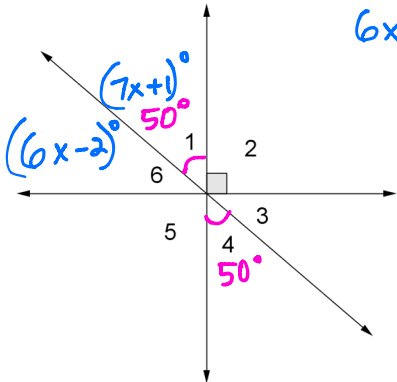
13. Determine the value of  $x$  that would make  $s \parallel r$ . **Explain your reasoning.** Why does that value make the lines parallel?



$$\begin{aligned} 4x+12x-10 &= 180 \\ 16x-10 &= 180 \\ 16x &= 190 \\ x &= 11.875 \end{aligned}$$

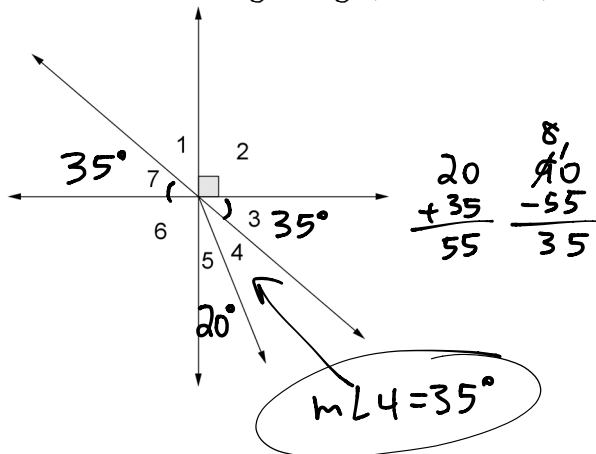
If the lines are going to be parallel, then the two angles I have marked  $4x^\circ$  must be congruent as they are corresponding. The new  $4x^\circ$  angle is a linear pair with the  $(12x-10)^\circ$  angle, so they must be supplementary.

14. If  $m\angle 1 = (7x + 1)^\circ$  and  $m\angle 3 = (6x - 2)^\circ$  determine  $m\angle 4$ .



$$\begin{aligned} 6x-2+7x+1 &= 90 \\ 13x-1 &= 90 \\ 13x &= 91 \\ x &= 7 \\ 7(7)+1 &= 50 \\ m\angle 4 &= 50^\circ \end{aligned}$$

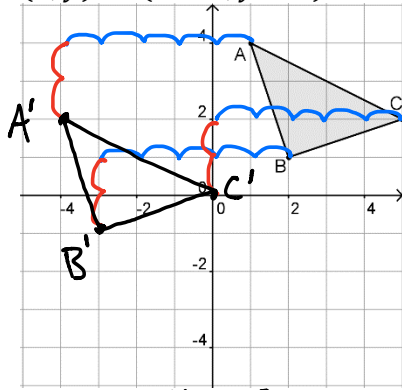
15. If  $\angle 2$  is a right angle,  $m\angle 5 = 20^\circ$ , and  $m\angle 7 = 35^\circ$ , then determine  $m\angle 4$ .



$$\begin{array}{r} 20 \\ + 35 \\ \hline 55 \end{array} \quad \begin{array}{r} 8 \\ 10 \\ - 55 \\ \hline 35 \end{array}$$

$$m\angle 4 = 35^\circ$$

16. Translate  $\triangle ABC$   
 $(x, y) \rightarrow (x - 5, y - 2)$

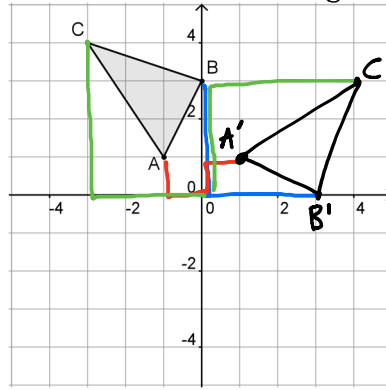


$A' = (-4, 1)$

$B' = (-3, -1)$

$C' = (0, -1)$

17. Rotate  $\triangle ABC$   $90^\circ$   
 clockwise about the origin



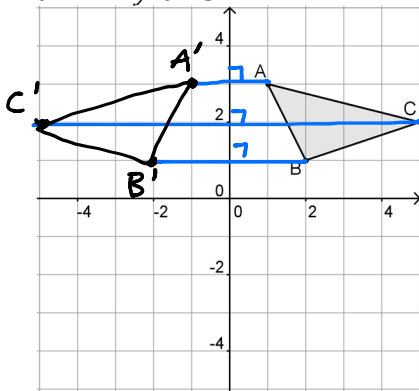
$A' = (1, 1)$

$B' = (3, 0)$

$C' = (4, 3)$

18. Draw the reflection of  $\triangle ABC$  in the given line. List the coordinates of the vertices  $A'$ ,  $B'$ , and  $C'$ .

a.  $y$ -axis

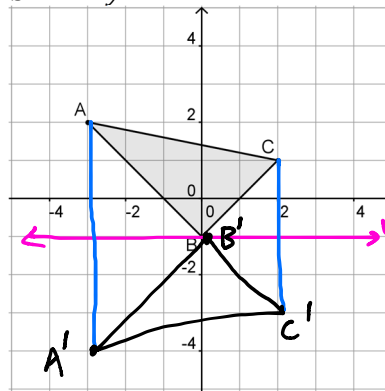


$A' = (-1, 3)$

$B' = (-2, 1)$

$C' = (-4, 1)$

b.  $y = -1$

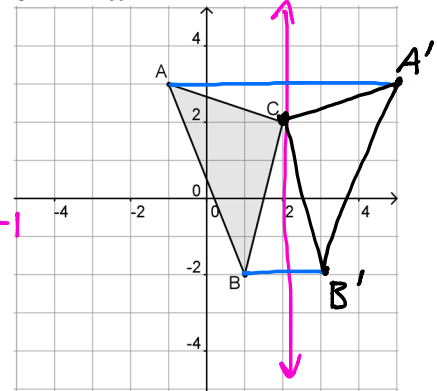


$A' = (-3, -4)$

$B' = (0, -1)$

$C' = (2, -3)$

c.  $x = 2$



$A' = (5, 3)$

$B' = (3, -2)$

$C' = (2, 2)$

19. Given  $\triangle DEF$  is reflected in line  $a$  followed by a reflection in line  $b$  where  $a \parallel b$ .

a. If  $FF'' = 36$  ft, then find the distance  $x$  between lines  $a$  and  $b$ .

$$\frac{36 \text{ ft}}{2} = 18 \text{ ft} = x$$

b. Find the value of  $y$ .

$$4y = 3.16$$

$$y = 0.79$$

c. Find  $D'F'$ .

4.12

