

# Unit 1: Geometry Fundamentals

*Initial  
Score*

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1

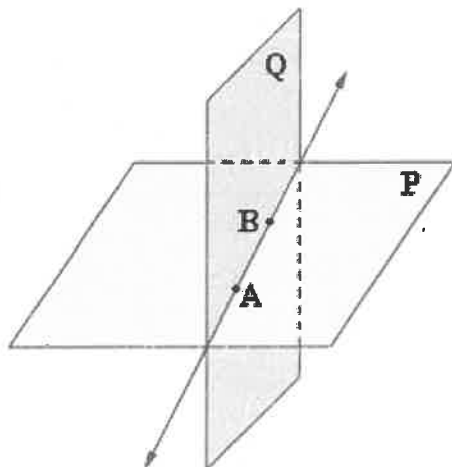
I can name points, lines and planes using correct notation.

2


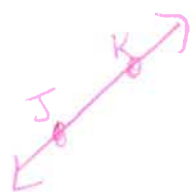


I can name angles using correct notation and find their measurement.

3

I can write a two column algebraic proof.



# Vocabulary:

	Point	Line	Segment	Ray
Model				
Drawn	as a dot	with an arrow at each end	with two endpoints	with one endpoint and one arrow
Named By	one capital letter	two capital letters	two capital letters	two capital letters - endpoint first
Symbols	P or Point P	$\overleftrightarrow{JK}$ $\overleftrightarrow{KJ}$ line JK	$\overline{ND}$ $\overline{DN}$ Segment ND	$\overrightarrow{LE}$ Ray LE
Facts	doesn't have a size	goes on forever in each direction	can be measured	half of a line



# Segment Addition Postulate

Four steps to follow:

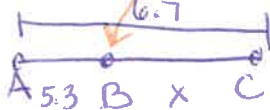
1. Draw picture
2. make equation
3. solve
4. answer the question

$$\overline{BH} + \overline{HS} = \overline{BS}$$



Ex 1) B is between A and C,  $AB = 5.3$  inches and  $AC = 6.7$  inches. Find BC.

Picture:



Write and solve the equation:

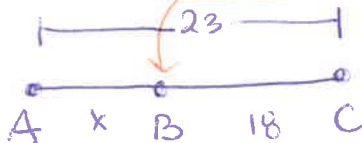
$$\begin{array}{r} \text{part} \quad \text{part} \quad \text{whole} \\ 5.3 + x = 6.7 \\ \underline{-5.3} \quad \underline{-5.3} \end{array}$$

Answer:

$$x = 1.4$$

$$\boxed{BC = 1.4 \text{ inches}}$$

Ex 2) B is between A and C,  $BC = 18$  and  $AC = 23$ . Find AB.

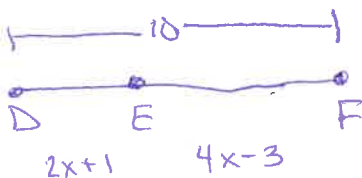


$$x + 18 = 23$$

$$\boxed{x = 5}$$

$$\boxed{AB = 5}$$

Ex 3) E is between D and F,  $DE = 2x + 1$ ,  $EF = 4x - 3$ , and  $DF = 10$ . Find the value of x and DE.



$$2x + 1 + 4x - 3 = 10$$

$$6x - 2 = 10$$

$$6x = 12$$

$$\boxed{x = 2}$$

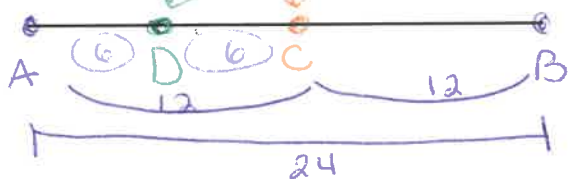
$$\begin{aligned} DE &= 2(2) + 1 \\ &= 4 + 1 \end{aligned}$$

$$\boxed{DE = 5}$$

## Segments - Midpoint

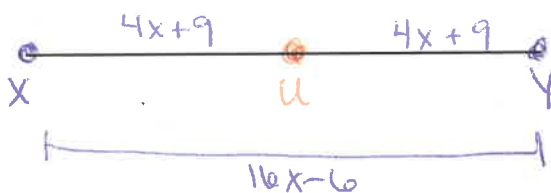
**Midpoint:** The point that divides the segment into two equal segments

Example 1) C is the midpoint of  $\overline{AB}$ , D is the midpoint of  $\overline{AC}$ . Find AD if  $AB = 24$ .



$$AD = 6$$

Example 2) U is the midpoint of  $\overline{XY}$ ,  $XY = 16x - 6$ , and  $UY = 4x + 9$ . Find XY.



$$4x + 9 + 4x + 9 = 16x - 6$$

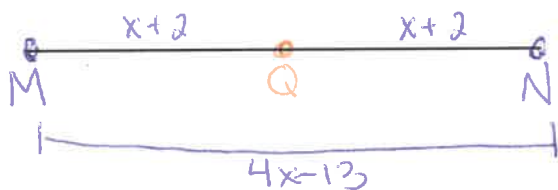
$$8x + 18 = 16x - 6$$

$$24 = 8x$$

$$x = 3$$

$$XY = 42$$

Example 3) Q is the midpoint of  $\overline{MN}$ ,  $MQ = x + 2$ , and  $QN = 4x - 13$ . Find x and QN.



$$x + 2 + x + 2 = 4x - 13$$

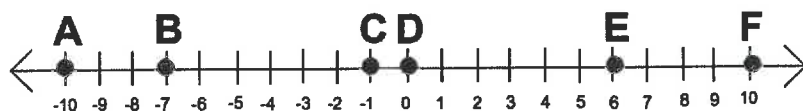
$$2x + 4 = 4x - 13$$

$$17 = 2x$$

$$x = 8.5$$

$$QN = 10.5$$

In order to find the midpoint on a number line, you take the average



1)  $AB = \underline{-9.5}$

2)  $AD = \underline{-5}$

3)  $CE = \underline{2.5}$

4)  $CD = \underline{-0.5}$

# Segment Practice

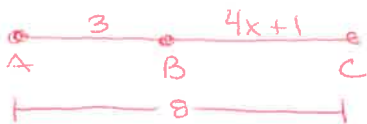
Given that J is between H and K, find the missing measure.

1.  $HJ = 17$ ,  $JK = 6$ ,  $HK = \underline{23}$



If B is between A and C, find the value of  $x$  and the measure of BC. (Draw pictures for each)

2.  $AB = 3$ ,  $BC = 4x + 1$ ,  $AC = 8$



$$3 + 4x + 1 = 8$$

$$4x + 4 = 8$$

$$4x = 4$$

$$x = 1$$

$$BC = 5$$

3.  $AB = 3$ ,  $BC = 2x + 5$ ,  $AC = 11x + 2$



$$3 + 2x + 5 = 11x + 2$$

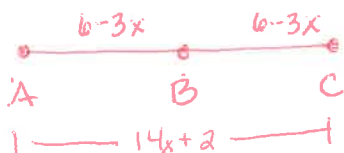
$$2x + 8 = 11x + 2$$

$$6 = 9x$$

$$x = \frac{2}{3}$$

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

4. If B is the midpoint of A and C,  $BC = 6 - 3x$  and  $AC = 14x + 2$ , find the value of  $x$  and AB.



$$(6-3x) + (6-3x) = 14x + 2$$

$$12 - 6x = 14x + 2$$

$$10 = 20x$$

$$\frac{1}{2} = x$$

$$x = \frac{1}{2}$$

$$AB = 4\frac{1}{2}$$

5. If M is the midpoint of LN,  $LM = 4x - 5$  and  $MN = 11 + 2x$ , find the value of  $x$  and LN.



$$4x - 5 = 11 + 2x$$

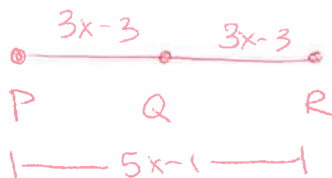
$$-2x = 16$$

$$x = 8$$

$$x = 8$$

$$LN = 54$$

6. If Q is the midpoint of PR,  $QR = 3x - 3$  and  $PR = 5x - 1$ , find the value of  $x$  and PQ.



$$(3x-3) + (3x-3) = 5x-1$$

$$6x - 6 = 5x - 1$$

$$x = 5$$

$$x = 5$$

$$PQ = 12$$



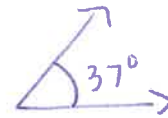
## Vocabulary:

	Angle
Model	
Drawn	two lines / rays that have a common endpoint
Named By	- vertex point - three points (must trace out angle)
Symbols	$\angle B$ $\angle ABC$ $\angle CBA$
Facts	

## Types of angles:

★ Acute angle

measures less than  $90^\circ$



★ Right angle

measures  $90^\circ$



★ Obtuse angle

measures more than  $90^\circ$



★ Straight angle

measures  $180^\circ$

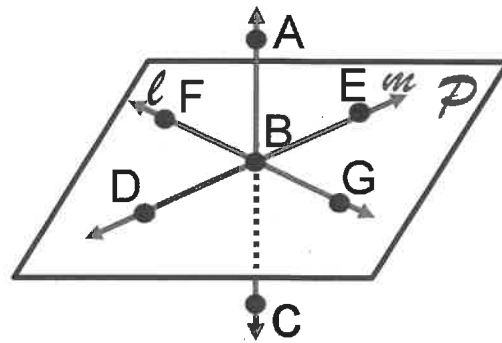


# Vocabulary:

	Plane
<b>Model</b>	
<b>Drawn</b>	Slanted 4 sided figure
<b>Named By</b>	- Script letter - three non-collinear points
<b>Symbols</b>	- plane $P$ - plane $xyz$ - plane $zxy$ } many options
<b>Facts</b>	extends forever in all directions

★ **Collinear:** Line  
 Points on the same line  
 together

★ **Coplanar:** Plane  
 Points on the same plane  
 together



1. What is another name for plane  $P$ ?
2. Name a point not on plane  $P$ .
3. Name three **collinear** points.
4. Name three **coplanar** points.

# Vocabulary Practice:

Use the figure at the right to answer questions #1-7.

1. Name the plane.

Plane ADH (many answers - must use 3 points on plane)

2. What two lines lie on the plane?

$\overleftrightarrow{EG} \neq \overleftrightarrow{HG}$

3. Line AC intersects the plane at what point?

B

4. Name 3 collinear points.

A, B, C

5. Name 3 noncollinear points.

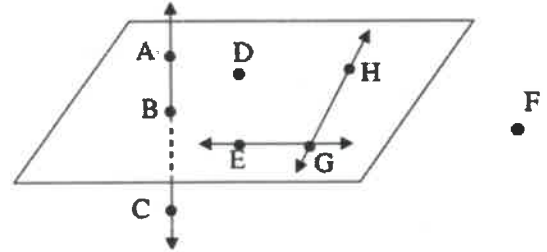
A, D, G (many answers)

6. Name a point not on the plane.

F

7. Name four coplanar points.

A, E, D, H (many answers)



Use the figure at the right to answer questions 8-14.

8. How many planes are there in the figure?

5

9. How many planes contain H?

3

10. Name three collinear points.

J, T, N

11. Name two points not on the Plane XBN.

J  $\neq$  T

12. Name four points that are coplanar.

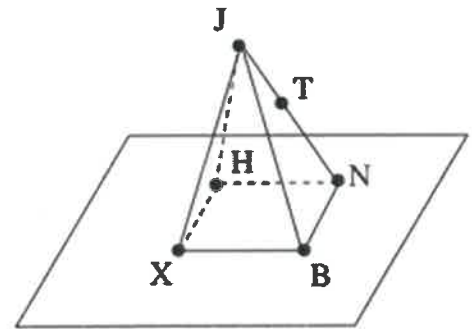
X, H, B, N or J, T, N, B or J, H, T, N

13. Name a line that does NOT contain J.

$\overleftrightarrow{XH}$  or  $\overleftrightarrow{HN}$  or  $\overleftrightarrow{XB}$  or  $\overleftrightarrow{BN}$

14. Name three non-collinear points.

J, X, B (many answers)





# ANGLE Relationships

## VERTICAL ANGLES

Two angles: **across** from each other on intersecting lines. They are always **congruent**!

Example:



equal measure

$$\angle 1 \cong \angle 2$$

## ADJACENT ANGLES

Two angles that are **next to each other** and share a common side.

Example:



## LINEAR PAIR

Two angles that are **adjacent and supplementary**. They form a **straight line**!

Example:



$$\angle 1 + \angle 2 = 180$$

## COMPLEMENTARY ANGLES

Any two angles whose **sum is  $90^\circ$**

Example:



## SUPPLEMENTARY ANGLES

Any two angles whose **sum is  $180^\circ$**

Example:



# Angle Practice:

Find the complement of each angle. If the angle does not have a complement, write NONE.

- a)  $44^\circ$   $46^\circ$       b)  $16^\circ$   $74^\circ$       c)  $109^\circ$  none      d)  $81^\circ$   $9^\circ$

Find the supplement of each angle. If the angle does not have a supplement, write NONE.

- a)  $147^\circ$   $33^\circ$       b)  $38^\circ$   $142^\circ$       c)  $90^\circ$   $90^\circ$       d)  $105^\circ$   $75^\circ$

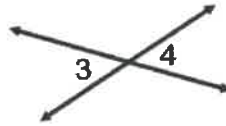
Identify each pair of angles as adjacent, vertical, complementary, supplementary, or a linear pair.

1.



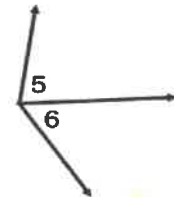
adjacent

2.



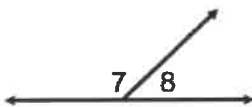
vertical

3.



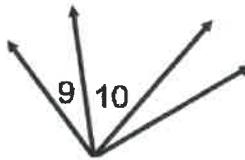
adjacent

4.



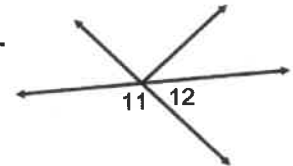
adjacent  
supplementary  
linear pair

5.



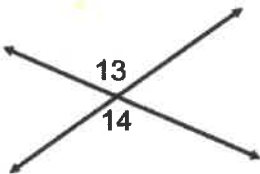
adjacent

6.



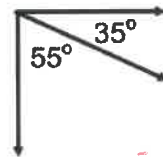
adjacent  
supplementary  
linear pair

7.



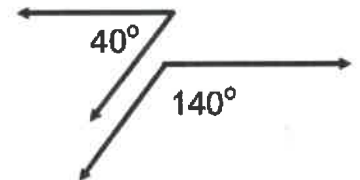
vertical

8.



adjacent  
complementary

9.



supplementary

Use the figure at the right to answer each question.

10. Name two vertical angles.

$\angle FGE$  &  $\angle CGD$

11. Name a pair of adjacent angles (many answers)

$\angle BGC$  &  $\angle CGD$

12. Name a linear pair.

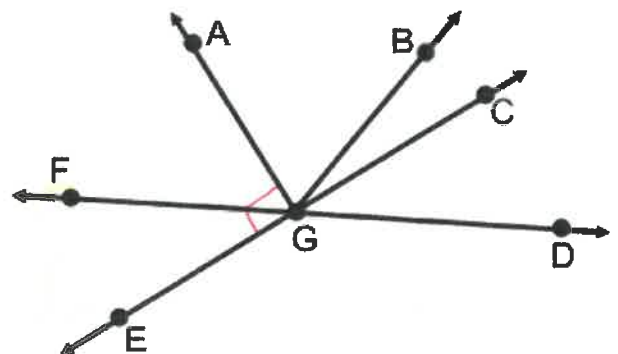
$\angle FGE$  &  $\angle CGD$

13. Name a pair of complementary angles.

$\angle EGF$  &  $\angle FGA$

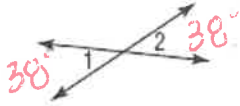
14. Name an angle supplementary to  $\angle FGE$

$\angle CGD$

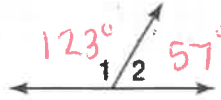


Find the measure of each numbered angle.

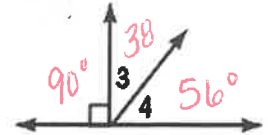
1.  $m\angle 1 = 38$



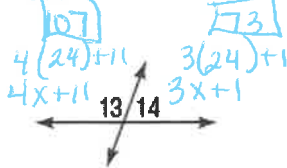
2.  $m\angle 2 = 57$



3.  $m\angle 3 = 38$

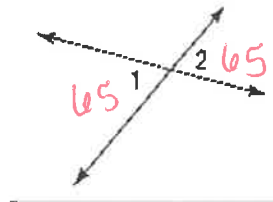


4.  $m\angle 13 = 4x + 11$ ,  
 $m\angle 14 = 3x + 1$

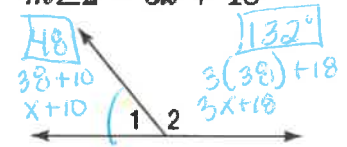


$7x + 12 = 180$   
 $7x = 168$   
 $x = 24$

5.  $m\angle 1 = 65$

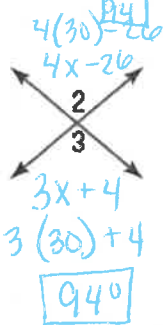


6.  $m\angle 1 = x + 10$   
 $m\angle 2 = 3x + 18$



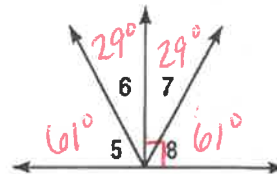
$4x + 28 = 180$   
 $4x = 152$   
 $x = 38$

7.  $m\angle 2 = 4x - 26$ ,  
 $m\angle 3 = 3x + 4$



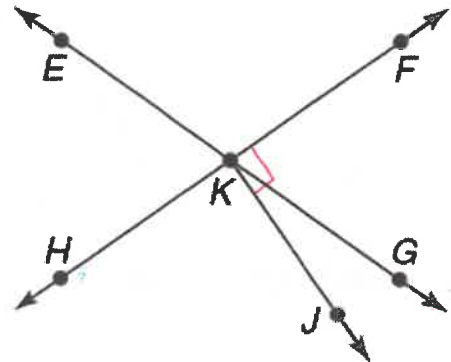
$4x - 26 = 3x + 4$   
 $x = 30$

8.  $\angle 7$  and  $\angle 8$  are complementary.  $\angle 5 \cong \angle 8$  and  $m\angle 6 = 29$ .



For #1-6, use the figure at the right.

- Name two vertical angles.  
 $\angle EKH$  &  $\angle FKG$
- Name a linear pair.  
 $\angle EKF$  &  $\angle FKG$
- Name two acute adjacent angles.  
 $\angle HKJ$  &  $\angle JKG$
- Name an angle complementary to  $\angle FKG$ .  
 $\angle GKJ$
- Name an angle supplementary to  $\angle FKG$ .  
 $\angle FKE$  or  $\angle JKH$

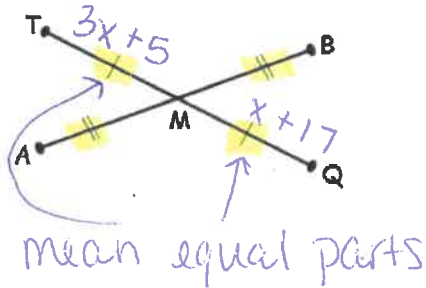


## Bisect

Bisect: to divide into two equal parts

Segment bisector → the dividing line

If  $TM = 3x + 5$ ,  $MQ = x + 17$ , find the value of  $x$ .



$$3x + 5 = x + 17$$

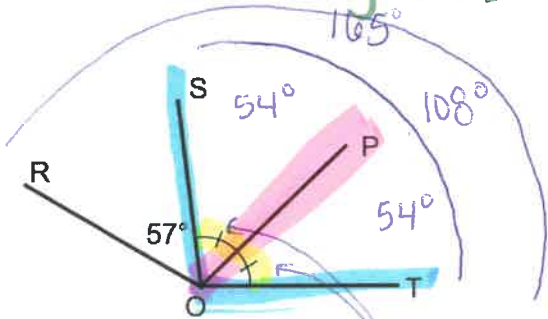
$$2x = 12$$

$$x = 6$$

## Angle bisector

Ex 1) OP is the angle bisector of  $\angle SOT$ , if  $m\angle ROT = 165^\circ$ , what is  $m\angle SOP$  and  $m\angle TOP$ ?

(dividing line)



mean equal parts

$$165 - 57 = 108^\circ$$

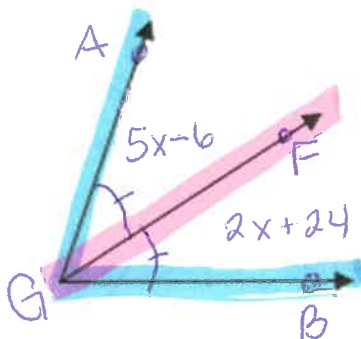
$$108 \div 2 = 54^\circ$$

(bisect means divide into two)

$$m\angle SOP = 54^\circ$$
$$m\angle TOP = 54^\circ$$

Ex 2) If GF bisects  $\angle AGB$ ,  $m\angle AGF = 5x - 6$  and  $m\angle BGF = 2x + 24$ , find the value of  $x$  and  $m\angle AGF$ .

(dividing line)



$$5x - 6 = 2x + 24$$

$$3x = 30$$

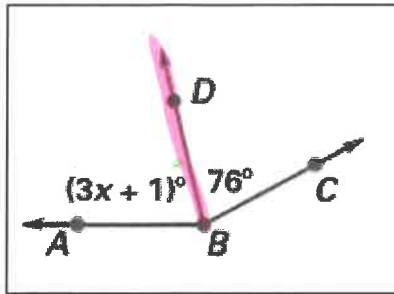
$$x = 10$$

$$m\angle AGF = 5(10) - 6$$
$$= 50 - 6$$

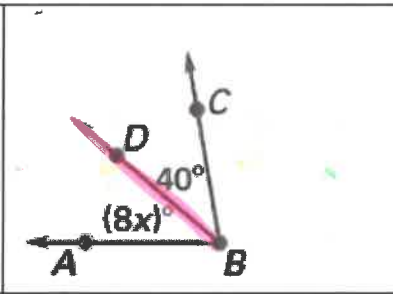
$$m\angle AGF = 44^\circ$$

# Bisect Practice

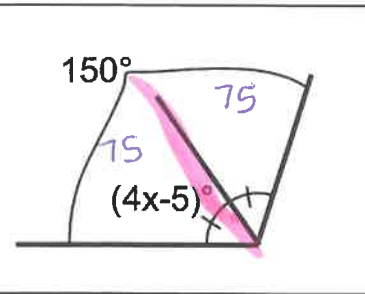
Directions:  $\angle ABC$  is bisected by  $\overline{BD}$ . Find the value of  $x$ .



$$\begin{aligned} 3x + 1 &= 76 \\ 3x &= 75 \\ x &= 25 \end{aligned}$$



$$\begin{aligned} 8x &= 40 \\ x &= 5 \end{aligned}$$

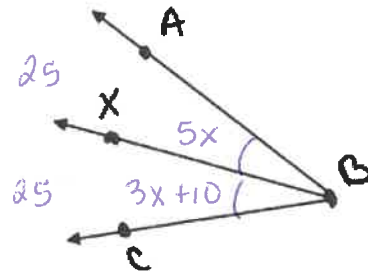


$$\begin{aligned} 4x - 5 &= 75 \\ 4x &= 80 \\ x &= 20 \end{aligned}$$

If  $m\angle ABX = 5x$  and  $m\angle XBC = 3x + 10$ , find the  $m\angle ABC$ . (Solve for  $x$  first!)

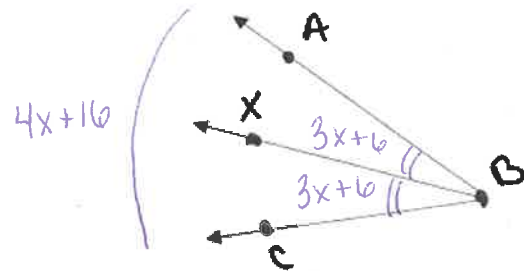
$$\begin{aligned} 5x &= 3x + 10 \\ 2x &= 10 \\ \boxed{x = 5} \end{aligned}$$

$$\boxed{m\angle ABC = 50}$$



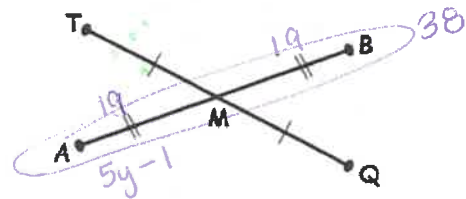
If  $m\angle ABC = 4x + 16$  and  $m\angle CBX = 3x + 6$ , find the value of  $x$ .

$$\begin{aligned} 3x + 6 + 3x + 6 &= 4x + 16 \\ 6x + 12 &= 4x + 16 \\ 2x &= 4 \\ \boxed{x = 2} \end{aligned}$$

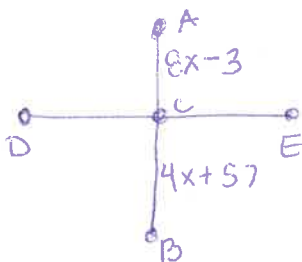


If  $AM = 5y - 1$ ,  $AB = 38$ , find the value of  $y$ .

$$\begin{aligned} 5y - 1 &= 19 \\ 5y &= 20 \\ \boxed{y = 4} \end{aligned}$$



Draw and label a diagram:  $\overline{DE}$  bisects  $\overline{AB}$  at  $C$ . If  $AC = 8x - 3$  and  $CB = 4x + 57$ , find  $x$ .



$$\begin{aligned} 8x - 3 &= 4x + 57 \\ 4x &= 60 \\ \boxed{x = 15} \end{aligned}$$



# Algebraic Proofs

Property	Example
Symmetric Property	$x = 5 \rightarrow 5 = x$ <span style="float: right;">flip equation</span>
Transitive Property	$a = b \neq b = c \rightarrow a = c$ <span style="float: right;">link beginning to end</span>
Addition and Subtraction Properties	$\begin{array}{r} 2x - 1 = 9 \\ +1 \quad +1 \\ \hline \end{array}$ <span style="margin-left: 150px;"> <math display="block">\begin{array}{r} x + 6 = 7 \\ -6 \quad -6 \\ \hline \end{array}</math> </span>
Multiplication and Division Properties	$\frac{x}{3} = 4 (3)$ <span style="margin-left: 150px;"> <math display="block">\frac{6x}{6} = \frac{12}{6}</math> </span>
Substitution Property	replace items with equal value $x + 2x \rightarrow 3x$
Distributive Property	$2(x + 9) \rightarrow 2(x) + 2(9) \rightarrow 2x + 18$

Ex 1) Identify the algebraic property used in each step:

Given:  $3(x - 2) = 42$

$3x - 6 = 42$

$3x - 6 + 6 = 42 + 6$

$3x = 48$

$\frac{3x}{3} = \frac{48}{3}$

$x = 16$

Distributive property  
addition property  
Substitution / simplify  
Division property  
Substitution / simplify

Ex 2) Given:  $3(x - \frac{5}{3}) = 1$  Start  
 Prove:  $x = 2$  End

Statements	Reasons
① $3(x - \frac{5}{3}) = 1$	① Given
② $3x - 5 = 1$	② Distributive prop.
③ $3x - 5 = 1$ $\quad +5 \quad +5$	③ addition property
④ $3x = 6$	④ Substitution / simplify
⑤ $\frac{3x}{3} = \frac{6}{3}$	⑤ Division property
⑥ $x = 2$	⑥ Substitution / simplify





8. Given:  $2(x - 3) = 8$

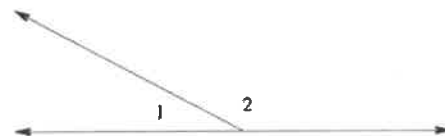
Prove:  $x = 7$

Proof:

Statements	Reasons
a. $2(x-3)=8$	a. Given
b. $(2)x - (2)3 = 8$	b. Distributive prop
c. $2x - 6 = 8$	c. Substitution
d. $2x - 6 = 8$ $+6 \quad +6$	d. Addition prop.
e. $2x = 14$	e. Simplify
f. $2x / 2 = 14 / 2$	f. Division prop.
g. $x = 7$	g. Substitution

9. Given:  $\angle 1$  and  $\angle 2$  are supplementary  
 $m\angle 2 = 145$

Prove:  $\angle 1 = 35$



Proof:

Statements	Reasons
a. $\angle 1 + \angle 2$ are supplementary	a. Given
b. $m\angle 2 = 145$	b. Given
c. $m\angle 1 + m\angle 2 = 180$	c. Definition of Supplementary
d. $\angle 1 + 145 = 180$	d. Substitution
e. $m\angle 1 + 145 = 180$ $-145 \quad -145$	e. Subtraction prop.
f. $m\angle 1 = 35$	f. Substitution



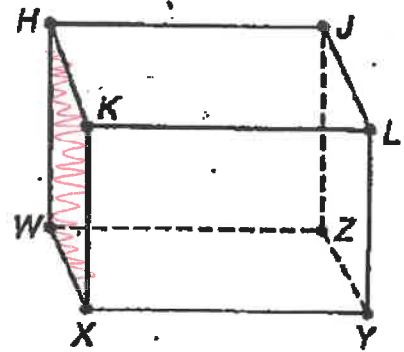


# Fundamentals Test Review #1

Name: Answer Key  
 Date: \_\_\_\_\_ Block: \_\_\_\_\_

Refer to the figure at the right to answer each question.

- Are points  $H, J, K,$  and  $L$  coplanar?  
 Yes
- Name three lines that intersect at  $X$ .  
 $\overline{WX}, \overline{XY}, \overline{KX}$
- What points do plane  $WXY$  and  $HWK$  have in common?  
 $W, X$
- Are points  $W, X,$  and  $Y$  collinear?  
~~Yes~~ No

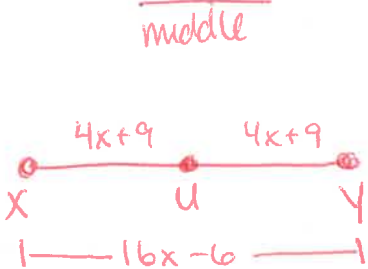


- List the possibilities for naming a line contained in plane  $WXH$ .

$\overline{WX}, \overline{HW}, \overline{KX}, \overline{HK}$

Draw a diagram and set up an equation to answer each question.

- If  $U$  is the midpoint of  $\overline{XY}$ , and  $XY = 16x - 6$  and  $UY = 4x + 9$  find the value of  $x$  and the measure of  $\overline{XY}$ .



$$4x+9 + 4x+9 = 16x-6$$

$$8x+18 = 16x-6$$

$$24 = 8x$$

$$3 = x$$

$x = 3$   
 $\overline{XY} = 42$

- $\overline{AB} \cong \overline{XY}$ ,  $AB = 3x - 5$ , and  $XY = x + 7$ . Find  $x$  and  $AB$ .

Congruent  
means  
equal

$$3x-5 = x+7$$

$$2x = 12$$

$$x = 6$$

$x = 6$   
 $AB = 13$

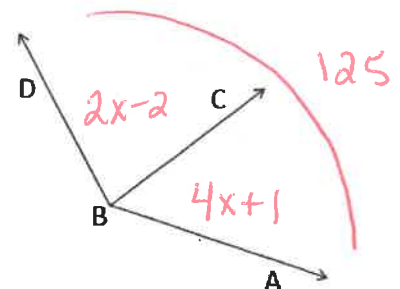
- Find the value of  $x$  if  $\angle CBA = 4x + 1$ ,  $\angle DBC = 2x - 2$  and  $\angle DBA = 125$

$$2x-2 + 4x+1 = 125$$

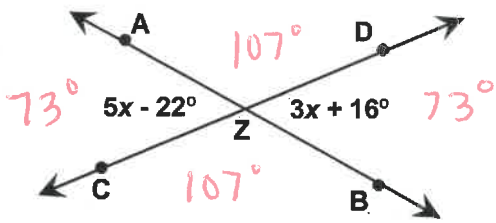
$$6x-1 = 125$$

$$\frac{6x}{6} = \frac{126}{6}$$

$x = 21$



9. Find the value of  $x$  and the measure of  $\angle CZB$ .



$$5x - 22 = 3x + 16$$

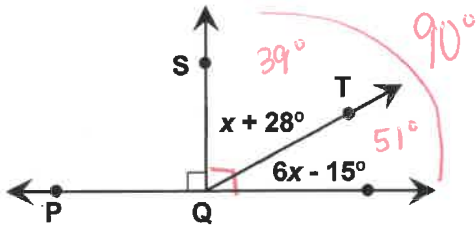
$$\frac{2x}{2} = \frac{38}{2}$$

$$x = 19$$

$$x = 19$$

$$\angle CZB = 107^\circ$$

10. Find the value of  $x$ ,  $m\angle SQT$  and  $m\angle TQR$ .



$$x + 28 + 6x - 15 = 90$$

$$7x + 13 = 90$$

$$\frac{7x}{7} = \frac{77}{7}$$

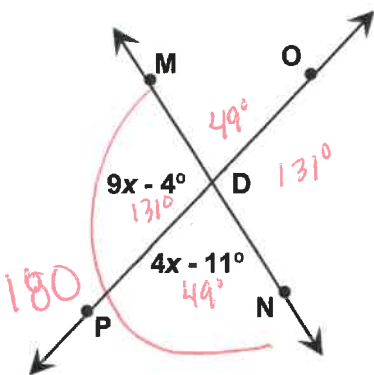
$$x = 11$$

$$x = 11$$

$$\angle SQT = 39^\circ$$

$$\angle TQR = 51^\circ$$

11. Find the value of  $x$ ,  $m\angle ODN$ ,  $m\angle ODM$ ,  $m\angle MDP$ , and  $m\angle PDN$ .



$$9x - 4 + 4x - 11 = 180$$

$$13x - 15 = 180$$

$$\frac{13x}{13} = \frac{195}{13}$$

$$x = 15$$

$$x = 15$$

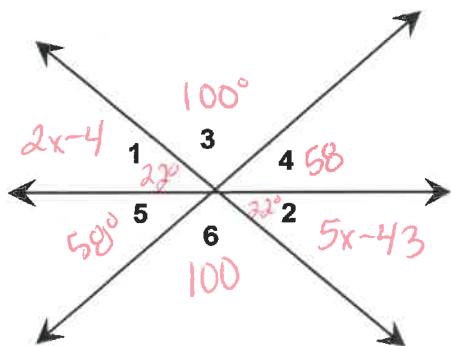
$$\angle ODN = 131^\circ$$

$$\angle ODM = 49^\circ$$

$$\angle MDP = 131^\circ$$

$$\angle PDN = 49^\circ$$

12. If  $m\angle 1 = 2x - 4$ ,  $m\angle 2 = 5x - 43$ , and  $m\angle 3 = 100$ , find the measure of each numbered angle.



$$2x - 4 = 5x - 43$$

$$\frac{39}{3} = \frac{3x}{3}$$

$$13 = x$$

$$x = 13$$

$$\angle 1 = 22^\circ$$

$$\angle 2 = 22^\circ$$

$$\angle 3 = 100^\circ$$

$$\angle 4 = 58^\circ$$

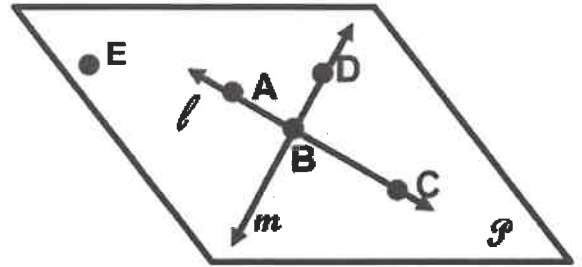
$$\angle 5 = 58^\circ$$

$$\angle 6 = 100^\circ$$

# Unit 1: Geometry Fundamentals Review #2

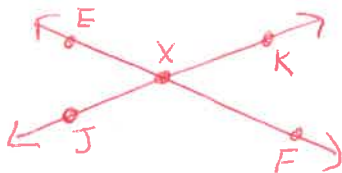
Refer to the figure.

1. Name a line that contains point A.  
 $\overleftrightarrow{AB}$  or  $\overleftrightarrow{AC}$
2. What is another name for line  $m$ ?  
 $\overleftrightarrow{BD}$
3. Name a point not on  $\overleftrightarrow{AC}$ .  
 $E$  or  $D$
4. Name the intersection of  $\overleftrightarrow{AC}$  and  $\overleftrightarrow{DB}$ .  
 $B$
5. Name a point not on line  $l$  or line  $m$ .  
 $E$
6. Name 3 collinear points  
 $A, B, C$



Draw and label a figure for each relationship.

7. Lines  $JK$  and  $EF$  intersect at  $X$ .

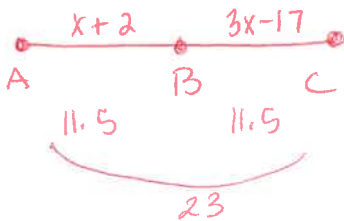


8. Points  $R, S,$  and  $T$  are in plane  $M$ , but point  $W$  does not lie in plane  $M$ .



Draw a diagram and set up an equation to answer each question.

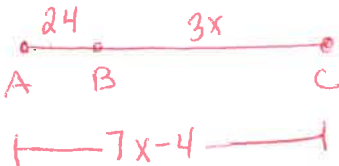
9. B is the midpoint of A and C.  $AB = x + 2$  and  $BC = 3x - 17$ . Find  $x$  and  $AC$ .



$$\begin{aligned} x+2 &= 3x-17 \\ 19 &= 2x \\ 9.5 &= x \end{aligned}$$

$$\begin{aligned} x &= 9.5 \\ AC &= 23 \end{aligned}$$

10. If B is between A and C and  $AB = 24$ ,  $BC = 3x$  and  $AC = 7x - 4$  Find  $x$  and  $BC$ .



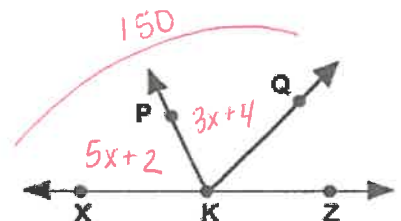
$$\begin{aligned} 3x+24 &= 7x-4 \\ 28 &= 4x \\ 7 &= x \end{aligned}$$

$$BC = 21$$

11. Given  $m\angle XKP = 5x + 2$ ,  $m\angle PKQ = 3x + 4$ , and  $m\angle XKQ = 150$ , find  $m\angle XKP$ .

$$\begin{aligned} 5x+2+3x+4 &= 150 \\ 8x+6 &= 150 \\ 8x &= 144 \\ x &= 18 \end{aligned}$$

$$m\angle XKP = 92^\circ$$



12. Given  $m\angle PKQ = 4x - 2$ ,  $m\angle QKZ = 2x - 5$ , and  $m\angle PKX = 31$ , find  $m\angle QKZ$ .

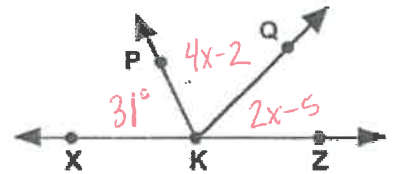
$$31 + 4x - 2 + 2x - 5 = 180$$

$$6x + 24 = 180$$

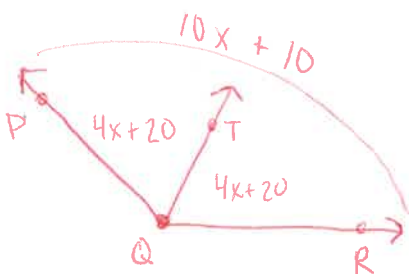
$$6x = 156$$

$$x = 26$$

$$m\angle QKZ = 47^\circ$$



13.  $\overline{QT}$  bisects  $\angle PQR$ .  $m\angle PQT = 4x + 20$ ,  $m\angle PQR = 10x + 10$ . Find  $x$  and  $m\angle TQR$ .



$$4x + 20 + 4x + 20 = 10x + 10$$

$$8x + 40 = 10x + 10$$

$$30 = 2x$$

$$15 = x$$

$$x = 15$$

$$m\angle TQR = 80$$

14.  $\angle 1$  and  $\angle 2$  are supplementary.  $m\angle 1 = 3x - 1$  and  $m\angle 2 = 5x + 21$ . Find  $x$ .

add to 180

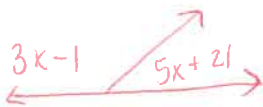
$$3x - 1 + 5x + 21 = 180$$

$$8x + 20 = 180$$

$$8x = 160$$

$$x = 20$$

$$x = 20$$



15.  $\angle T$  and  $\angle U$  are complementary. Find  $m\angle T$  and  $m\angle U$  if  $m\angle T = 16x - 9$  and  $m\angle U = 4x + 3$ .

add to 90

$$16x - 9 + 4x + 3 = 90$$

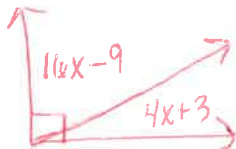
$$20x - 6 = 90$$

$$20x = 96$$

$$x = 4.8$$

$$m\angle T = 67.8^\circ$$

$$m\angle U = 22.2^\circ$$



16. Given:  $3x + 2 = 5(x - 2)$

Prove:  $x = 6$

①  $3x + 2 = 5(x - 2)$

②  $3x + 2 = 5x - 10$

③  $\frac{-5x \quad -5x}{\hline}$

④  $-2x + 2 = -10$

⑤  $\frac{-2 \quad -2}{\hline}$

⑥  $-2x = -12$

⑦  $\frac{-2 \quad -2}{\hline}$

⑧  $x = 6$

Statements

Reasons

① Given

② Distributive property

③ Subtraction property

④ Simplify

⑤ Subtraction property

⑥ Simplify

⑦ Division property

⑧ Simplify