

# 1.1 Points, Lines, and Planes

## NOTES

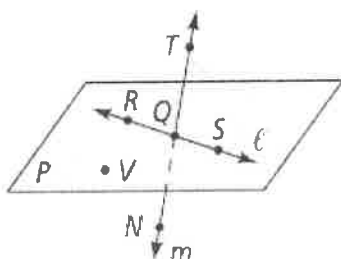
Write your questions here!



TERM	Name it	Picture
A <b>point</b> indicates	Capital letter Example: Point A	
A <b>line</b> is represented by a straight path that extends in two opposite directions without end and has no thickness. A line contains		
A <b>plane</b> is represented by a flat surface that extends without end and has no thickness. A plane contains infinitely many points.		

TERM	Picture
<b>Collinear Points</b> are points that	
<b>Coplanar</b> – Points and lines that	

Space =



- What are two other ways to name  $\overleftrightarrow{QT}$  ?
- What are two other ways to name plane  $P$  ?
- Name three collinear points.
- Name a point not coplanar with points  $R$ ,  $S$ , and  $V$ .

Write your questions here!

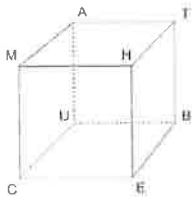


TERM	Name it	Picture
A <b>segment</b> is part of a line that consists of	Name a segment by its two endpoints.  Ex:	
A <b>ray</b> is part of a line consists of	Name a ray by its endpoint and another point on the ray. The endpoint <b>MUST</b> come first!  Ex:	
<b>Opposite Rays</b> are two rays that	Name both rays.  Ex:	



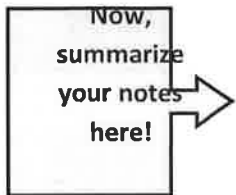
- Name the three line segments.
- Name the four rays.
- Which rays are opposite rays?

#	POSTULATE	Picture
1-1	Through any two points is exactly	
1-2	If two lines intersect, they intersect in exactly	
1-3	If two distinct planes intersect, they intersect in exactly	
1-4	Through any three noncollinear points there is exactly	



What is the intersection of plane *CUE* and plane *EBT* ?

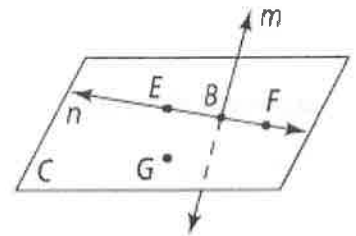
Summarize your notes:



## 1.1 PRACTICE

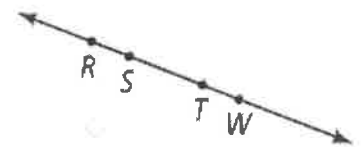
Use the figure at the right for 1-4

1. What are two other ways to name  $\overleftrightarrow{EF}$ ?
2. What are two other ways to name plane C?
3. Name three collinear points.
4. Name four coplanar points.



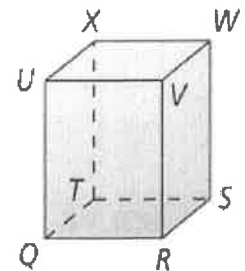
Use the figure at the right for 5-8

5. Name the segments in the figure.
6. Name the rays in the figure with endpoint S.
7. Name the pair of opposite rays with endpoint T.
8. Name another pair of opposite rays.



Use the figure at the right for 9-13

9. Name the intersection of planes  $QRS$  and  $RSW$ .
10. Name the intersection of planes  $TXW$  and  $UQX$ .
11. Name two planes that intersect at  $\overleftrightarrow{QU}$ .
12. Name two planes that intersect at  $\overleftrightarrow{VW}$ .
13. Draw an arrow to the plane that contains the points  $R, V, W$ .



Draw the following:

14. four collinear points

15.  $\overleftrightarrow{MA}$

16.  $\overleftrightarrow{ET}$  on plane D

17. four noncoplanar points

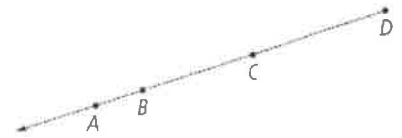
**WHO IS RIGHT?!**

Mr. Brust and Mr. Sullivan are arguing about who is correct. Help them settle each argument by explaining who, if anyone, is right. Each argument has an included picture to the right.

18.

- Mr. Brust says “picture is called  $\overrightarrow{DB}$ ”
- Sully says “picture is called  $\overrightarrow{BD}$ ”

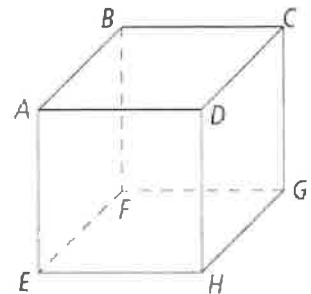
Who is correct, if anyone? Why?



19.

- Mr. Brust says “intersection of plane  $ABC$  and plane  $CDH$  is point  $C$ ”
- Sully says “intersection of plane  $ABC$  and plane  $CDH$  is point  $D$ ”

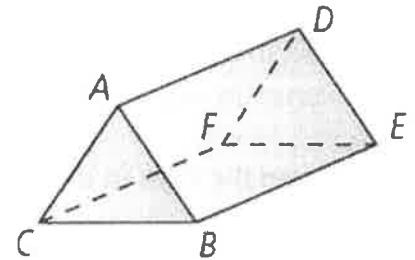
Who is correct, if anyone? Why?



20.

- Mr. Brust says “ $\overline{AB}$  and point  $D$  are coplanar”
- Sully says “ $\overline{AB}$  and point  $C$  are coplanar”

Who is correct, if anyone? Why?



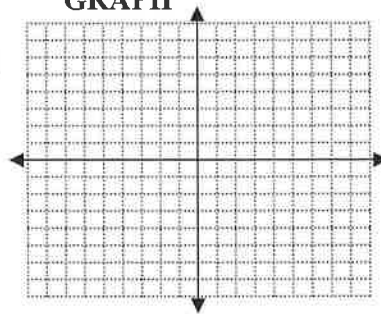
**ALGEBRA REVIEW**

**SOLVE**

$$\frac{x}{3} - 5 = -7$$

**GRAPH**

$$y = \frac{3}{4}x - 2$$



**MULTIPLY**  
(distribute)

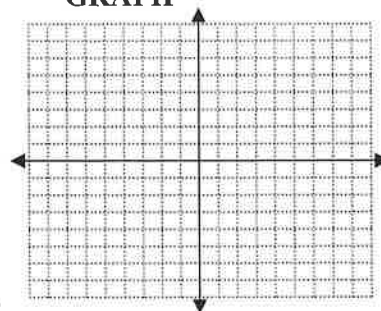
$$5(2x - 3)$$

**SOLVE**

$$3x + 2 = 5x - 8$$

**GRAPH**

$$y = -4$$



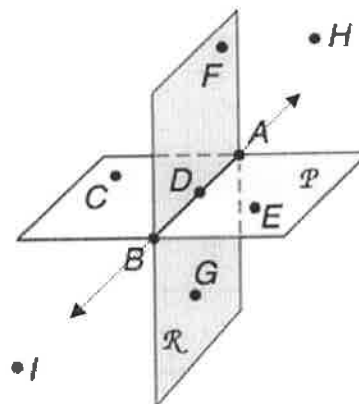
**FACTOR**  
Factor out the greatest common  
factor (undistribute)

$$4x^2 - 12$$

# 1.1 APPLICATION

Use the figure at the right to answer 1 and 4

- Where do plane  $R$  and plane  $P$  intersect?
- Name plane  $R$  another way.
- Name three collinear points.
- Name  $\overrightarrow{BA}$  another way.

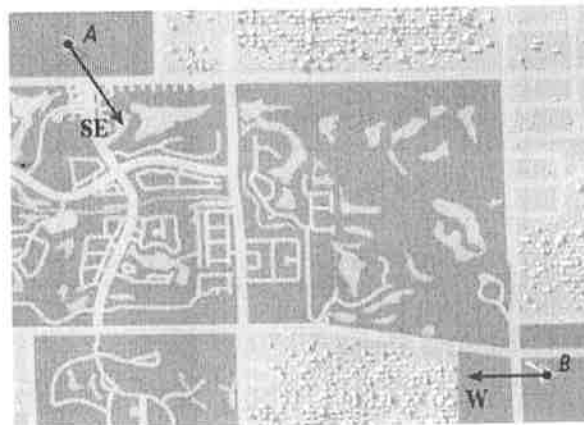


Watch the application walk through video if you need extra help getting started!

## 5. MAP

Mr. Kelly gets lost walking home from work one day. He calls his mommy for help on his cell phone. A cell phone tower at point A receives his cell phone signal from the Southeast as shown on the map. A cell phone tower at point B receives his same signal from due West as shown on the map.

- Help a Geometry teacher out by finding the exact location of Mr. Kelly on the map. Label it point  $K$ .
- Which postulate(s) help you locate Mr. Kelly?



## 6. Coordinate Geometry

- Graph the points

$$F(2,7)$$

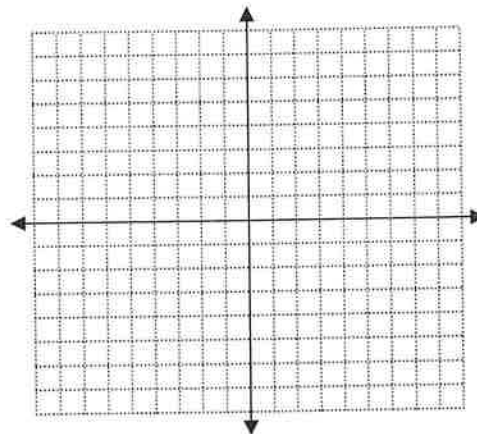
$$U(-6,-5)$$

$$N(-2,4)$$

- State whether the three points are collinear or not.

- If the three points are not collinear, change the coordinate of point  $N$  to make them collinear.

$$N(\underline{\quad}, \underline{\quad})$$



### 7. Proofs

A two column proof logically shows why something is true. Look at the example below.

<b>Given: <math>2x + 1 = 9</math></b>	
<b>Prove: <math>x = 4</math></b>	
<b>STATEMENTS</b>	<b>REASONS</b>
1. $2x + 1 = 9$	1. Given
2. $2x = 8$	2. Subtraction Property of Equality
3. $x = 4$	3. Division Property of Equality

**Some possible reasons:**

- Given
- Addition Property of Equality
- Subtraction Property of Equality
- Multiplication Property of Equality
- Division Property of Equality
- Substitution
- Distributive Property
- Combine like terms
- Definition of \_\_\_\_\_
- \_\_\_\_\_ Postulate
- \_\_\_\_\_ Theorem

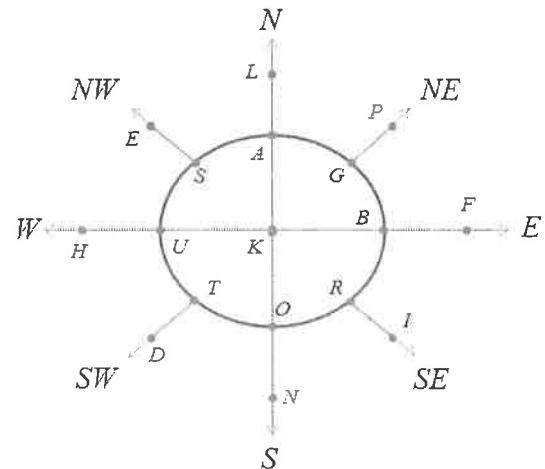
Fill in the missing reasons in the two column proof.

<b>Given: <math>2(3x + 1) = 14</math></b>	
<b>Prove: <math>x = 2</math></b>	
<b>STATEMENTS</b>	<b>REASONS</b>
1. $2(3x + 1) = 14$	1.
2. $6x + 2 = 14$	2.
3. $6x = 12$	3.
4. $x = 2$	4.

### 8. Geometric Shape

Mr. Brust buys Mr. Kelly a compass to help with his navigational skillz. Mr. Brust starts thinking about geo.

- a. Name 3 collinear points that run North to South.
- b. Name the ray that points to Northeast.
- c. How many points are on circle  $K$  ?
- d. Name  $\overleftrightarrow{HF}$  3 different ways.
- e. What do you notice about  $\overline{KB}$ ,  $\overline{KA}$ ,  $\overline{KU}$ , and  $\overline{KO}$  ?



**COMPASS**