Geometry Notes – 1.1 Points, Lines, and Planes

5 Minute Check

1. What is the value of $x^2 + 3yz$ if $x = 3$, $y = 6$, and $z = 4$?

   A. 27   B. 33   C. 72   D. 81

2. Solve $2(x - 7) = 5x + 4$.

   A. −6   B. $-\dfrac{10}{3}$ C. 2   D. 6
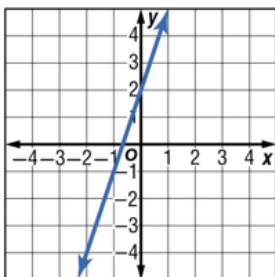
3. Which is a solution of $3x + 4y = 14$?

   A. (−3, 4)   B. (−2, 5)   C. (1, 3)   D. (2, 3)

4. Factor $9x^2 - 25y^2$.

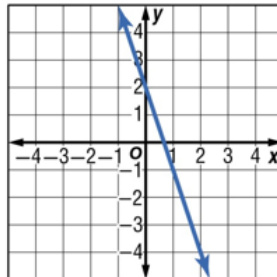   A. $(3x - 5y)^2$ B. $(3x + 5y)^2$ C. $(3x + 5y)(3x - 5y)$ D. $(9x + 5y)(x - 5y)$
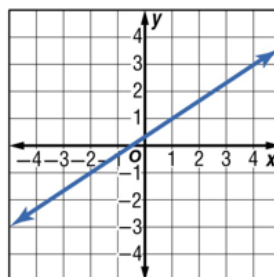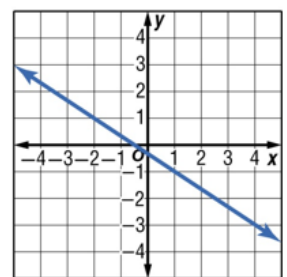
5. Graph $y = 3x + 2$.

   A.   B.   C.   D.

6. Which of the following equations is a quadratic equation?

   A. $4x = 2$ B. $5x + 2y = 13$ C. $6x^2 - 3x = 16$ D. $5x^3 - x^2 + 2 = 0$

Content Standards

G.CO.1 Know precise definitions of angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, distance along a line, and distance around a circular arc.

Mathematical Practices

4 Model with mathematics.
6 Attend to precision.

Vocabulary – Undefined Terms (which are Intuitive Ideas) – Points, Line, & Plane

Term Description	How to Name It (Represent It)	Diagram (How to Draw It)
Point – is a _____. It has neither _____ nor _____.	**Draw:** _____ **Named By:** a _____ letter	Fill this in!
Line – made up of _____ and has no _____ or _____. There is exactly _____ line through any _____ points.	**Draw:** a _____ with _____ on _____ ends **Named By:** the _____ representing _____ points on the _____ or a _____ script _____.	Fill this in!
Plane – a _____ surface made up of _____ that extends infinitely in _____ directions. There is exactly _____ plane through any _____ points not on the same line.	**Draw:** a _____ **Named By:** a _____ script _____ or by the _____ naming _____ points that are not all on the _____ _____.	Fill this in!

Example 1 – Name Lines and Planes
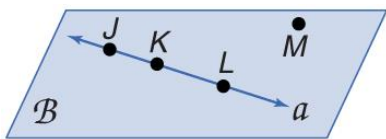
    A.   Use the figure to name a line containing point *K*.

    B.   Use the figure to name a plane containing point *L*.

Example 1 – Check Your Progress
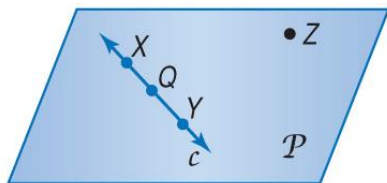
    A. Use the figure to name a line containing the point *X*.

        A. line *X*   B. line *c*   C. line *Z*   D. $\overleftrightarrow{YZ}$

    B. Use the figure to name a plane containing point *Z.*

        A. plane XY   B. plane c   C. plane XQY   D. plane P

Real-World Example 2 – Model Points, Lines, and Planes

    A.   Name the geometric shape modeled by a 10×12 patio.

    B.   Name the geometric shape modeled by a button on a table.

Real-World Example 2 – Check Your Progress

    A. Name the geometric shape modeled by a colored dot on a map used to mark the location of a city.

        A. point   B. line segment   C. Plane   D. none of the above

    B.   Name the geometric shape modeled by the ceiling of your classroom.

        A. point   B. line segment   C. Plane   D. none of the above

# Vocabulary – Space, Collinear Points, Coplanar Points, & Intersection

Term Description	Explain in Your Own Words	Diagram
Space – a _____, _____ dimensional set of all points. Space can contain _____ and _____.		
Collinear Points – points that lie on the _____ _____. Noncollinear points ____ _____ lie on the _____ _____.	Fill this in!	Fill this in!
Coplanar Points – points that lie in the _____ _____. Noncoplanar points _____ _____ lie in the _____ _____.	Fill this in!	Fill this in!
Intersection – of two or more geometric figures, is the set of points they have ____ _____. Two lines intersect at a _____. Lines can intersect _____, and planes can intersect _____ _____.	Fill this in!	Fill this in!

Example 3 – Draw Geometric Figures

A. Draw and label a figure for the following situation. Plane *R* contains lines AB and DE, which intersect at point *P*. Add point *C* on plane *R* so that it is not collinear with $\overleftrightarrow{AB}$ or $\overleftrightarrow{DE}$.
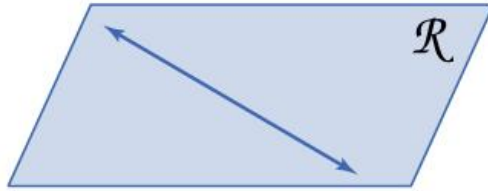

B. Draw and label a figure for the following situation. $\overleftrightarrow{QR}$ on a coordinate plane contains Q(-2, 4) and R(4, -4). Add point T so that T is collinear with these points.
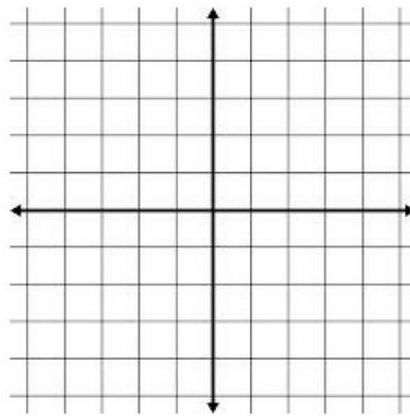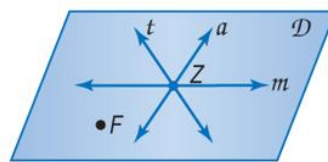

Example 3 – Check Your Progress

A. Choose the best diagram for the given relationship. Plane *D* contains line *a*, line *m*, and line *t*, with all three lines intersecting at point *Z*. Also, point *F* is on plane *D* and is not collinear with any of the three given lines.
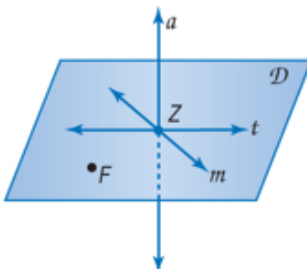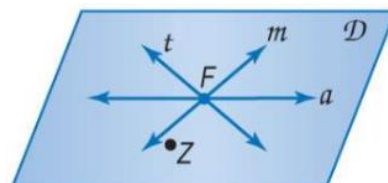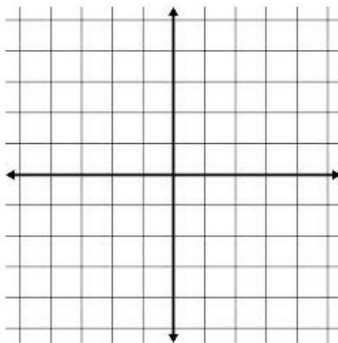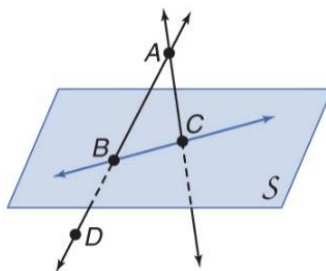
A.

B.

C.

D.

5
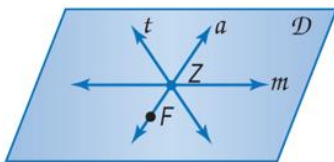
B. Draw and label a figure for each relationship. $\overleftrightarrow{BA}$ on a cooridinate plane contains B(-3, -2) and A(3, 2). Also, point *M* is on the plane and is collinear with these points.
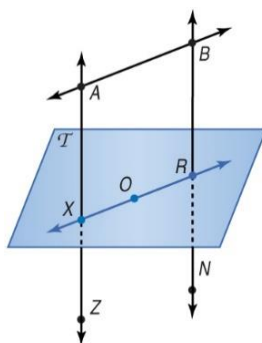

Example 4 – Interpret Drawings

A. How many planes appear in this figure?

B. Name three points that are collinear.

C. Are points *A*, *B*, *C*, and *D* coplanar? Explain.

D. At what point do $\overleftrightarrow{DB}$ and $\overleftrightarrow{CA}$ intersect.

Example 4 – Check Your Progress

A. How many planes appear in this figure?

    A. one   B. two   C. three   D. four

B. Name three points that are collinear.

    A. *B*, *O*, and *X*   B. *X*, *O*, and *N*   C. *R*, *O*, and *B*   D. *A*, *X*, and *Z*

C. Are points *X, O,* and *R* coplanar?

    A. yes   B. No   C. cannot be determined

D. At what point do $\overleftrightarrow{BN}$ and $\overleftrightarrow{XO}$ intersect?

    A. point *X*   B. point *N*   C. point *R*   D. point *A*