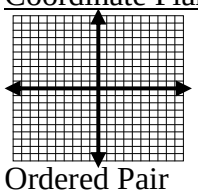
The Cartesian Coordinate System
§P.1

Coordinate Plane



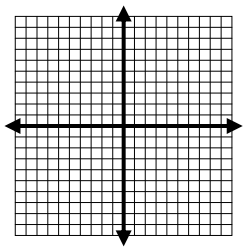
Ordered Pair

(x, y)

Example 1

Graph.

A (-3, 4)
B (0, -2)
C (2, -1)
D (4, 1)
E (-3, -2)
F (-5, 0)

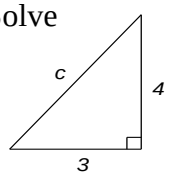


Pythagorean Theorem

$a^2 + b^2 = c^2$

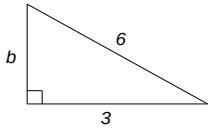
Example 2

Solve



Example 3

Solve



Distance Formula

$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

Example 4

Find the distance.

a. (-7, 4) (3, -6)

b. (4, 8) (-2, 0)

Midpoint Formula

$$\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$$

Example 5

Find the midpoint.

a. (3, -2) (5, 6)

b. (4, 9) (7, -1)

Pg 10, 1-24

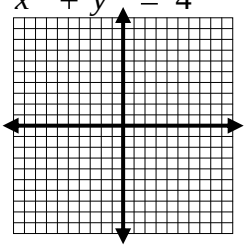
The Cartesian Coordinate System
§P.1 (Day 2)

Equation for a Circle

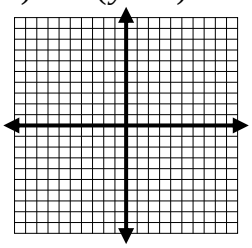
$(x - h)^2 + (y - k)^2 = r^2$
Center: (h, k)
Radius: r

Example 1
Draw each circle.

a. $x^2 + y^2 = 4$



b. $(x - 2)^2 + (y + 3)^2 = 9$



Example 2
Write the equation of each circle.

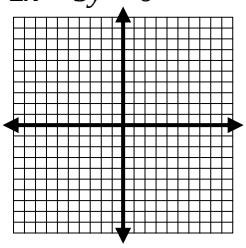
a. Center = (-3, 4), r = 5

b. Center = (-1, -6),
passes through (3, -6)

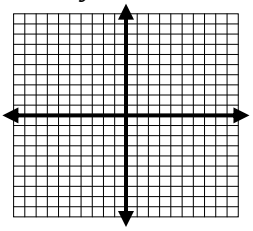
Linear Equation in Two Variables
$Ax + By = C$

Example 3
Graph each equation.

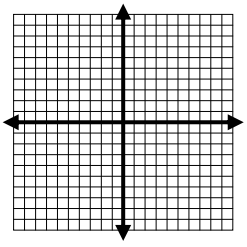
a. $2x + 3y = 6$



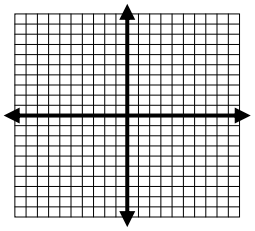
b. $2x - 5y = 15$



c. $y = -5$



d. $x = 3$



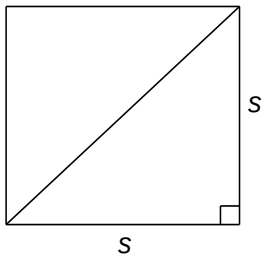
Functions
§P.2

Function – a set of ordered pairs in which no two pairs have the same first coordinate and different second coordinates.

Example 1
Given the figure below, answer the following.

a. Write the perimeter as a function of the length of a side.

b. Write the area as a function of the diagonal.

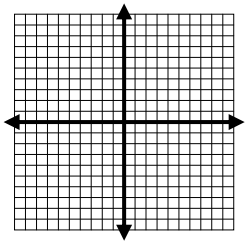


Domain – the set of all first coordinates of the ordered pairs (x-value).

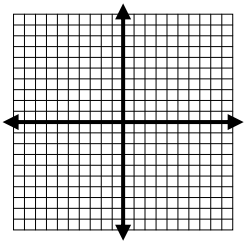
Range – the set of all second coordinates of the ordered pair (y-value).

Example 2
Graph each function and state the domain and range.

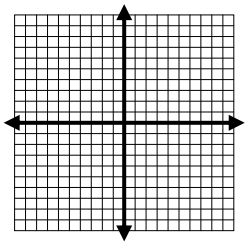
a. $y = x^2$



b. $y = |x| + 4$



c. $y = \sqrt{x - 10}$



Example 3

Let $f(x) = 2x^2 + 1$, $g(x) = 4x$, and $h(x) = x - 5$. Find each.

a. f(5) b. h(7) c. g(-3)

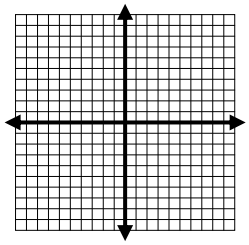
Pg 18, 15-18, 23-26, 33-50

Graph Review
§P.2 (Day 2)

Graph each and find the Domain and Range.

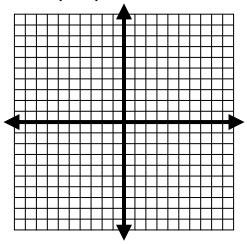
Example 1

$y = x^2 - 3$



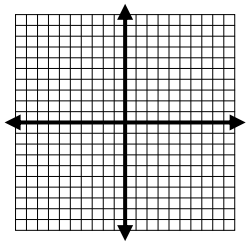
Example 2

$y = 2|x|$



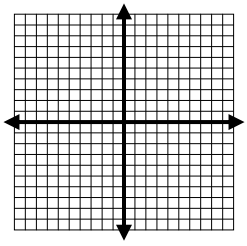
Example 3

$y = \sqrt{x} - 4$



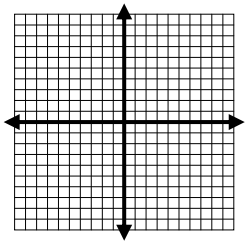
Example 4

$y = |x + 2|$



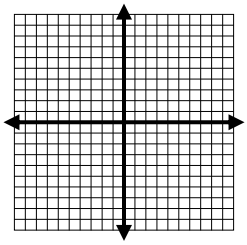
Example 5

$y = (x + 7)^2 - 3$



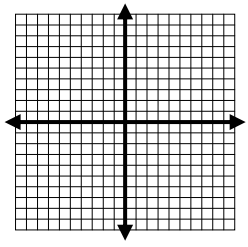
Example 6

$y = -\sqrt{x - 3}$



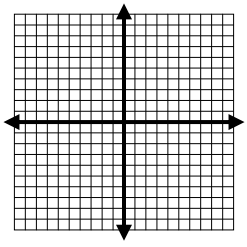
Example 7

$y = -3|x| + 1$



Example 8

$y = -2x^2 + 3$

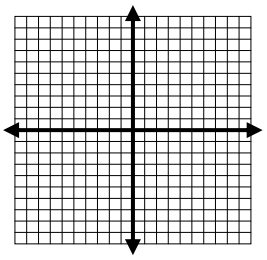


No Homework!!!!!

Graph each.

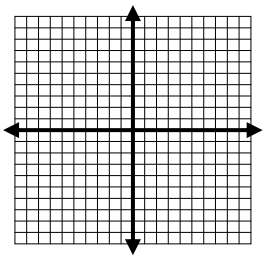
Example 1

$f(x) = 3x^2$ and $g(x) = -3x^2$



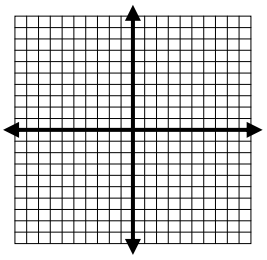
Example 2

$f(x) = x^3$ and $g(x) = -x^3$



Example 3

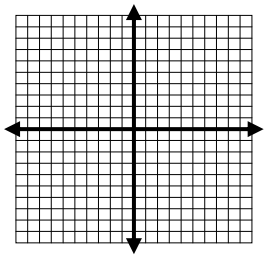
$f(x) = x^2$ and $g(x) = x^2 + 5$



Multiple Transformations

1. Horizontal Translation
2. Vertical Stretch or Vertical Shrink
3. Reflection
4. Vertical Translation

$y = x^2$ $y = 3x^2$ $y = -3x^2$ $y = \frac{1}{2}x^2$ $y = -\frac{1}{2}x^2$



Example 4

Identify, without graphing, what type of transformation(s) are indicated by each equation.

a. $f(x) = -x^2 + 1$

b. $f(x) = (x + 2)^2$

c. $f(x) = -(x - 2)^2 + 5$

d. $f(x) = |x + 3| - 2$

Pg 27, 1-24, skip 4

Compositions and Inverses
§P.4

Composition of Functions – if *f* and *g* are two functions, the composition of f and g is a function defined by:

$$(f \circ g)(x) = f(g(x))$$

Example 1

If $f(x) = 2x + 3$, $g(x) = \sqrt{x}$, and $h(x) = x^2$, find each.

a. $(f \circ g)(16)$ b. $g(h(25))$ c. $h(f(-3))$

Example 2

Use the two given functions to write *y* as a function of *x*.

a. $y = 2b + 1, b = 2x + 3$ b. $y = t^2 - 2, t = x - 1$

Inverse – the inverse of a one-to-one function *f* is the function f^{-1} where the ordered pair of f^{-1} are obtained by interchanging the coordinates in each ordered pair of *f*.

Example 3

Find the inverse of each function.

a. $y = 2x^2 + 3$ b. $y = \sqrt{x+4}$

Pg 36, 1-20, 27-34

Composition and Inverses
§P.4 (Day 2)

If two functions are inverses of one another, then: $f(f^{-1}(x)) = x = f^{-1}(f(x))$.

Determine whether each pair of functions are inverses.

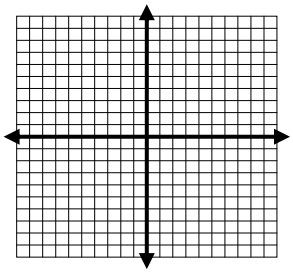
Example 1

$f(x) = 2x - 1,\ g(x) = \frac{1}{2}x + \frac{1}{2}$

Example 2

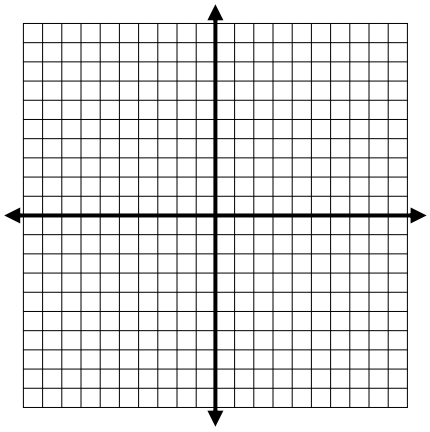
$f(x) = 3x + 6,\ f^{-1}(x) = \frac{x - 6}{3}$

Graphs of f and f^{-1}.



Example 3

Find the inverse of $f(x) = \sqrt{x - 1}$ and graph both f and f^{-1} on the same coordinate plane.



Pg 36, 39-56, 63-66