3.1 Plot Points in a Coordinate Plane

Before You graphed numbers on a number line.

**Now** You will identify and plot points in a coordinate plane.

Why? So you can interpret photos of Earth taken from space, as in Ex. 36.

Goal: Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.

You have used a coordinate plane to graph ordered pairs whose coordinates were nonnegative. If you extend the x-axis and y-axis to include negative values, you divide the coordinate plane into four regions called **quadrants**, labeled I, II, III, and IV as shown.

Points in Quadrant I have two positive coordinates. Points in the other three quadrants have at least one negative coordinate.

For example, point P is in Quadrant IV and has an x-coordinate of 3 and a y-coordinate of -2. A point on an axis, such as point Q, is not considered to be in any of the four quadrants.
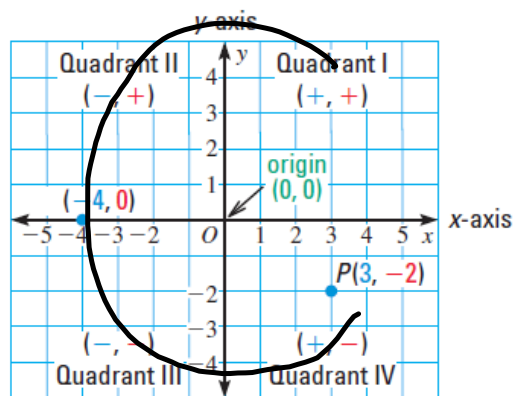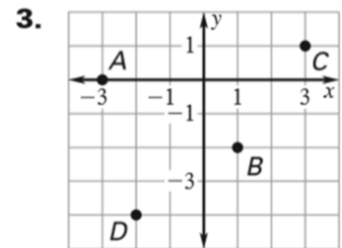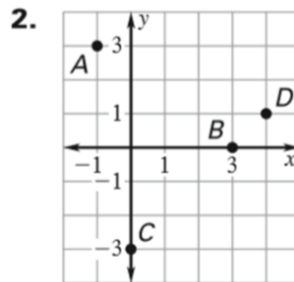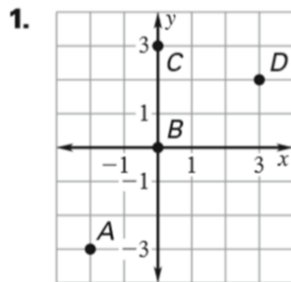
Practice A

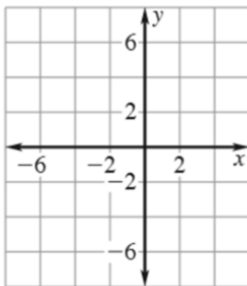*For use with the lesson "Plot Points in a Coordinate Plane"*

Give the coordinates of the points labeled A, B, C, and D.

1.

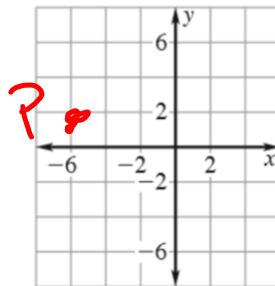**2.**

3.

A(-3, 0)
B (1, -2)
C (3, 1)
D (-2, -3)

Plot the point in a coordinate plane. *Describe* the location of the point.

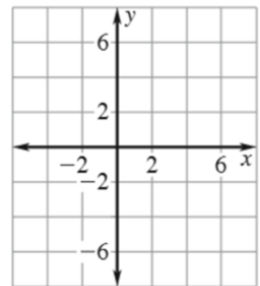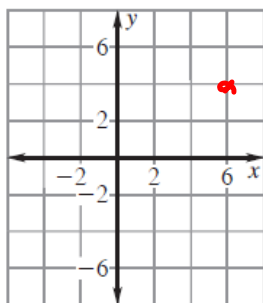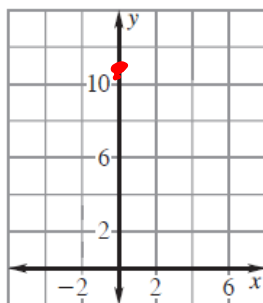**4.** $A(-5, 0)$

5. $P(-6, 2)$

6. $Q(0, -4)$
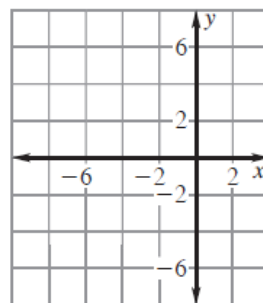
Q II

6 to th left
then up 2

7. $V(6, 4)$

8. $S(0, 11)$

9. $T(-3, -5)$

QI

Right 6, up 2
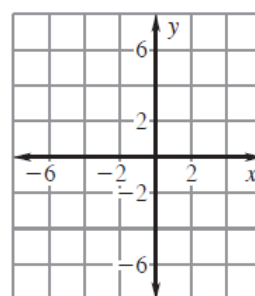
On the y axis
(up 11 units)
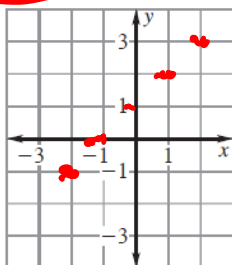
10. $B(8, 0)$
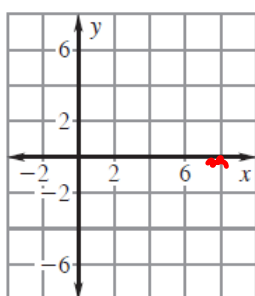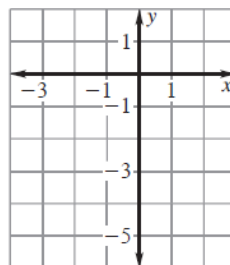
11. $W(2, -2)$
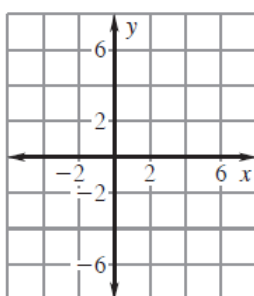
12. $R(-4, 3)$

Go   8 to.the right

(on-the x axis)

Graph the function with the given domain. Then identify the range of the function.

13. $y = x + 1$; domain: $-2, -1, 0, 1, 2$

14. $y = x - 3$; domain: $-2, -1, 0, 1, 2$
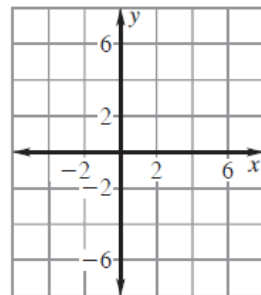
X	y
-2	-1
-1	0
0	1
1	2
2	3

R: $-1, 0, 1, 2, 3$

15. $y = 3x$; domain: $-2, -1, 0, 1, 2$
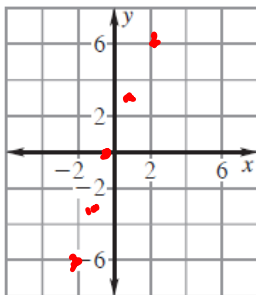
16. $y = \frac{1}{2}x$; domain: $-4, -2, 0, 2, 4$

X	y
-2	0 -6
-1	-3
6	0
1	3
2	6

$R: -6, -3, 0, 3, 6$

Without plotting the point, tell whether it is in Quadrant I, Quadrant II, Quadrant III, or Quadrant IV.

17. $(2, 4)$ *I*

18. $(1, -7)$

19. $(-5, 10)$ *II*

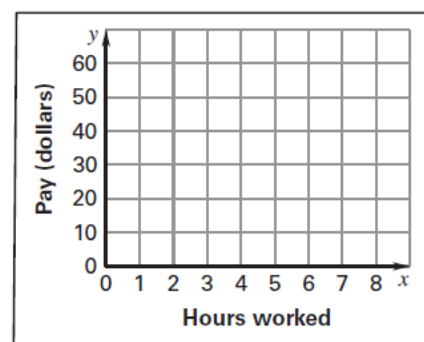**20.** $(7, -3)$ *IV*

21. $(-11, -3)$ *III*

22. $(8, 8)$

23. Hourly Pay The table shows the number of hours worked and the corresponding pay in dollars.

| Hours worked	1	2	3	5	8
Pay (dollars)	7.50	15.00	22.50	37.50	60

a. Graph the data from the table.

b. Does the graph represent a function? Why or why not?

24. Basketball The table shows the heights (in inches) of players on a high school basketball team and how many players are each height.

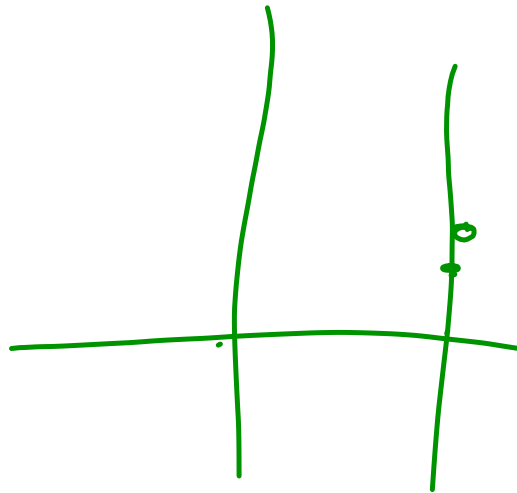| Height (inches)	69	70	71	72	73	74	75	76	77
Number of players	0	2	1	4	3	2	1	0	1

a. Graph the data from the table.

b. Does the graph represent a function? Why or why not?
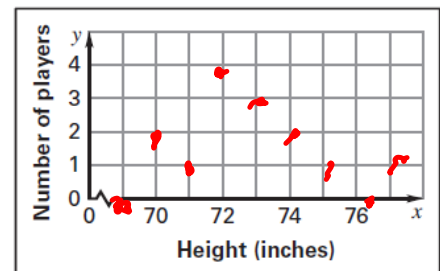
YES — each input has only 1 output

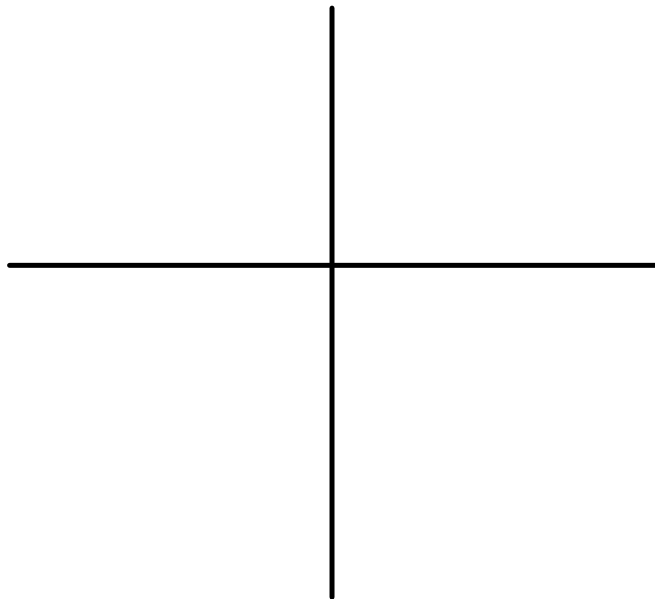| X	y
23	1
24	1
25	2
27	3
28	4
25	3
26	4

NO

Warm-up!

What is a coordinate plane?
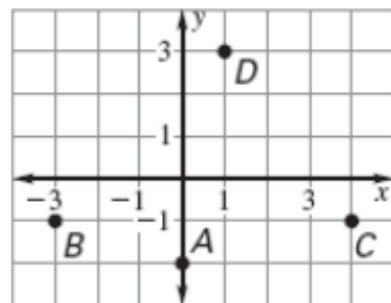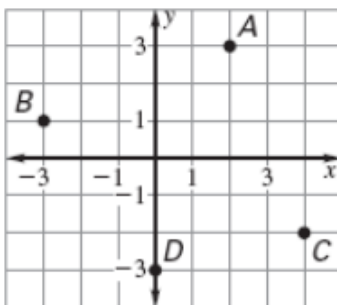What are ordered pairs?

Homework

Pages 149-150, # 3 - 27 Odd

Examples!

In the following two examples, name the ordered pairs!

Next one-Graphing!
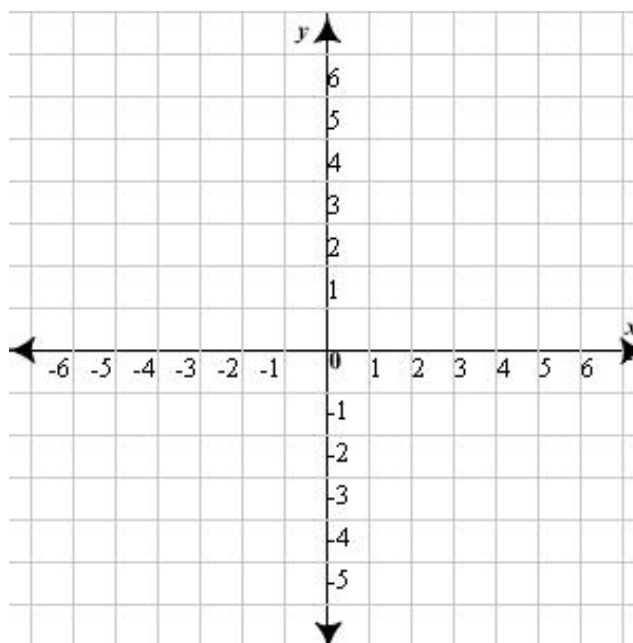
Graph the following ordered
pairs on your graph paper.

A: (-3, 5)

B: (4, 6)

C: (5, 0)

D: (0, 3)

E: (-2, -4)
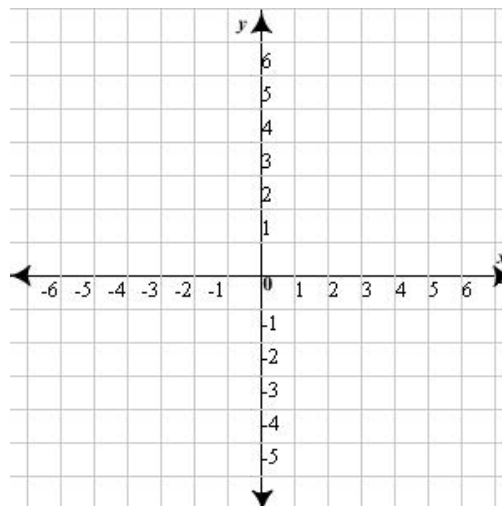
More Graphing!

Graph the function with the given domain.
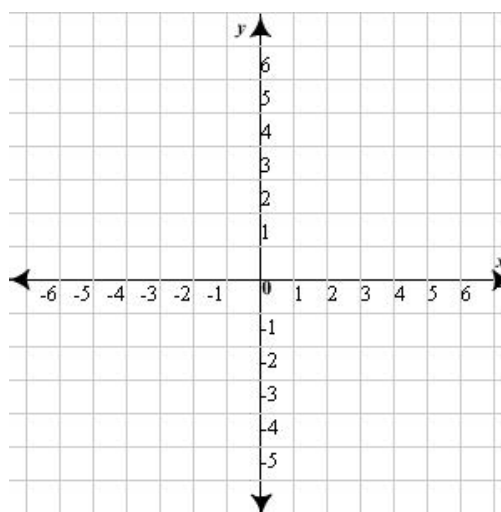Then, give the range.

y = 3x - 4

Domain: -2, -1, 0, 1, 2

Same Thing-Fractions!

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

Domain: -4, -2, 0, 2, 4

Tough One!

Suppose the point (a, b) lies in Quadrant II. Describe the location of the specified point.

(b, a)

(b, -b)

(-2a, 2b)