

### 3.3 Graphing Non-Linear Equations

Name \_\_\_\_\_

Identify each equation as linear or nonlinear.

1.  $2x + 3y = -5$

2.  $y = -2x + 3$

3.  $y = x^2 - 1$

4.  $x^2 + y^2 = 9$

5.  $y = \sqrt{x} + 4x$

6.  $y = \frac{1}{x} - 3$

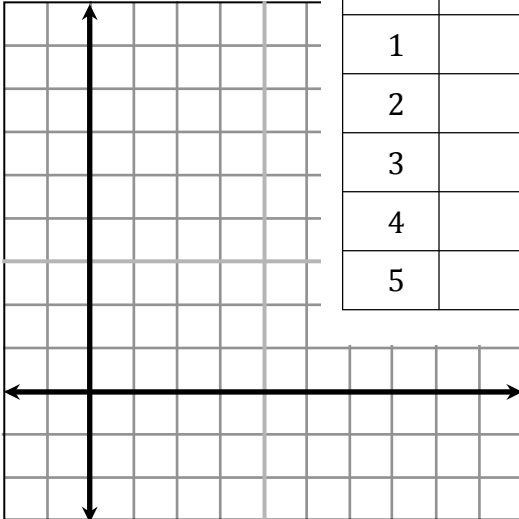
7.  $y = |x - 2|$

8.  $y = \frac{3}{4}x - \frac{1}{2}$

Graph the equations.

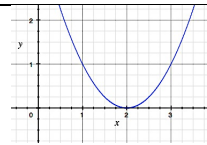
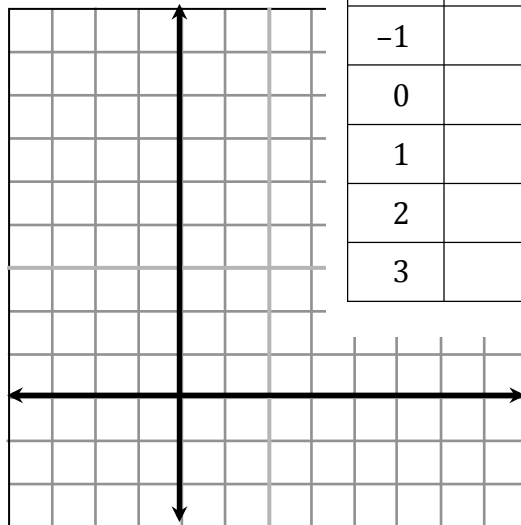
9.  $y = (x - 2)^2$

| x  | y |
|----|---|
| -1 |   |
| 0  |   |
| 1  |   |
| 2  |   |
| 3  |   |
| 4  |   |
| 5  |   |



10.  $y = x^2 - 2$

| x  | y |
|----|---|
| -3 |   |
| -2 |   |
| -1 |   |
| 0  |   |
| 1  |   |
| 2  |   |
| 3  |   |

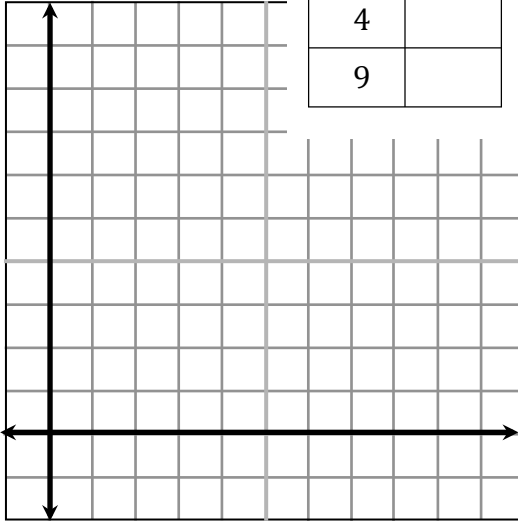


Answers: 1. linear, 3. nonlinear, 5. nonlinear, 7. nonlinear, 9.

Complete a table of values for each equation and graph the equation.

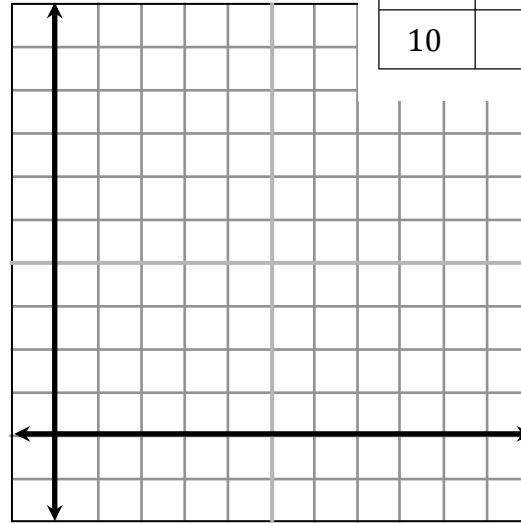
11.  $y = \sqrt{x} + 2$

| x | y |
|---|---|
| 0 |   |
| 1 |   |
| 4 |   |
| 9 |   |



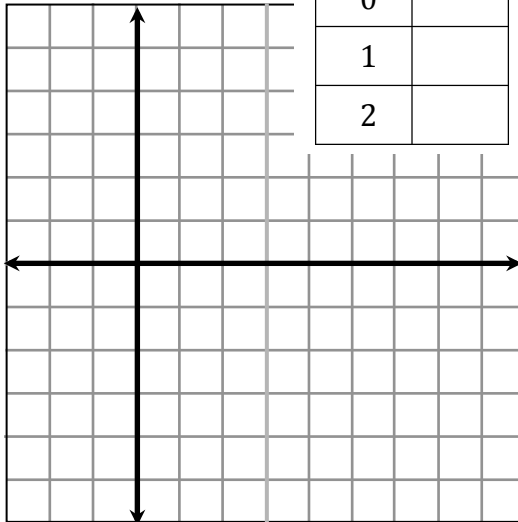
12.  $y = \sqrt{x-1}$

| x  | y |
|----|---|
| 1  |   |
| 2  |   |
| 5  |   |
| 10 |   |



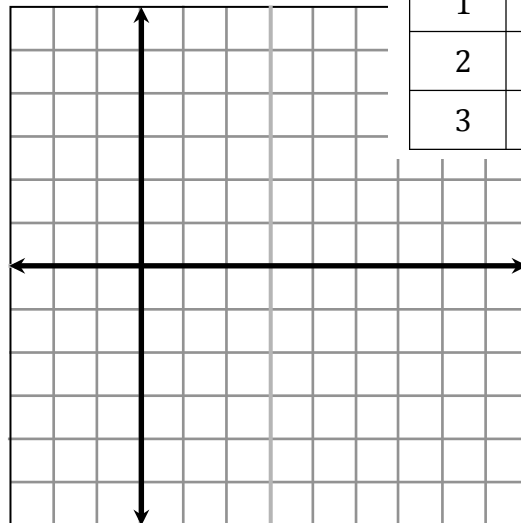
13.  $y = x^3 - 1$

| x  | y |
|----|---|
| -2 |   |
| -1 |   |
| 0  |   |
| 1  |   |
| 2  |   |

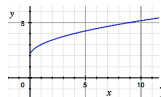


14.  $y = (x-1)^3$

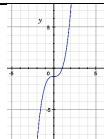
| x  | y |
|----|---|
| -1 |   |
| 0  |   |
| 1  |   |
| 2  |   |
| 3  |   |



Answers: 11.



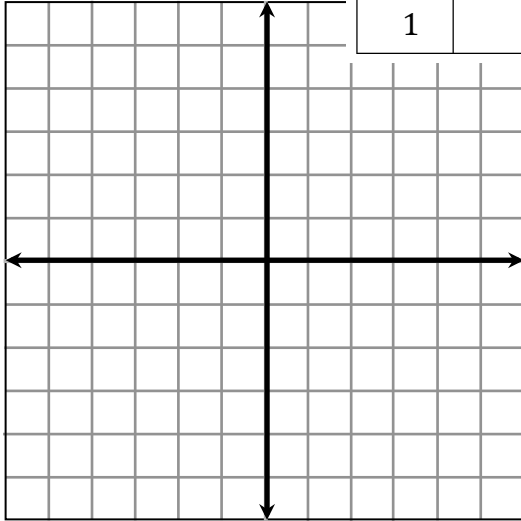
13.



Graph each equation.

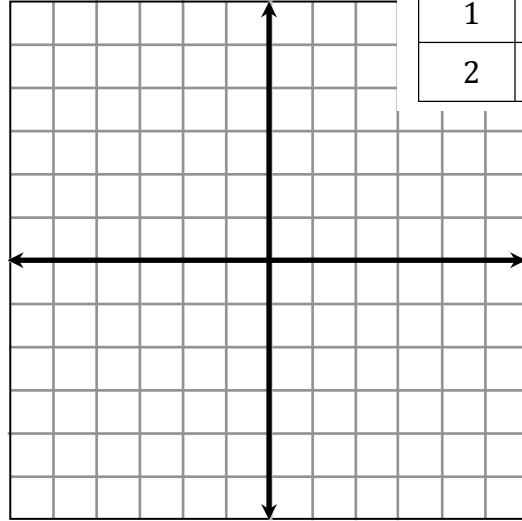
15.  $y = 2|x + 1|$

| x  | y |
|----|---|
| -3 |   |
| -2 |   |
| -1 |   |
| 0  |   |
| 1  |   |



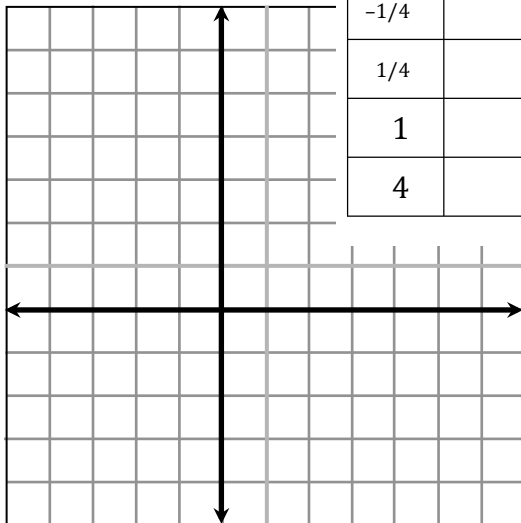
16.  $y = -2|x|$

| x  | y |
|----|---|
| -2 |   |
| -1 |   |
| 0  |   |
| 1  |   |
| 2  |   |



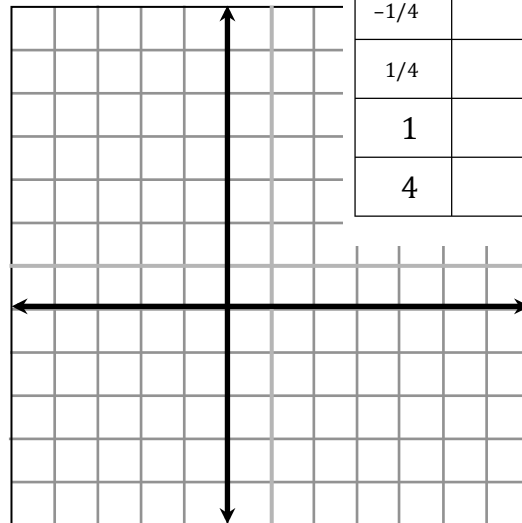
17.  $y = \frac{1}{x}$

| x    | y |
|------|---|
| -4   |   |
| -1   |   |
| -1/4 |   |
| 1/4  |   |
| 1    |   |
| 4    |   |

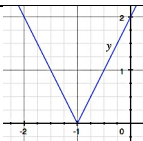


18.  $y = -\frac{1}{x}$

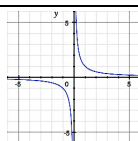
| x    | y |
|------|---|
| -4   |   |
| -1   |   |
| -1/4 |   |
| 1/4  |   |
| 1    |   |
| 4    |   |



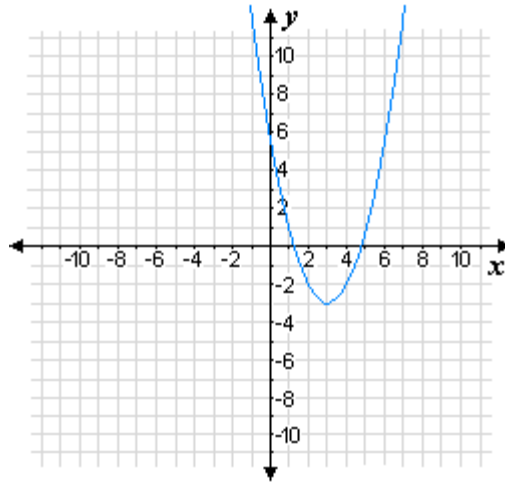
Answers: 15.



; 17.



Use the graph to find the requested  $x$  or  $y$  value.



19. If  $x = 3$ , find  $y$ .

20. If  $x = 1$ , find  $y$ .

21. If  $y = 1$ , find  $x$ .

22. If  $y = -3$ , find  $x$ .

23. If  $y = -2$ , find  $x$ .

24. If  $y = 6$ , find  $x$ .

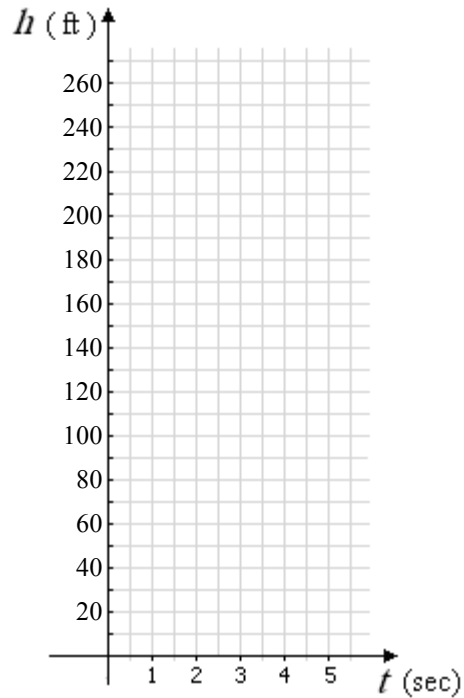
Answers: 19.  $-3$ ; 21. 1 and 5; 23. 2 and 4

A construction worker dropped a  $\frac{3}{4}$ " nut while he was working on an upper story of a tall building. He dropped the nut from a height of 256 ft. Assuming the nut had a clear path to the ground, its approximate height is given by the formula:

$$h = 256 - 16t^2$$

$t$  is the time in seconds after the nut was dropped,  
 $h$  is the height (in feet) above the ground after  $t$  seconds.

| $t$<br>(seconds) | $h$<br>(feet) |
|------------------|---------------|
| 0                |               |
| 1                |               |
| 2                |               |
| 3                |               |
| 4                |               |
| 5                |               |



Use the graph to find the appropriate height of the nut

**25.** 2.5 seconds after it was dropped

**26.** 0.5 seconds after it was dropped

Use the graph to determine approximately how long it took

**27.** to reach a height of 100 feet

**28.** to reach the ground

Answers: **25.** 156 ft; **27.** 3.1 seconds