

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

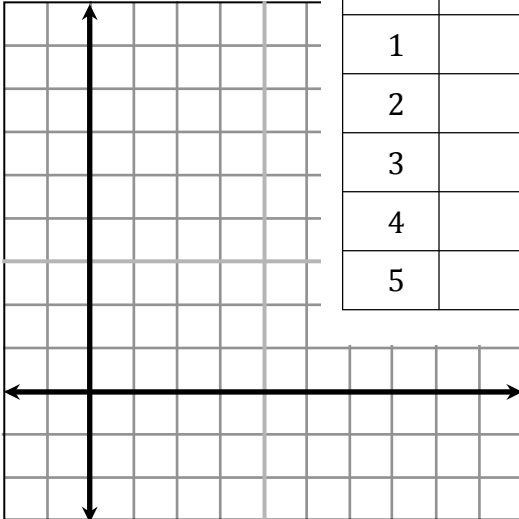
7.  $y = |x - 2|$

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

Graph the equations.

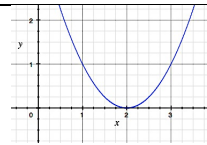
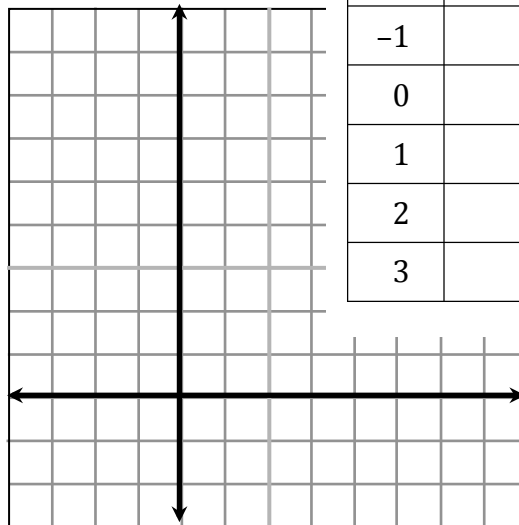
9.  $y = (x - 2)^2$

x	y
-1	
0	
1	
2	
3	
4	
5	



10.  $y = x^2 - 2$

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

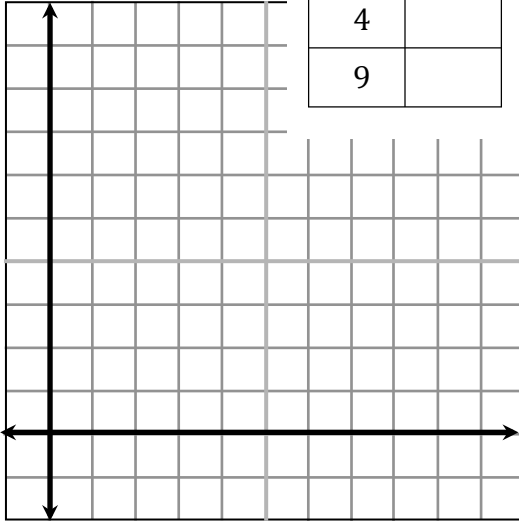


Answers: 1. linear, 3. nonlinear, 5. nonlinear, 7. nonlinear, 9.

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

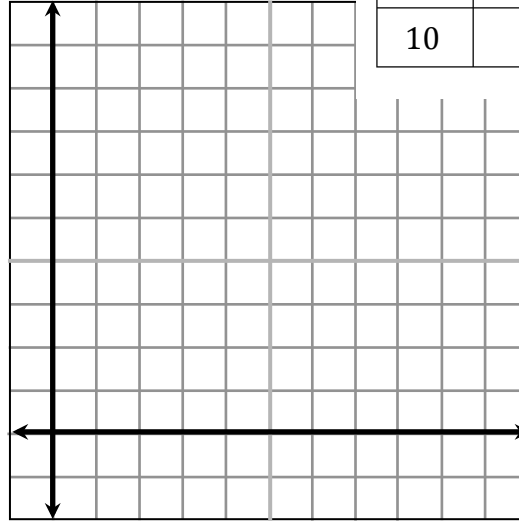
11.  $y = \sqrt{x} + 2$

x	y
0	
1	
4	
9	



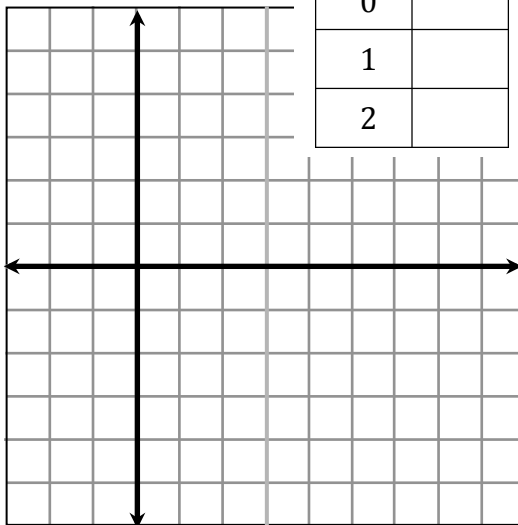
12.  $y = \sqrt{x-1}$

x	y
1	
2	
5	
10	



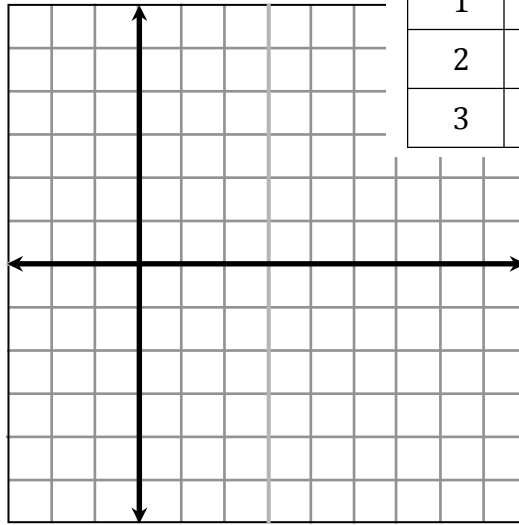
13.  $y = x^3 - 1$

x	y
-2	
-1	
0	
1	
2	

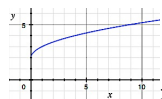


14.  $y = (x-1)^3$

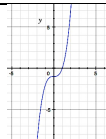
x	y
-1	
0	
1	
2	
3	



Answers: 11.



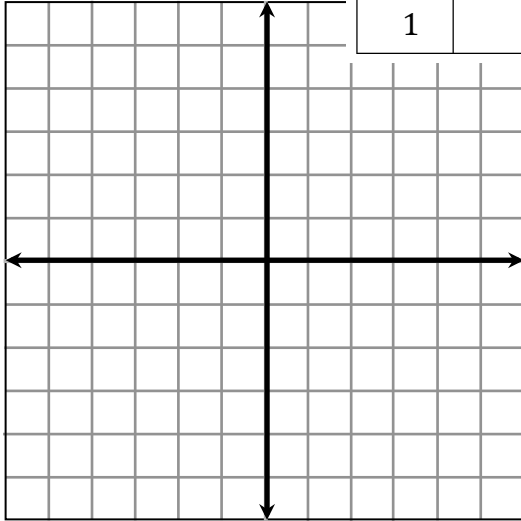
13.



Graph each equation.

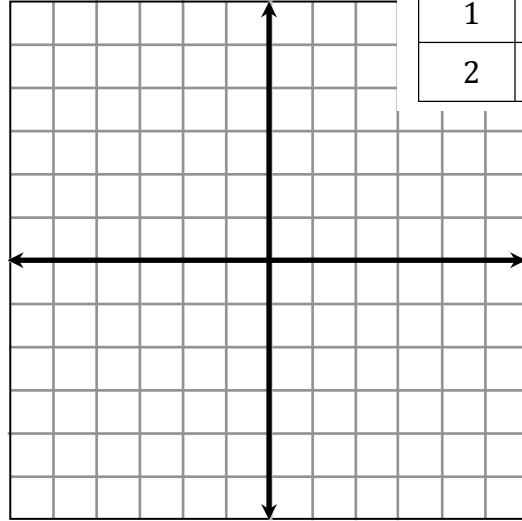
15.  $y = 2|x + 1|$

x	y
-3	
-2	
-1	
0	
1	



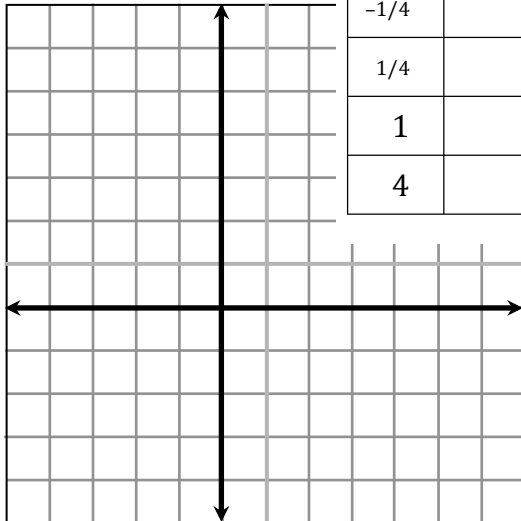
16.  $y = -2|x|$

x	y
-2	
-1	
0	
1	
2	



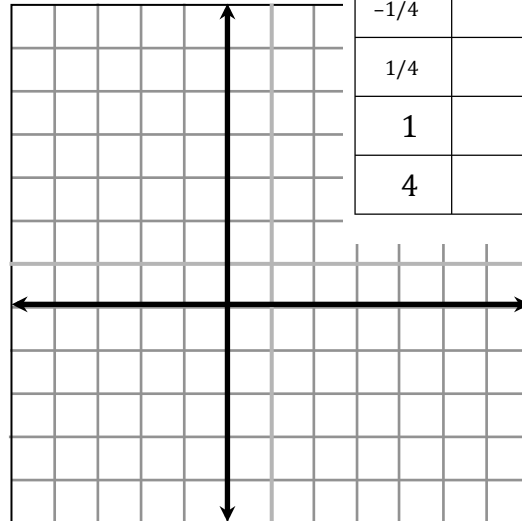
17.  $y = \frac{1}{x}$

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

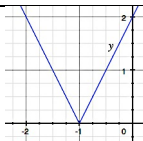


18.  $y = -\frac{1}{x}$

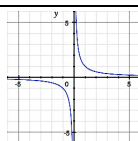
x	y
-4	
-1	
-1/4	
1/4	
1	
4	



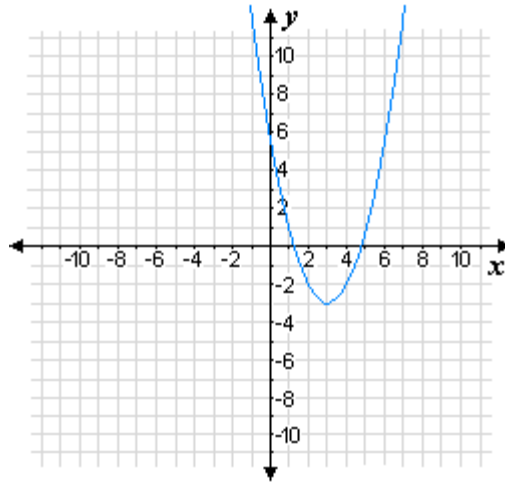
Answers: 15.



; 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

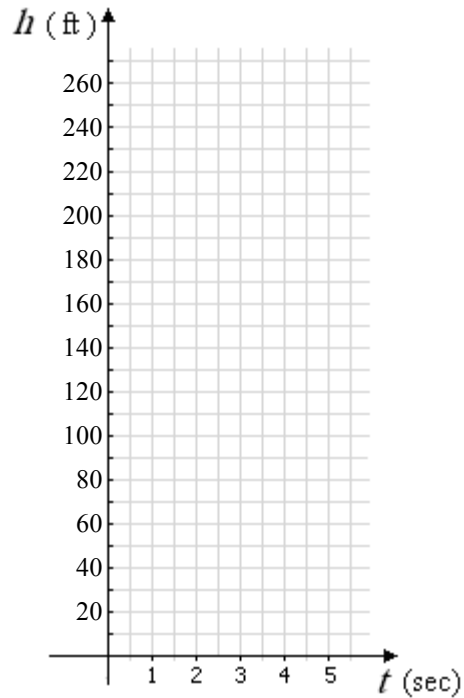
A construction worker dropped a  $\frac{3}{4}$ " nut while he was working on an upper story of a tall building. He dropped the nut from a height of 256 ft. Assuming the nut had a clear path to the ground, its approximate height is given by the formula:

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

$t$  is the time in seconds after the nut was dropped,

$h$  is the height (in feet) above the ground after  $t$  seconds.

$t$ (seconds)	$h$ (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