

3.3 Graphing Non-Linear Equations

Solutions

Identify each equation as linear or nonlinear.

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

Linear

2. $y = -2x + 3$

3. $y = x^2 - 1$

Nonlinear

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

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

Nonlinear

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

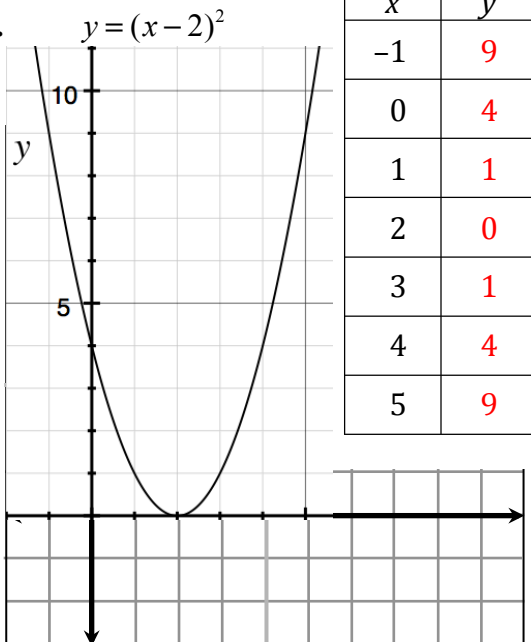
7. $y = |x - 2|$

Nonlinear

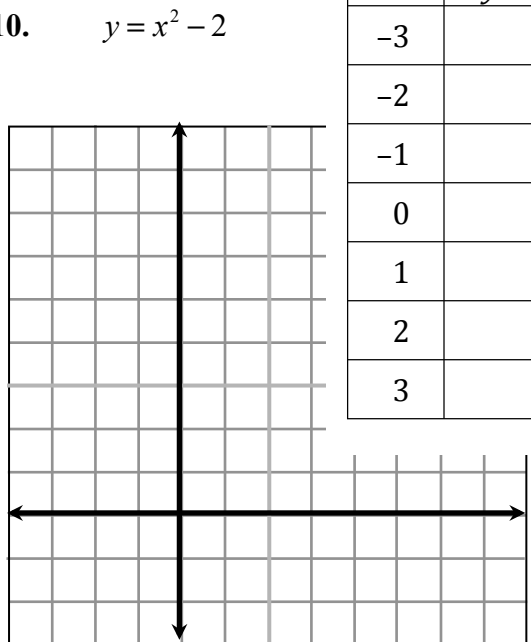
8. $y = \frac{3}{4}x - \frac{1}{2}$

Graph the equations.

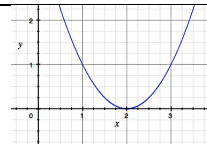
9.



10.



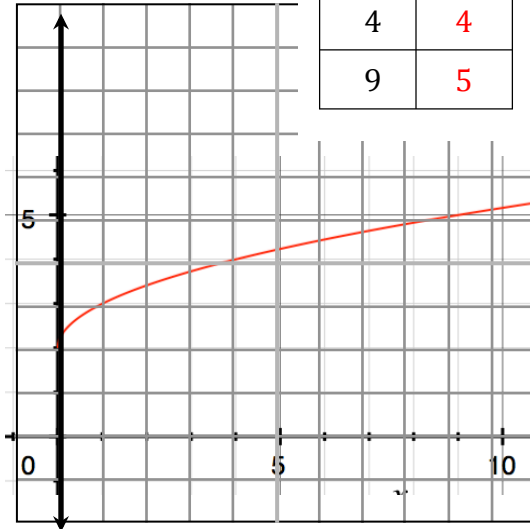
Answers: 1. linear, 3. nonlinear, 5. nonlinear, 7. nonlinear, 9.



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

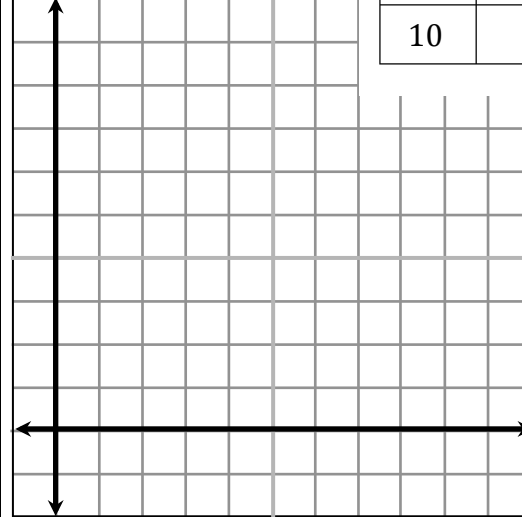
11. $y = \sqrt{x} + 2$

x	y
0	2
1	3
4	4
9	5



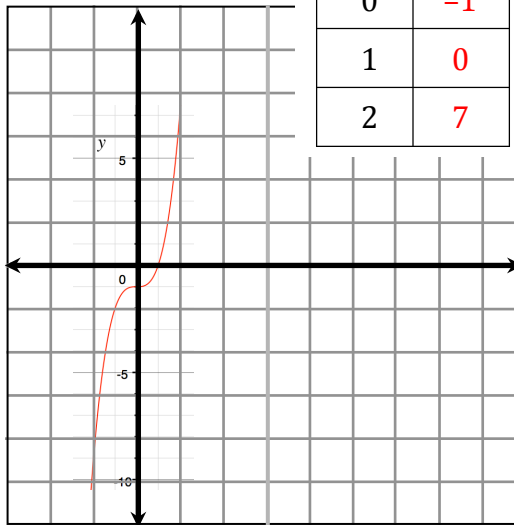
12. $y = \sqrt{x-1}$

x	y
1	
2	
5	
10	



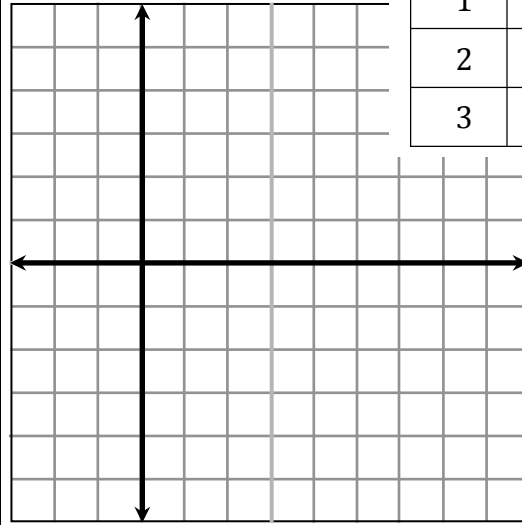
13. $y = x^3 - 1$

x	y
-2	-9
-1	-2
0	-1
1	0
2	7

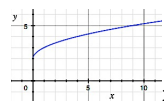


14. $y = (x-1)^3$

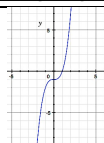
x	y
-1	
0	
1	
2	
3	



Answers: 11.



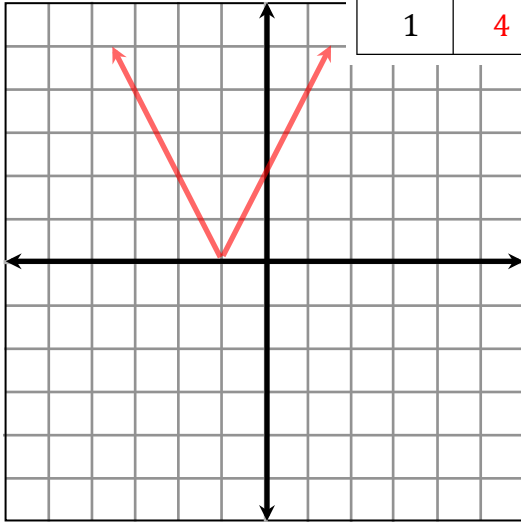
13.



Graph each equation.

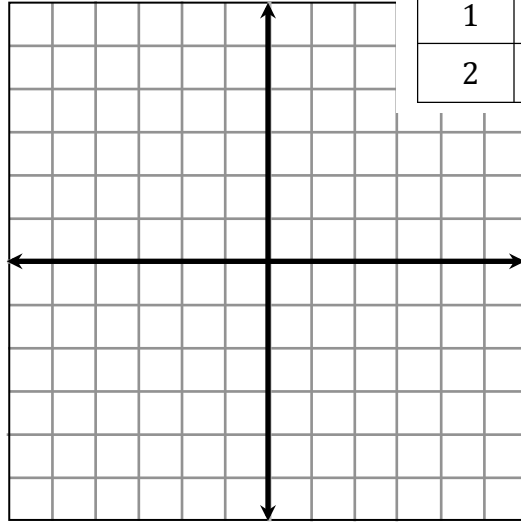
15. $y = 2|x + 1|$

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



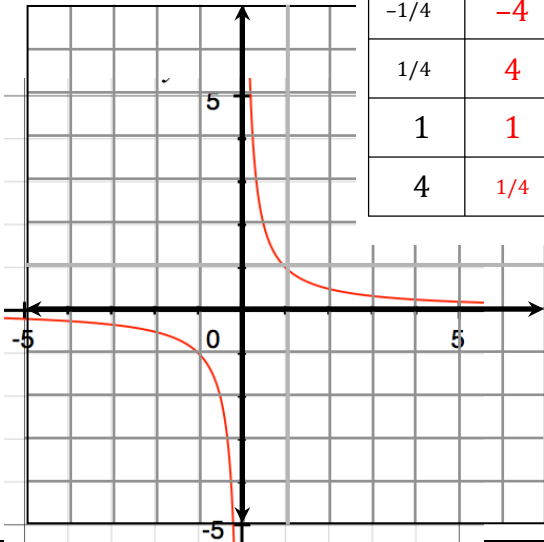
16. $y = -2|x|$

x	y
-2	
-1	
0	
1	
2	



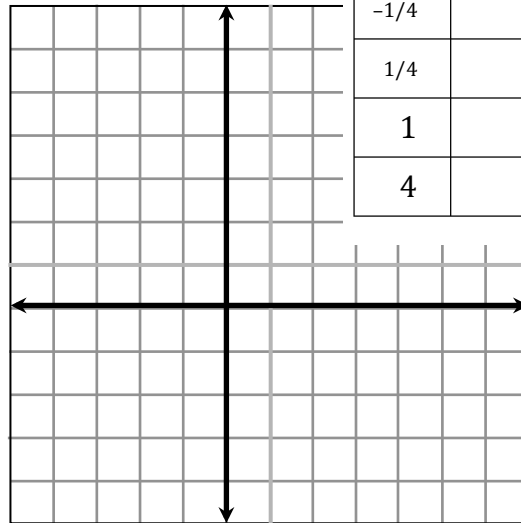
17. $y = \frac{1}{x}$

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

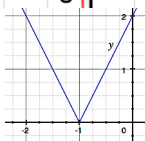


18. $y = -\frac{1}{x}$

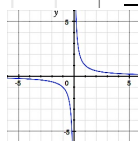
x	y
-4	
-1	
-1/4	
1/4	
1	
4	



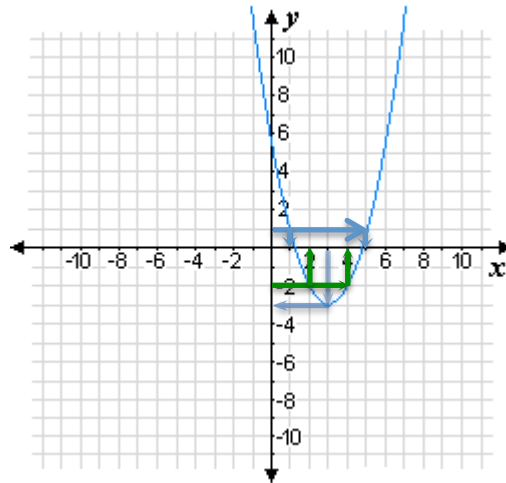
Answers: 15.



; 17.



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



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

$$y = -3$$

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

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

$$x = 1 \text{ and } x = 5$$

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

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

$$x = 2 \text{ and } x = 4$$

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

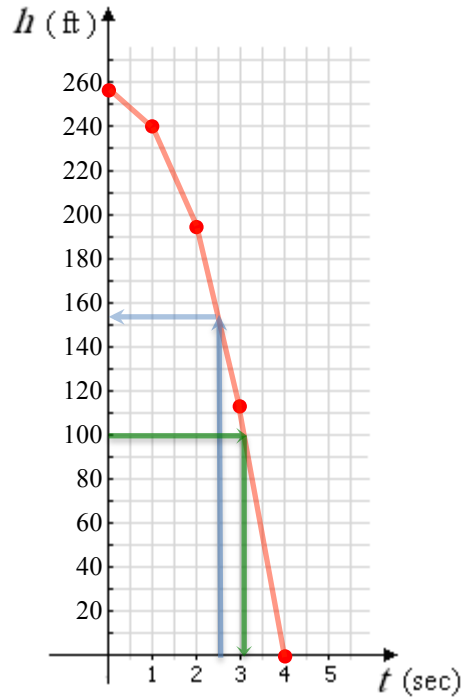
Answers: 19. -3 ; 21. 1 and 5; 23. 2 and 4

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	256
1	240
2	192
3	112
4	0
5	-144



Use the graph to find the appropriate height of the nut

25. 2.5 seconds after it was dropped

about 156 feet

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

about 3.1 seconds

28. to reach the ground

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