Grade 6 Math Circles

February 7/8/9, 2023

Functions, Relations, and Graphing - Problem Set

1. Classify each of the following relations as a function or not a function. How do you know?

a)

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

b)

x	y
-8	16
0	20
4	5
-8	3

c)

x	y
20	6
86	6
-30	6
-6	6

d)

x	y
-5	21
-3	5
0	9
-5	21

e)

x	y
4	2
4	4
5	6
5	8

2. Sketch the following functions.

   a) $y = 2x$
   b) $y = 5x + 2$
   c) $y = -4x^2 + 3$
   d) $y = x^2 - 2$
   e) $y = 8$

3. State whether the following functions are linear functions, quadratic functions, or neither.

   a) $y = 3x^2 + 2$
   b) $y = -x^2 + 3x - 1$
   c) $y = 0$
   d) $y = x$
   e) $y = x^3$
   f) $y = 3$
   g) $y = 6 + 3x - x^2$
   h) $y = 4x^4 + 3x$

4. For each of the following linear functions, state the slope and the y-intercept.

   a) $y = x + 1$
   b) $y = -15x$
   c) $y = 3x - 18$

d) $y = \frac{2}{3}x + 21$

e) $y = -\frac{1}{2}$

5. For each of the following quadratic functions, determine whether the parabola opens up or down and state the y-intercept.

a) $y = -x^2 + 2x - 8$

b) $y = 3x^2 + 1$

c) $y = x^2$

d) $y = -5x^2 + 8x + 3$

e) $y = 2x^2 + 2$

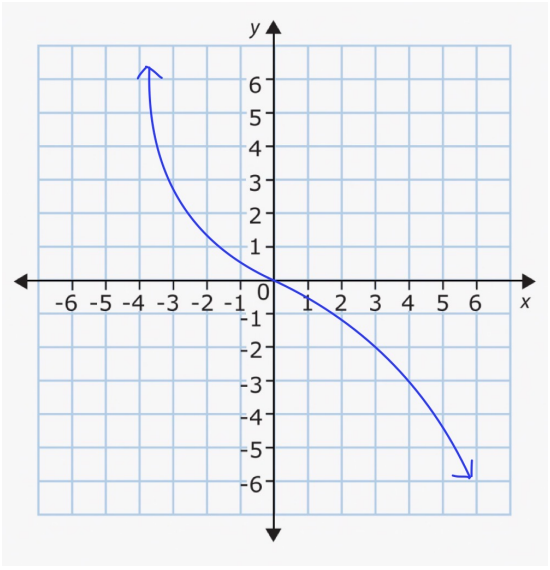
6. Give an example for each of the following types of functions. Create a table of x-coordinates to find corresponding y-coordinates and use this to sketch the graph.

a) Linear function

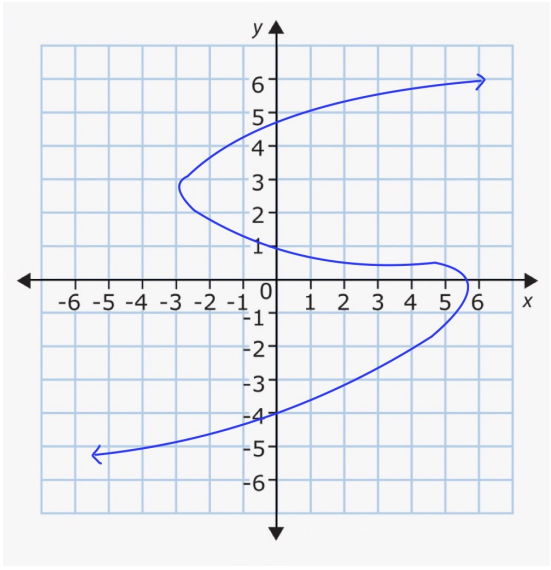
b) Quadratic function

7. Determine whether each graph is a function or not a function by the vertical line test.

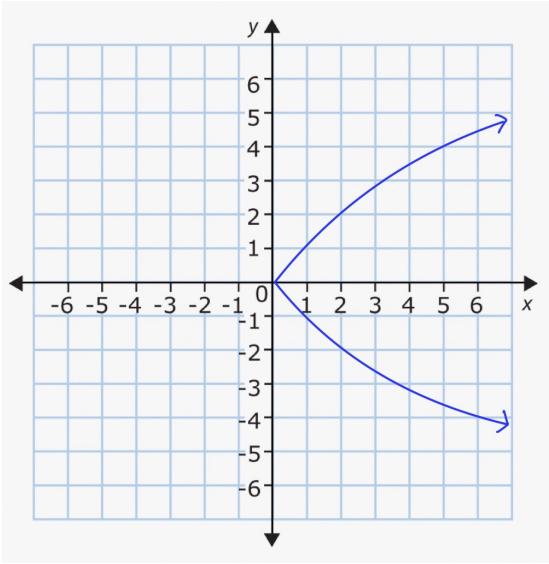
a)



b)



c)


y
x
6
5
4
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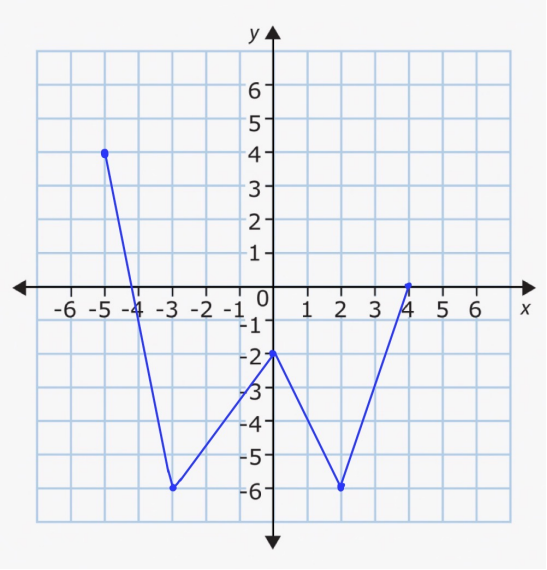
-1
-2
-3
-4
-5
-6
-6 -5 -4 -3 -2 -1 1 2 3 4 5 6

d)


y
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