Functions 8.F.3 Post-Test

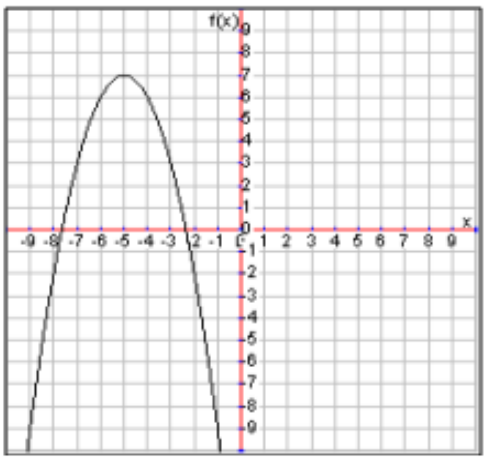
Please do not use a calculator.

Determine whether the following functions are linear or non-linear and explain how you know.

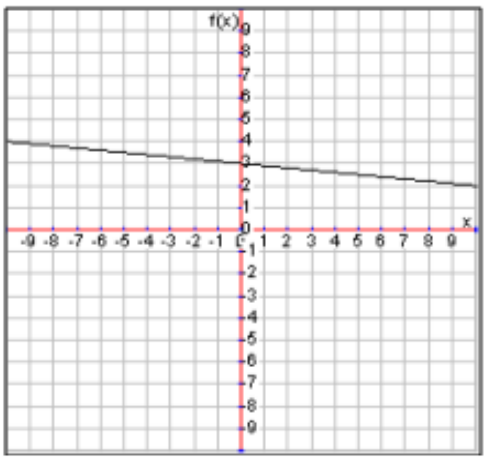
1. $y = \sqrt{x}$

2. $y = -\frac{1}{5}x - 2$

3.



4.



5.

x	-2	-1	0	1	2
y	1	-2	-5	-8	-11

6.

x	3	5	7	9	11
y	-2	1	-2	1	-2

7. Input: # of hours renting a car
   Output: Total cost at a daily rate

8. Input: The number of letters in your name
   Output: The input squared plus seven

Adapted from Eric Bright, Charleston Middle School Curriculum

Answer the following question about different types of functions.

9. Give an example of a non-linear function in equation form and explain how you know it is non-linear.

10. Give an example of a linear function in equation form and explain how you know it is non-linear.

11. Give an example of a non-linear function in table form and explain how you know it is linear.

12. Give an example of a linear function in table form and explain how you know it is linear.

13. Give an example of a non-linear function in a verbal description and explain how you know it is non-linear.

14. Give an example of a linear function in a verbal description and explain how you know it is non-linear.

15. Valence thinks the equation $y = 3$ is a linear function because it is in the form $y = mx + b$. He believes that in this function the rate of change is 0. Do you agree with him? Why or why not?

16. Raelyn thinks the following table is non-linear because the change in output is not constant. Do you agree with her? Why or why not?

x	0	2	6	7	10
y	2	6	14	16	22

$+4$ $+8$ $+2$ $+6$

Adapted from Eric Bright, Charleston Middle School Curriculum

Functions 8.F.3 Post-Test Answers

Please do not use a calculator.

Determine whether the following functions are linear or non-linear and explain how you know.

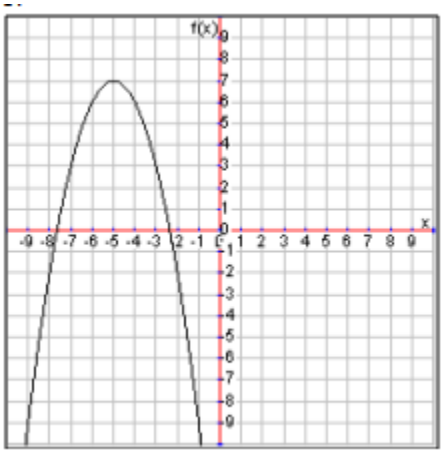
1. $y = \sqrt{x}$

Non-linear because of the square root.

2. $y = -\frac{1}{5}x - 2$

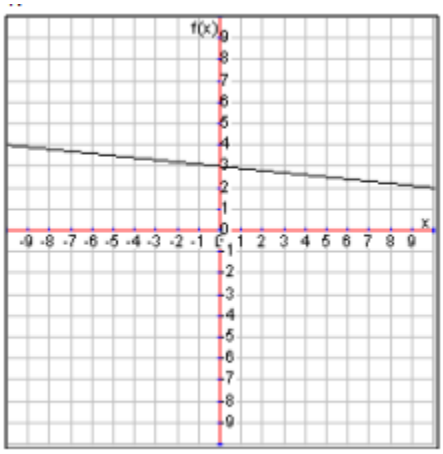
Linear because it's in the form $y = mx + b$.

3.



Non-linear because it's not straight.

4.



Linear because it's straight.

5.

x	-2	-1	0	1	2
y	1	-2	-5	-8	-11

Linear because it has a constant rate of change.

6.

x	3	5	7	9	11
y	-2	1	-2	1	-2

Non-linear because it's rate of change is not constant.

7. Input: # of hours renting a car
   Output: Total cost at a daily rate

Linear because it's a constant rate (of change).

8. Input: The number of letters in your name
   Output: The input squared plus seven

Non-linear because of squaring the input.

Adapted from Eric Bright, Charleston Middle School Curriculum

Answer the following question about different types of functions.

9. Give an example of a non-linear function in equation form and explain how you know it is non-linear.
Answers will vary.

10. Give an example of a linear function in equation form and explain how you know it is non-linear.
Answers will vary.

11. Give an example of a non-linear function in table form and explain how you know it is linear.
Answers will vary.

12. Give an example of a linear function in table form and explain how you know it is linear.
Answers will vary.

13. Give an example of a non-linear function in a verbal description and explain how you know it is non-linear.
Answers will vary.

14. Give an example of a linear function in a verbal description and explain how you know it is non-linear.
Answers will vary.

15. Valence thinks the equation $y = 3$ is a linear function because it is in the form $y = mx + b$. He believes that in this function the rate of change is 0. Do you agree with him? Why or why not?
Valence is correct. Since $m = 0$, then m times x would also be zero leaving the equation $y = b$. This is a constant linear function.

16. Raelyn thinks the following table is non-linear because the change in output is not constant. Do you agree with her? Why or why not?

x	0	2	6	7	10
y	2	6	14	16	22

$+4$ $+8$ $+2$ $+6$

Raelyn is incorrect. Looking at the ratio of change in output to change in input, they are all the same.
$\frac{4}{2} = \frac{8}{4} = \frac{2}{1} = \frac{6}{3}$

Adapted from Eric Bright, Charleston Middle School Curriculum