

READY, SET, GO!
Name \_\_\_\_\_
Period \_\_\_\_\_
Date \_\_\_\_\_

**READY**

Topic: Attributes of linear and exponential functions.

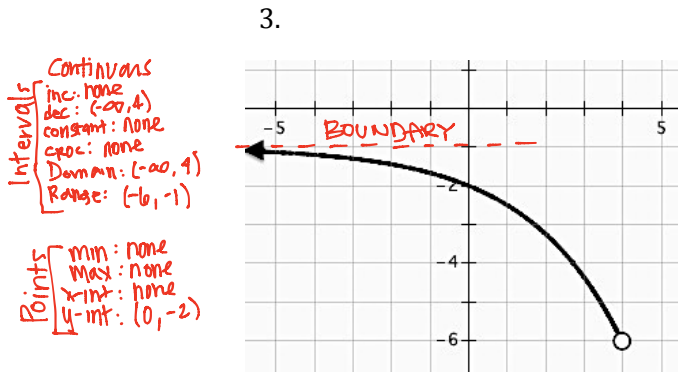
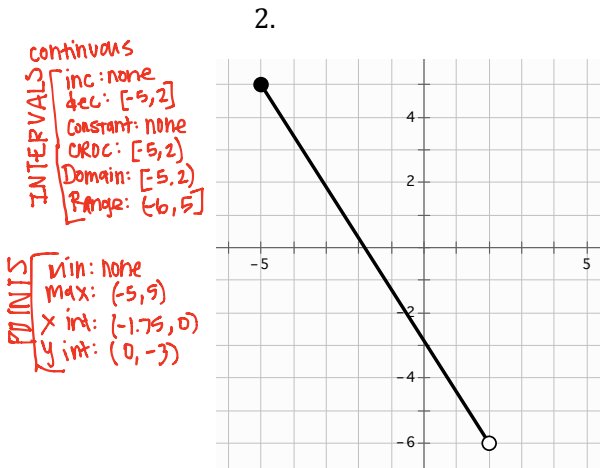
1. Comparing and contrasting linear and exponential functions. Provide a comparison between linear and exponential functions, be sure to include as many characteristics of each function as possible and be clear about the similarities and differences between these functions.

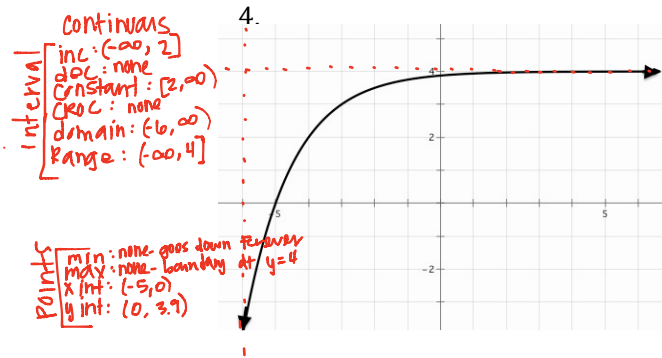
Linear	Exponential
<p>In general, Linear functions are represented as being continuous. They have a domain and range of all real numbers. They can be increasing or decreasing (not both). They won't have a minimum or maximum. They will have exactly one x intercept and y intercept. They have a constant rate of change.</p>	<p>In general, Exponential functions are modeled as being continuous. This makes their domain the real numbers but the range is only the positive real numbers. They can be increasing or decreasing (not both). They will not have a minimum or maximum point. They will always have a y-intercept but no x-intercept (unless shifted). It will not have a constant rate of change.</p>

**SET**

Topic: Identifying attributes of functions from their graphs.

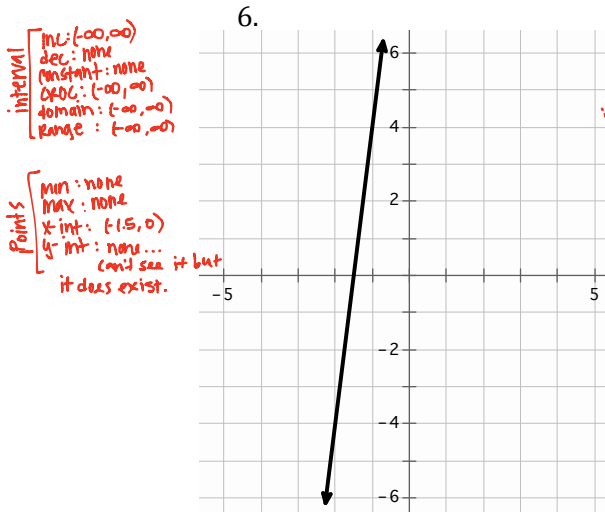
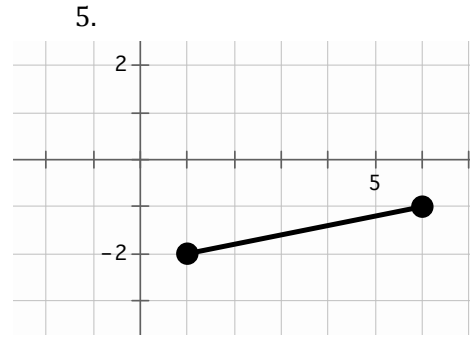
For each graph, identify the domain, range and whether or not the function is increasing or decreasing. Use interval notation when you state the domain and range.





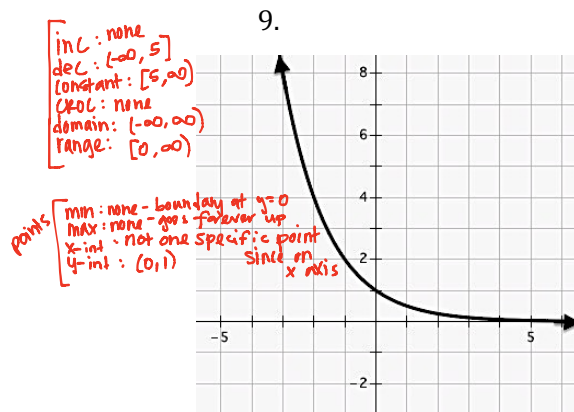
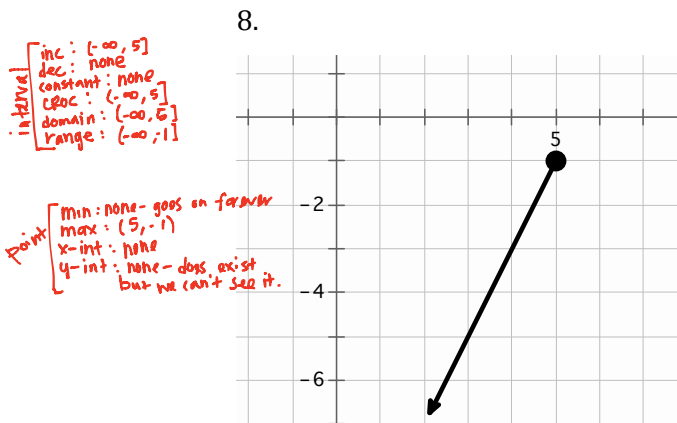
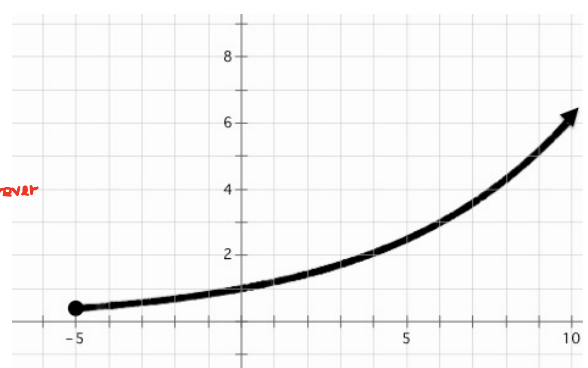
**Interval**  
 inc:  $[1, 6]$   
 dec: none  
 constant: none  
 cROC:  $[1, 6]$   
 domain:  $[1, 6]$   
 Range:  $[-2, -1]$

**Points**  
 min:  $(1, -2)$   
 max:  $(6, -1)$   
 x-int: none  
 y-int: none



**Interval**  
 inc:  $[-5, \infty)$   
 dec: none  
 constant: none  
 cROC: none  
 domain:  $[5, \infty)$   
 Range:  $[0.5, \infty)$

**Points**  
 min:  $(-5, 0.5)$   
 max: none - goes on forever  
 x-int: none  
 y-int:  $(0, 1)$



**GO**

Topic: Finding equations for functions.

Find both the explicit and recursive equations for the tables below.

10.

$n$	$f(n)$
1	3
2	5
3	7
4	9

$+1$   $\downarrow$   $+2$   $\downarrow$   $+1$

**Linear**  
 Explicit:  $f(x) = 2(x-1) + 3$   
 $= 2x - 2 + 3$   
 $f(x) = 2x + 1$   
 Recursive:  $f(x) = f(x-1) + 2$   
 $f(1) = 3$

11.

$n$	$f(n)$
2	4
3	8
4	16
5	32

$\downarrow \times 2$

**Exponential**  
 Explicit:  $f(x) = 4 \cdot 2^{x-2}$   
 $f(x) = 2^x$   
 Recursive:  $f(x) = f(x-1) \cdot 2$   
 $f(1) = 2$

12.

$n$	$f(n)$
6	23
7	19
8	15
9	11

$+1$   $\downarrow$   $-4$   $\downarrow$   $-4$   $\downarrow$   $-4$

**Linear**  
 Explicit:  $f(x) = -4(x-6) + 23$   
 $= -4x + 24 + 23$   
 $f(x) = -4x + 47$   
 Recursive:  $f(x) = f(x-1) - 4$   
 $f(6) = 23$

13.

$n$	$f(n)$
1	1
2	3
3	9

$+1$   $\downarrow \times 3$   $+1$   $\downarrow \times 3$

**Exponential**  
 Explicit:  $f(x) = 1 \cdot 3^{x-1}$   
 $f(x) = 3^{x-1}$   
 Recursive:  $f(x) = f(x-1) \cdot 3$   
 $f(1) = 1$

14.

$n$	$f(n)$
3	8
4	4
5	2

$+1$   $\downarrow \times \frac{1}{2}$   $+3$

**Exponential**  
 Explicit:  $f(x) = 8 \left(\frac{1}{2}\right)^{x-3}$   
 Recursive:  $f(x) = f(x-1) \times \frac{1}{2}$   
 $f(1) = 32$

15.

$n$	$f(n)$
6	7
9	13
12	19

$+3$   $\downarrow +6$   $M = \frac{6}{3} = 2$

**Linear**  
 Explicit:  $f(x) = 2(x-6) + 7$   
 $= 2x - 12 + 7$   
 $f(x) = 2x - 5$   
 Recursive:  $f(x) = f(x-1) + 2$   
 $f(6) = 7$

16.

$n$	$f(n)$
2	40
4	32
8	16

$m = \frac{-16}{4} = -4$   $\downarrow -9$   $\downarrow -16$

**Linear**  
 Explicit:  $f(x) = -4(x-2) + 40$   
 $= -4x + 8 + 40$   
 $f(x) = -4x + 48$   
 Recursive:  $f(x) = f(x-1) - 4$   
 $f(1) = 44$

17.

$n$	$f(n)$
2	16
3	4
4	1

$+1$   $\downarrow \times \frac{1}{4}$   $+3$   $\downarrow \times \frac{1}{4}$   $+6$   $\downarrow \times \frac{1}{4}$

**Exponential**  
 Explicit:  $f(x) = 16 \left(\frac{1}{4}\right)^{x-2}$   
 Recursive:  $f(x) = f(x-1) \times \frac{1}{4}$   
 $f(1) = 64$

18.

$n$	$f(n)$
17	5
20	10
26	20

$+3$   $\downarrow +5$   $\downarrow +10$   $M = \frac{10}{6} = \frac{5}{3}$

**Linear**  
 Explicit:  $f(x) = \frac{5}{3}(x-17) + 5$   
 $= \frac{5}{3}x - 28\frac{1}{3} + 5$   
 Recursive:  $f(x) = \frac{5}{3}x - 23\frac{1}{3}$   
 $f(x) = f(x-1) + \frac{5}{3}$   
 $f(17) = 5$