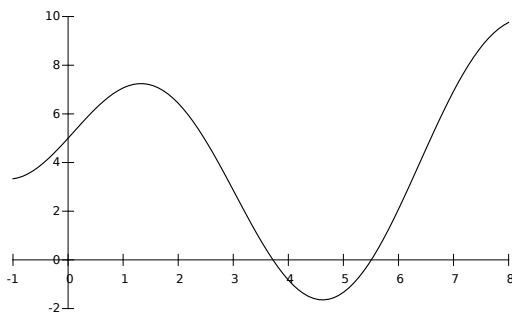


# MATH1101 – Test Review – Unit 1 – Nov. 11, 2017 6:00-8:00PM – Sanford Hall, Rm. 213

1. Is  $x$  a function of  $y$ , is  $y$  a function of  $x$ ?

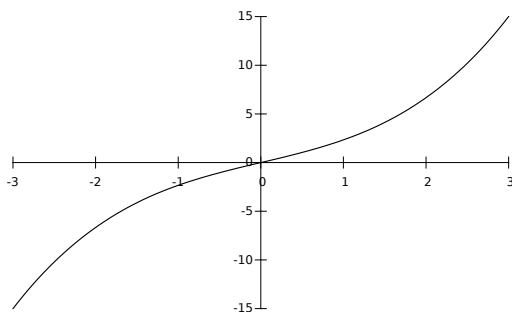
$x$	1	2	3	4	5	6
$y$	3	1	3	2	5	0

2. Is  $x$  a function of  $y$ , is  $y$  a function of  $x$ ?



3. Let  $N$  be the value of the NASDAQ stock market at the end of each day  $d$ .  
Is  $N$  a function of  $d$ ? \_\_\_\_\_ Is  $d$  a function of  $N$ ? \_\_\_\_\_

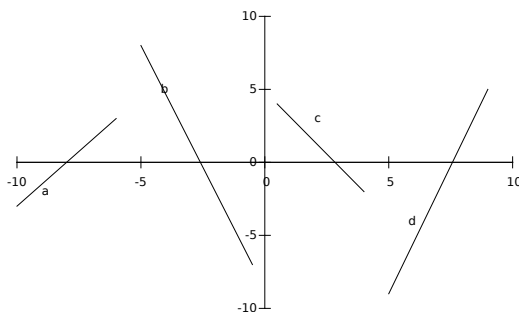
4. Is  $x$  a function of  $y$ , is  $y$  a function of  $x$ ?



In the the interval  $(1, 3)$ , the function is [increasing or decreasing] at an [increasing or decreasing] rate.

In the the interval  $(-3, -1)$ , the function is [increasing or decreasing] at an [increasing or decreasing] rate.

5. Rank the slopes of the line segments below from lowest to highest.

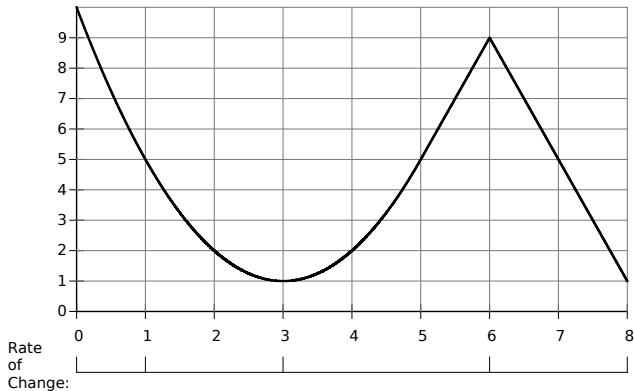


1. \_\_\_\_\_ 2. \_\_\_\_\_ 3. \_\_\_\_\_ 4. \_\_\_\_\_

6. Find the domain and range of:

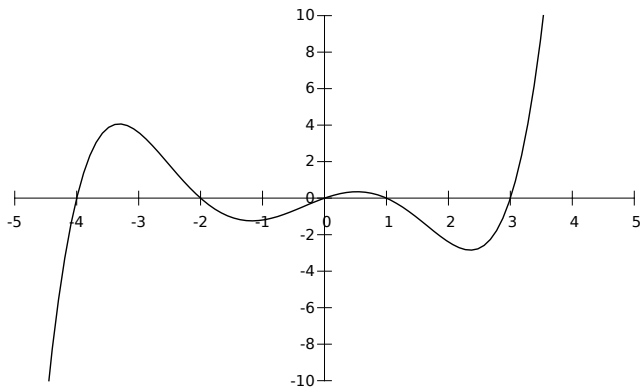
$x$	1	2	3	4	5	6
$y$	3	1	3	2	5	0

7. Find the average rate of change on the intervals in the image.



- (a)  $[0, 1]$  \_\_\_\_\_
- (b)  $[1, 3]$  \_\_\_\_\_
- (c)  $[3, 6]$  \_\_\_\_\_
- (d)  $[6, 8]$  \_\_\_\_\_
- (e)  $[5, 7]$  \_\_\_\_\_
- (f) Without calculating anything more:  $[7, 8]$  \_\_\_\_\_

8. Use this graph to answer the parts below:



- (a) Is this a function?
- (b) What is the domain? What is the range?
- (c) How many turning points does it have? How many inflection points?
- (d) Is there a local maximum? Is there more than one? What are they?
- (e) The equation  $y = -1$  has how many solutions?
- (f) The equation  $y = 3$  has how many solutions?
- (g) Does the function have an inverse?

9. Your lemonade stand on North Campus sold 59 cups when your price was \$.50 per cup the next day you changed the price to \$.75 and sold 44 cups.
- Assume the function between sales and price is linear, write a function  $s(p)$  where  $s$  is the number of cups sold and  $p$  is the price charged.
  - How many cups do you sell if you charge \$1.00?
  - You only brought 20 cups, you want to set your price so you sell all of them, what should your price be?
  - How much money do you make selling those 20 cups for the price you found?

10. The population of Makebelievia is  $p(t) = -13t^2 + 156t + 668$  where  $t$  is years after January 1, 2000. This equation works from Jan 1, 2000 to Jan 1, 2014.

- What is the domain in terms of  $t$ ?
- What is the range?
- How many turning points does it have? How many inflection points?
- Is this concave up or concave down, or first one then the other?
- Estimate the maximum population of Makebelievia.
- Complete the table:

$t$	$p(t)$	ARC
0	_____	_____
2	_____	_____
4	_____	_____
5	_____	_____
8	_____	_____
10	_____	_____
12	_____	_____
14	_____	Blank

11. You are heading to the Georgia vs. Florida game! You begin your trip traveling 60mph for 3 hours. You then decide to stop for lunch for an hour. After lunch you continue your trip driving 55mph for 2 hours. Once you enter Jacksonville you hit heavy traffic before you reach the stadium. Therefore you travel 20mph for half an hour until you are able to park. GO DAWGS! Let  $d(t)$  represent the total number of miles that you have traveled and  $t$  represent the number of hours.

- Write a formula for your distance traveled in terms of number of hours.
- What is the domain and range of your function?
- How far have you traveled after five and a half hours
- When are you exactly 100 miles from home?

12. Georgia Power charges different rates depending on how much power a customer uses. The amount charged is modeled by  $f(x)$  where  $x$  is the number of kWh used.

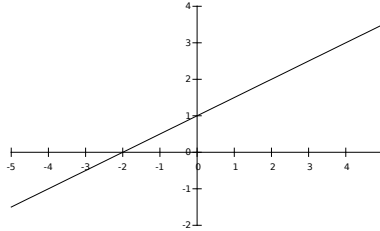
$$f(x) = \begin{cases} 15 + .15x & 0 \leq x \leq 100 \\ 5 + .25x & 100 < x \leq 2000 \\ 305 + .10x & 2000 < x \end{cases}$$

- What is your power bill if you use 80 kWh?
- What is your power bill if your roommate leaves their space heater on high over the break and you use 280 kWh?
- What is your power bill if you are running an industrial aluminum refinery and you use 6000 kWh?
- if your power bill is \$103, how much electricity did you use?
- What is the average rate of change over the interval  $[10, 50]$
- In English, what does  $f(x) = 15 + .15x$  mean?

13. Is this a linear function of  $x$ ? if yes, what is the function?

$x$	0	1	2	3	4	5
$y$	3.500	.350	-.954	-1.956	-2.80	-3.54

14. Is this a linear function of  $x$ ? If yes, what is the function?



15. Is this a linear function of  $x$ ? if yes, what is the function?

$x$	0	1	2	3	4	5
$y$	7.100	3.950	.800	-2.350	-5.500	-8.650

16. Makebelievia Inc. is making automatic homework machines, they can make 2000 the first year, increasing by 250 every year, 2750 people want to buy them the first year, increasing by 100 every year. What's the first year that everyone who wants one will be able to buy one? (number made  $\geq$  number wanted)

Answers:

1.  $x$  is not a function of  $y$ ,  $y$  is a function of  $x$
2.  $x$  is not a function of  $y$ ,  $y$  is a function of  $x$
3.  $N$  is a function of  $d$ ,  $d$  is not a function of  $N$
4.  $x$  is a function of  $y$ ,  $y$  is a function of  $x$   
 In the the interval  $(1, 3)$ , the function is [**increasing** or decreasing] at an [**increasing** or decreasing] rate.  
 In the the interval  $(-3, -1)$ , the function is [**increasing** or decreasing] at an [increasing or **decreasing**] rate.
5. b, c, a, d
6. Domain:  $\{1,2,3,4,5,6\}$  Range:  $\{0, 1, 2, 3, 5\}$
7. (a)  $[0, 1] = -5$   
 (b)  $[1, 3] = -2$   
 (c)  $[3, 6] = \frac{8}{3}$   
 (d)  $[6, 8] = -4$   
 (e)  $[5, 7] = 0$   
 (f)  $[7, 8] = -4$
8. (a) yes  
 (b) Domain:  $(-\infty, \infty)$  Range  $(-\infty, \infty)$   
 (c) turning points 4, inflection points 3  
 (d) 2 local maximums,  $(-3.3, 4)$ ,  $(.5, .5)$   
 (e) 5  
 (f) 3  
 (g) no
9. (a)  $s(p) = -60p + 89$   
 (b) 29  
 (c) \$1.15  
 (d) \$23
10. (a)  $[0, 14]$   
 (b)  $[304, 1136]$   
 (c) 1 turning point, but not in the domain. No inflection points.  
 (d) Concave down  
 (e) 668

(f)

$t$	$p(t)$	ARC
0	668	130
2	928	78
4	1084	26
5	1136	-26
8	1084	-78
10	928	-130
12	668	-182
14	304	Blank

11. (a)

$$d(t) = \begin{cases} 60t + 0 & 0 \leq t \leq 3 \\ 0t + 180 & 3 < t \leq 4 \\ 55t - 40 & 4 < t \leq 6 \\ 20t + 710 & 6 < t \leq 6.5 \end{cases}$$

(b) Domain:  $[0, 6.5]$  Range:  $[0, 720]$

(c)  $d(5.5) = 262.5$

(d)  $t = 1.67, 1:40$

12. (a) \$27

(b) \$75

(c) \$905

(d) 392 kWh

(e) .15

(f) There is a 15 dollar monthly charge, and every kWh costs \$.15.

13. No.

14. Yes.

15. Yes.

16.  $t = 5$ .