MAT1033/MAC1105- Test 3 Name _____

Calculator Part: You may use your calculator on this portion of the test. Show all necessary work for full credit.

1. In kick boxing, it is found that the force, F, needed to break a board, varies inversely with the length, L, of the board. Assume it takes 5 lbs of pressure to break a board 2 feet long

4 A) Write an equation for force, F, in terms of the length of the board.

$F = \frac{k}{L}$ $F = \frac{10}{L}$

$5 = \frac{k}{2} \Rightarrow k = 10$

2 B) How many pounds of pressure will it take to break a board that is 6 feet long?

$F = \frac{10}{6} = 1.67$ lbs of pressure

2. The length, L, of a pendulum varies directly with the square of its period, T, the time required for the pendulum to make one complete swing back and forth. The pendulum on a grandmother clock is 3.15 feet long and has a period of 1.4 seconds.

4 A) Express the length, L, of the pendulum as a function of T.

$L = kT^2$ $L = 1.61T^2$

$3.15 = k(1.4)^2$

$k = 1.61$

2 B) The pendulum in the math and physics building at UCF is 75 feet long. What is the period of its swing?

$75 = 1.61T^2$

$46.58 = T^2$

$T = 6.8$ sec

3. The number of cases of the flu reported during the beginning of flu season at a local health clinic is shown in the table below.

T, days	0	2	4	6	8
C, cases	10	23	51	114	256

3 A) Find the average rate of change over the first 4 days.

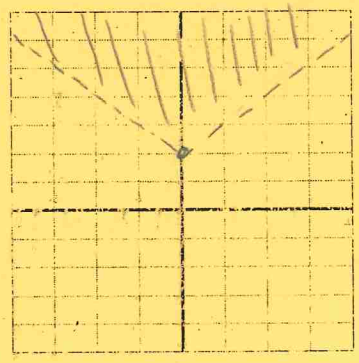
$\frac{41}{4} = 10.25$ cases/day

3 B) Find the average rate of change from day 6 to day 8.

$\frac{256-114}{8-6} = \frac{142}{2} = 71$ cases/day

4. Sketch the graph of $y > |x| + 2$

4



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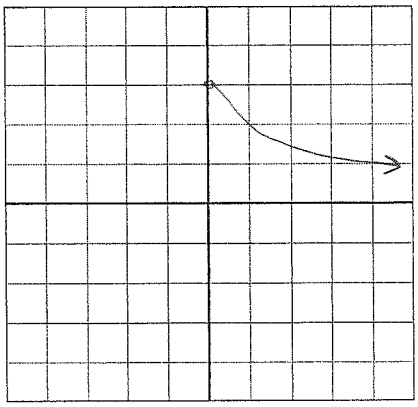
MAT1033/MAC1105 – Test 3 Name _____

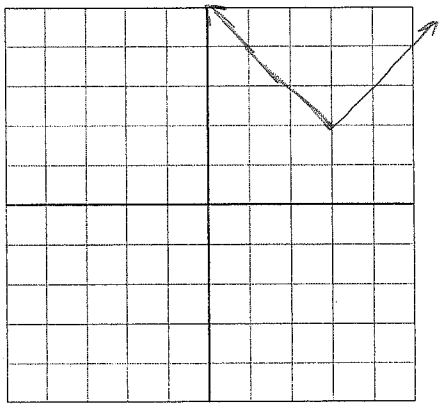
No Calculator: You may not use your calculator on this portion of the test. Show all necessary work for full credit.

Sketch graphs of the following:

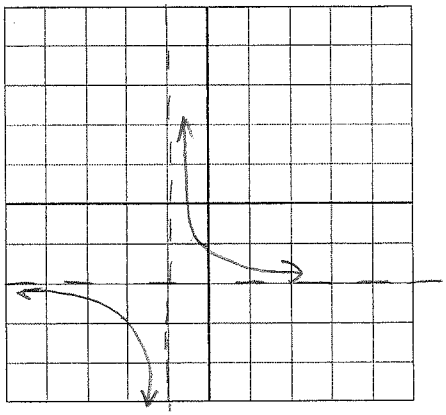
4 1. $P(x) = -\sqrt{x} + 3$



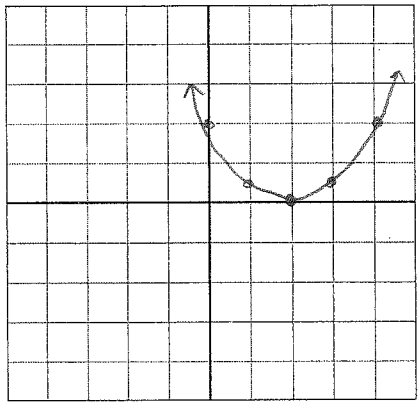
4 2. $f(x) = |x-3| + 2$



4 3. $f(x) = \frac{1}{x+1} - 2$

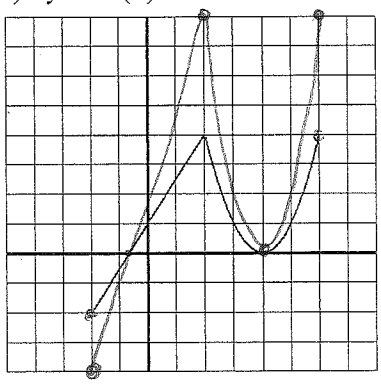


4 4. $f(x) = \frac{1}{2}(x-2)^2$

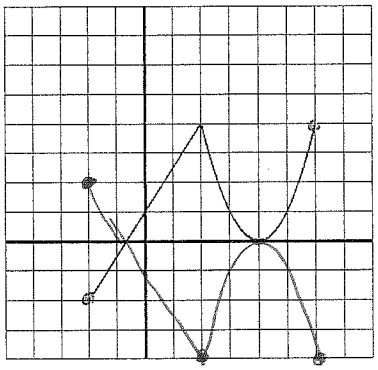


5. Given the graph of f(x) as shown, sketch the transformation graph on the same grid.

3 A) y =2 f(x)



3 B) y = -f(x)



6. Given the function f(x), explain how the graph of f(x – 5) + 11 will be transformed.

2 right 5, up 11

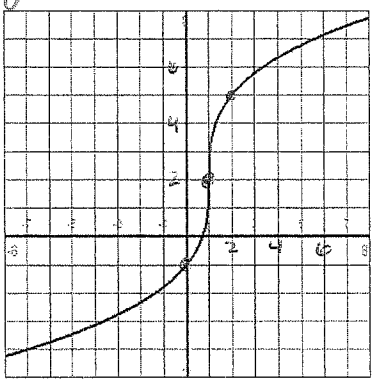
7. Given the function f(x), explain how the graph of -3f(x) will be transformed.

2 reflected, stretched by 3

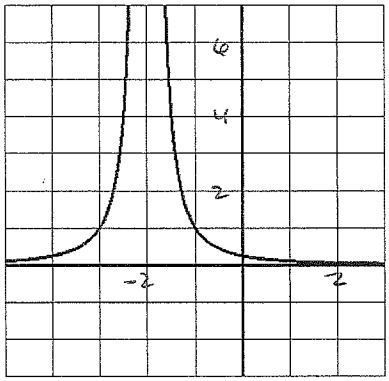
26

Write the equations of the graphs shown.

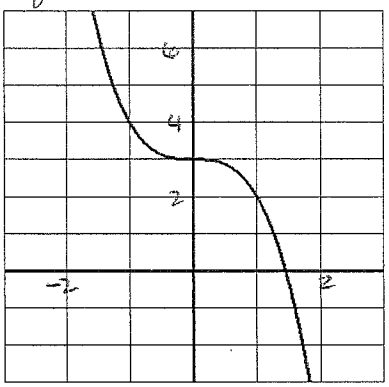
4 8. $y = 3\sqrt[3]{x-1} + 2$



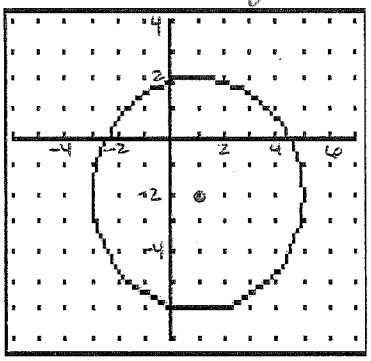
4 9. $y = \frac{1}{(x+2)^2}$



4 10. $y = -x^3 + 3$

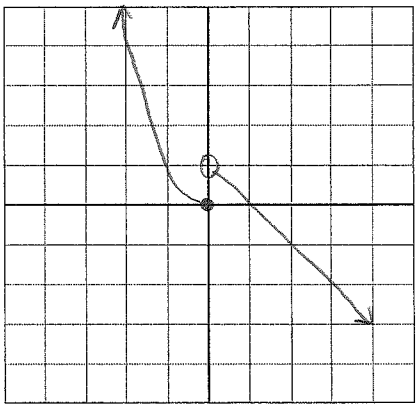


4 11. $(x-1)^2 + (y+2)^2 = 16$



12. Sketch the graph of $f(x) = \begin{cases} x^2, & \text{if } x \le 0 \\ -x+1, & \text{if } x > 0 \end{cases}$

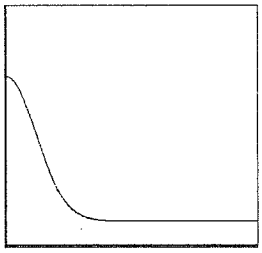
5



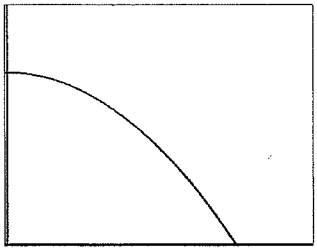
13. Which of the graphs best illustrates a pinecone falling from the top of a tree? B

2

A.



B.



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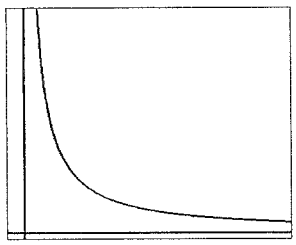
14. Do the following represent direct variation, inverse variation, or neither? **Explain your answer.**

3 A. Neither, does not go through (0,0) but touches axis

x	y
0	1
1	4
2.5	8.5
5	16

3 B. inverse, as x↑, y↓

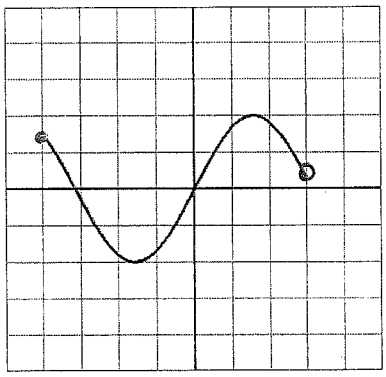


15. Give the domain and range for each of the following functions.

5 A. $f(x) = \sqrt{x-2} + 3$ domain $[2, \infty)$

range $[3, \infty)$

5 B.



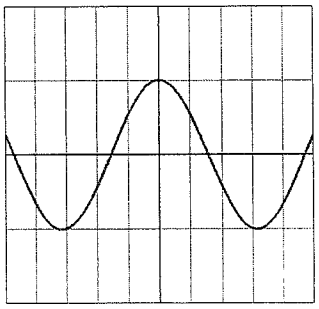
domain $[-4, 3)$

range $[-2, 2]$

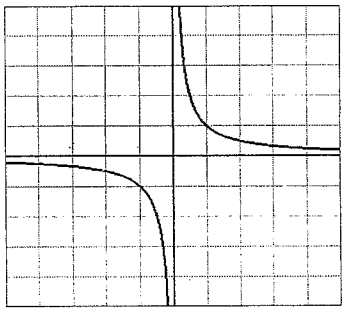
16. Given the following graphs, are the functions even, odd, or neither?

4

A. even



B. odd



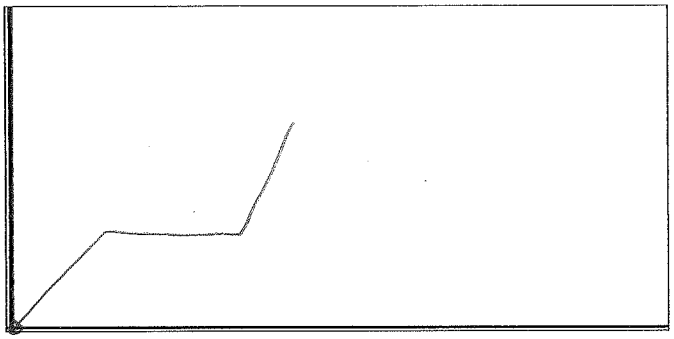
17. Given $(x-1)^2 + (y+3)^2 = 16$, find the center and radius of the circle.

3

Center: $(1, -3)$ Radius: 4

18. Cody leaves home to drive to school. On the way, he gets a flat tire. He stops to change the tire. Then, because he is late, he drives much faster to school. Graph the distance between Cody and his house as a function of time.

3



19. Match the scenario to the appropriate table of values. Put the number of the matching table in the blank next to the scenario.

4

I A. The number of love bugs in September grows very quickly but then declines slowly over time.

IV B. The price of an item rose slowly at first, but due to high demand is now rising rapidly.

III C. A student drops their algebra book off the top of a building. The height of the book is a function of time, decreasing ever more rapidly as gravity accelerates its descent.

II D. A cup of coffee cooled off rapidly at first, then more gradually as the temperature approached room temperature.

I.

x	1	5	10	15	20	25	30
y	200	700	1000	925	750	575	300

II.

x	1	2	3	4	5	6	7
y	190	135	100	87	80	77	75

III.

x	0	1	2	3	4	5	6
y	160	155	140	116	82	38	0

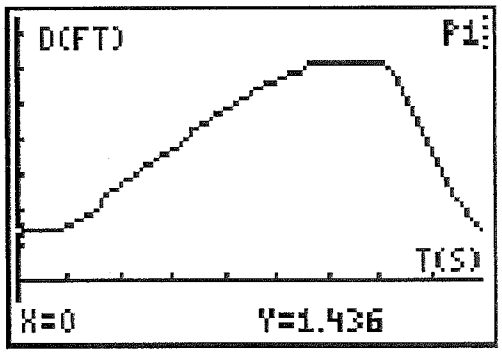
IV.

x	1	2	3	4	5	6	7
y	10	12	15	27	50	90	175

20. The graph shown is the path walked by a student in front of a motion detector. Describe how the student walked.

3

stood still, walked slowly away, stopped, walked quickly back



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