Math 3201 **Chapter 5 Review** **Name: _____**

20 **Part I:** **Multiple Choice. Write the correct answer in the space provided at the end of this section.**

1. Observe the following graph.

In which quadrant does the graph begin?

(A) 1

(B) 2

(C) 3

(D) 4

2. The graph of the function $p(x) = x^3 + 6x^2 - 11x + 6$ will cross the y-axis at?

(A) 0

(B) 1

(C) 6

(D) 11

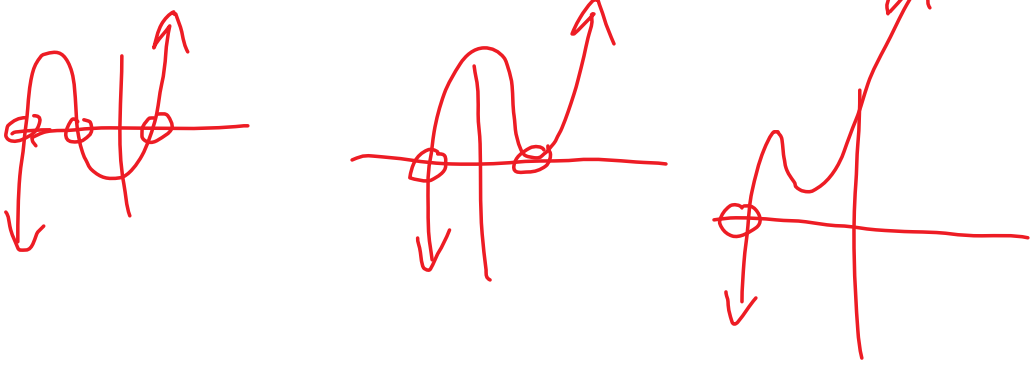
3. What is the <u>minimum</u> number of zeros (x-intercepts) a cubic can have?

(A) 0

(B) 1

(C) 2

(D) 3



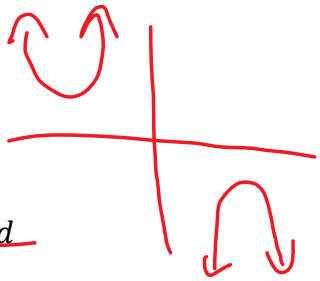
4. For the graph of which of the following functions, would it be possible to have NO x-intercepts?

(A) $y = ax^3$

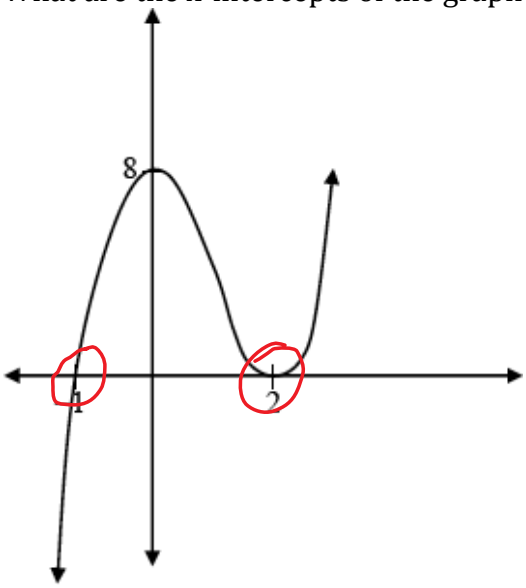
(B) $y = ax + b$

(C) $y = ax^2 + bx + c$

(D) $y = ax^3 + bx^2 + cx + d$



5. What are the x-intercepts of the graph below?



(A) 0 and 8

(B) -1 and 2

(C) 1 and -2

(D) 0 and -8

6. What is the degree of the polynomial function: $f(x) = \frac{1}{2}x^3 + 6x - 4$?

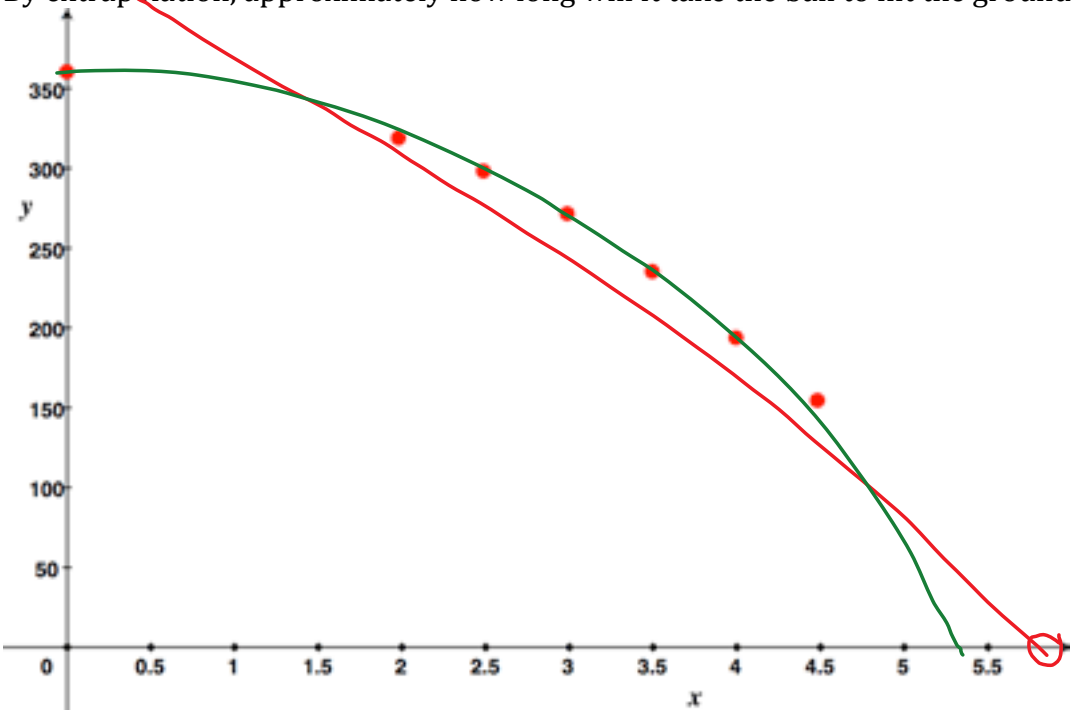
(A) 0

(B) 1

(C) 2

(D) 3

7. By extrapolation, approximately how long will it take the ball to hit the ground?



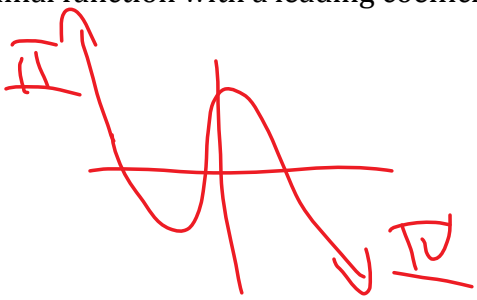
(A) 4.5 s

(B) 5

(C) 5.5

(D) 6

8. The graph of a polynomial function with a leading coefficient of $-3x^3$ will have an end behavior of:



(A) $Q2 \rightarrow Q1$

(B) $Q2 \rightarrow Q4$

(C) $Q3 \rightarrow Q1$

(D) $Q3 \rightarrow Q4$

9. Determine the degree of the polynomial function: $f(x) = x^2(x - 2x + 1)$

$f(x) = x^2(-x + 1)$

$f(x) = -x^3 + x^2$

(A) 0

(B) 1

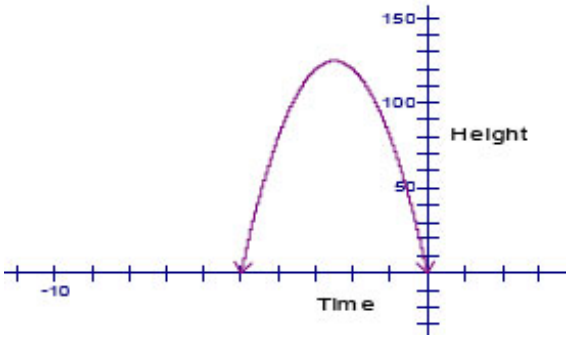
(C) 2

(D) 3

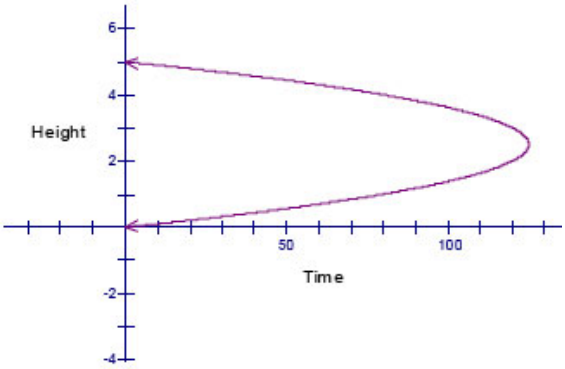
10. You throw a ball and measure it's height at different times. You record the time and height in a table of values (shown below). The time is in seconds and the height is in centimeters.

Time (s)	Height (cm)
0	0
1	80
2	120
3	120
4	80
5	0

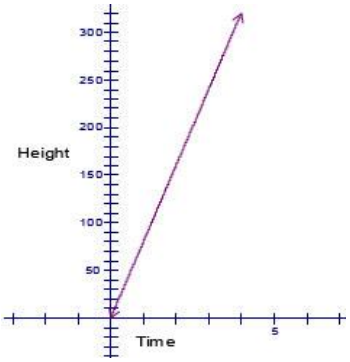
(A)



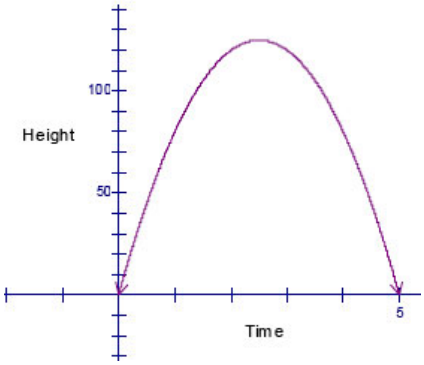
(B)



(C)



(D)



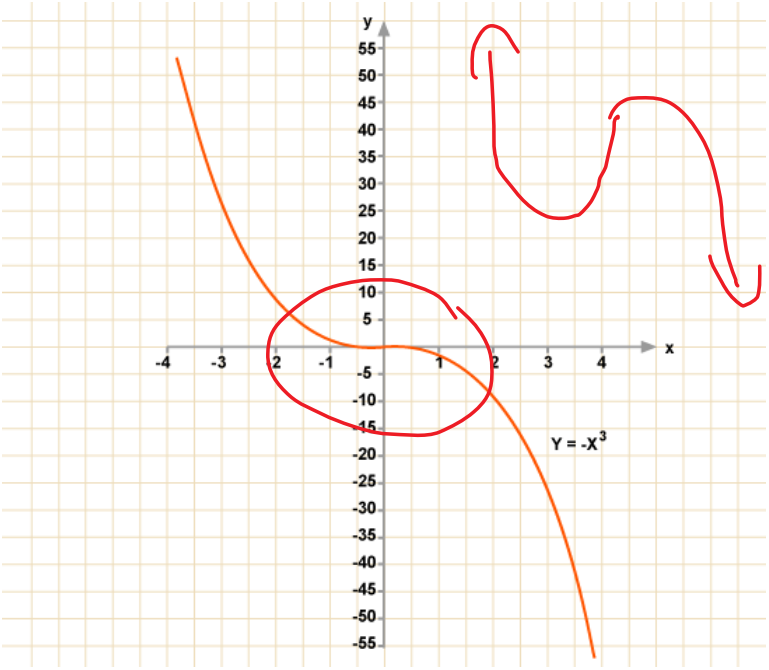
11. Determine the number of turning points in the following graph?

(A) 0

(B) 1

(C) 2

(D) 3



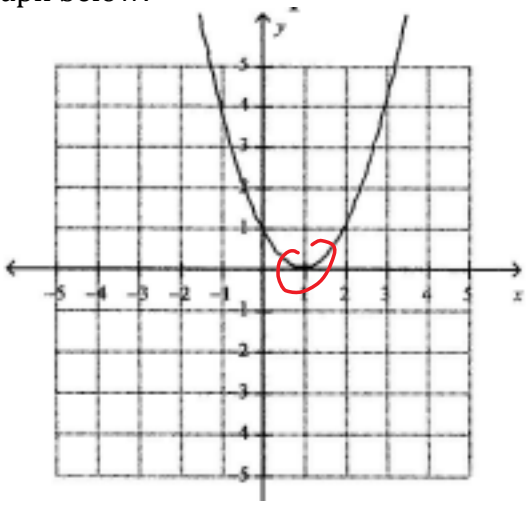
12. Determine the equation of the graph below:

(A) $f(x) = -x^2 - 3x - 1$

(B) $g(x) = x^2 - 2x + 1$

(C) $h(x) = -x^3 - 2x^2 + 1$

(D) $j(x) = -x^3 + 2x$



(1, 0)

$y \geq 0$

13. How many x-intercepts does the graph from #12 have?

(A) 0

(B) 1

(C) 2

(D) 3

14. What is the range of the graph shown in #12?

(A) $\{y|y \geq 1, y \epsilon R\}$

(B) $\{y|y \geq 0, y \epsilon R\}$

(C) $\{y|y \leq 1, y \epsilon R\}$

(D) $\{y|y \leq 0, y \epsilon R\}$

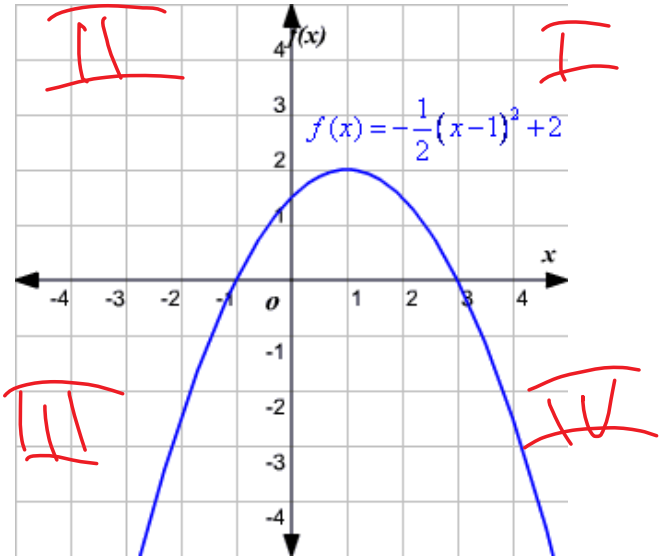
15. Describe the end behavior of the graph below:

(A) Q1 to Q2

(B) Q4 to Q2

(C) Q2 to Q4

(D) Q3 to Q4



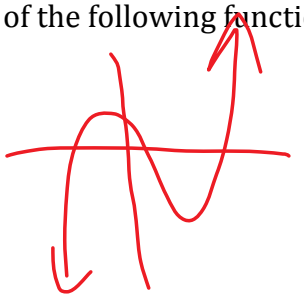
16. Describe the end behavior of the following function: $f(x) = 2x^3 + x^2 - 2x + 7$

(A) Q2 to Q1

(B) Q2 to Q4

(C) Q3 to Q2

(D) Q3 to Q1



17. The growth of a tree can be modeled by the function $h(t) = 2.3t - 0.45$ where h represents the height in metres and t represents the time in years. Approximately how long will it take the tree to grow 32 m tall?

$32 = 2.3t - 0.45$

$t = 14$

(A) 13 years

(B) 14 years

(C) 15 years

(D) 16 years

18. Determine the equation of the linear regression function for the data:

x	1	2	3	4	5	6
y	84	155	241	310	405	478

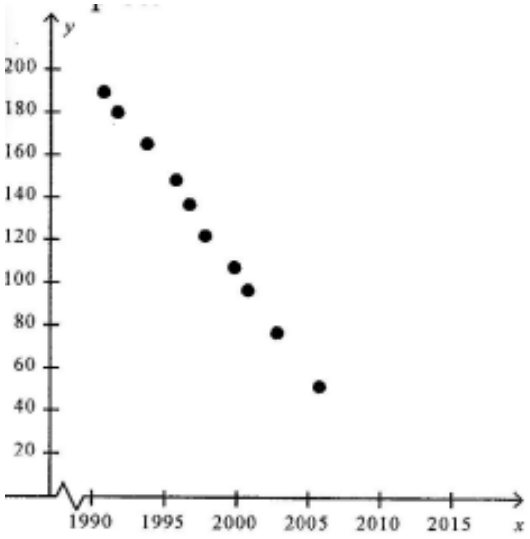
(A) $y = 79.7x - 0.07$
(B) $y = 78.1x - 1.07$
(C) $y = 79.7x + 0.07$
(D) $y = 78.1x + 1.07$

Lin Reg
$y = ax + b$
$a = 79.68571429$
$b = -0.066666667$

$y = 79.7x - 0.07$

19. What kind of relationship might there be between the independent and dependent scatter plot?

(A) linear
(B) quadratic
(C) cubic
(D) neither



20. Use cubic regression to interpolate the value of when x = 5

x	1	2	3	4	6	7	8	9
y	12.4	30.3	41.1	55.7	68.9	83.0	101.3	125.5

(A) 61
(B) 62
(C) 63
(D) 64

$a = 0.356$
$b = -4.85$
$c = 30.3$
$d = -13.8$

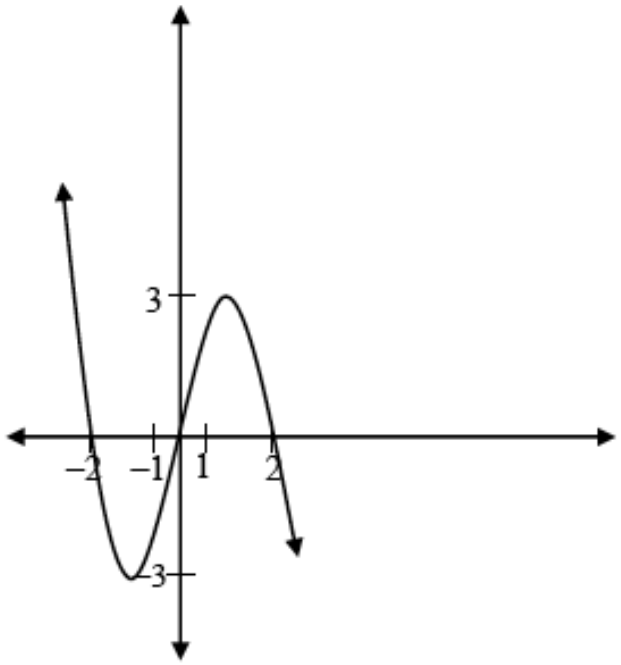
$y = 0.356x^3 - 4.85x^2 + 30.3x - 13.8$
$y = 0.356(5)^3 - 4.85(5)^2 + 30.3(5) - 13.8$
$y = 61$

Answers to multiple choice.

1.____	**2.____**	**3.____**	**4.____**	**5.____**
6.____	**7.____**	**8.____**	**9.____**	**10.____**
11.____	**12.____**	**13.____**	**14.____**	**15.____**
16.____	**17.____**	**18.____**	**19.____**	**20.____**

15 **Part II:** **Constructed Response. Answer each question in the space provided. Show all workings.**

5 21. Use the following graph to fill in the table:



Type of Function:	cubic
Degree:	3
x-intercepts:	$-2, 0, 2$
y-intercepts:	0
Domain:	$\{x \mid x \in \mathbb{R}\}$
Range:	$\{y \mid y \in \mathbb{R}\}$
Sign of Leading Coefficient	-ve
Number of Turning Points:	2
End Behaviour:	rise left/fall right QII → QIV

2 22. Does the point $(2, 5)$ lie on the graph of $f(x) = x^3 - 4x + 9$?

(x,y)

$5 = (2)^3 - 4(2) + 9$

$5 = 8 - 8 + 9$

$5 \neq 9$

NO!

3 23. The motion of a motorized vehicle along a straight path is given by the function $m = t^3 - 23t^2 + 24t + 8$, where m is the displacement of the vehicle in millimeters and t is the time in seconds, $t \geq 0$. Determine the displacement of the vehicle after 62 seconds.

$m = (62)^3 - 23(62)^2 + 24(62) + 8$

$m = 15412$ mm

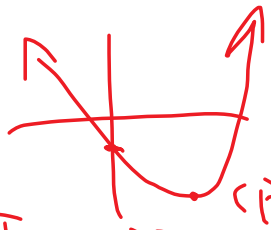
5 24. Determine the following characteristics of the polynomial function $f(x) = 5x^2 + 3x - 4$.

- # of x-intercepts

  2

- end behavior

  rise left / rise right QII → QI



- domain

  $\{x | x \in R\}$

- range

  $p = \frac{-b}{2a} = \frac{-3}{2(5)} = -0.3$ $q = 5(-0.3)^2 + 3(-0.3) - 4 = -4.45$

  $\{y | y \geq -4.45, y \in R\}$

- number of possible turning points

  1