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

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

1.   Identify the leading coefficient and degree of $f(x) = -5x^4 - 6x^2 + 6$

    (A)   The leading coefficient is –5. The degree is 4.

    (B)   The leading coefficient is –5. The degree is 6.

    (C)   The leading coefficient is 5. The degree is 4.

   (D)   The leading coefficient is 5. The degree is 6.

2.   Identify whether the function graphed has degree 2 or 3 and if it has a positive or negative leading coefficient.

    (A)   The degree is 2, and the leading coefficient is negative.

    (B)   The degree is 3, and the leading coefficient is negative.

    (C)   The degree is 2, and the leading coefficient is positive.

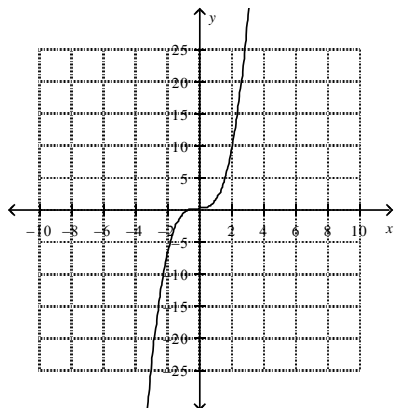   (D)   The degree is 3, and the leading coefficient is positive.
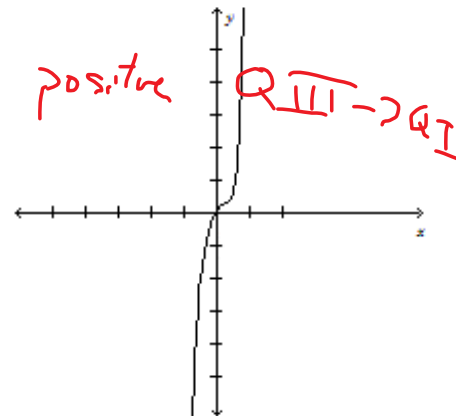
3.   From which quadrants does the graph of $f(x) = -x^3 + 3x^2 - 4$ extend?

    (A)   II to I

    (B)   II to IV

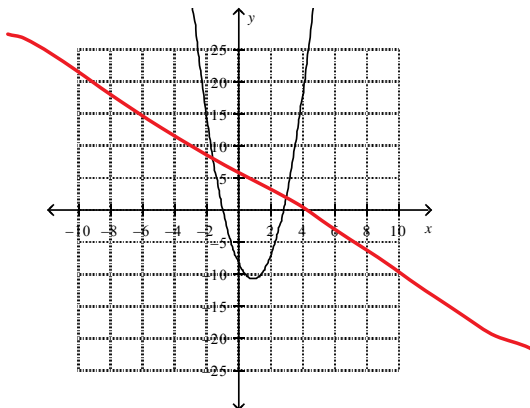   (C)   III to I

    (D)   III to IV
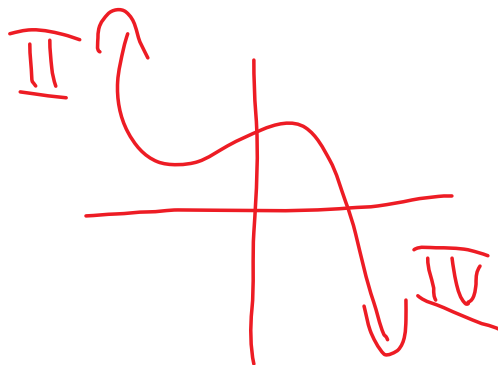
4. Identify the graph of $f(x) = x^3 + 3x^2 - 6x - 8$
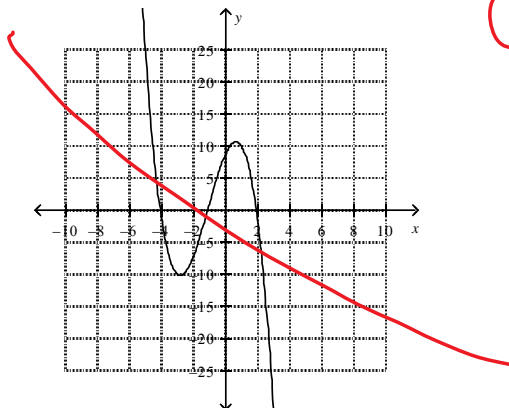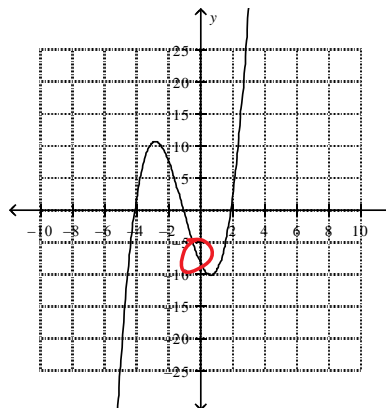
(A)

(B)

(C)

(D)

5. What is the range of the quadratic function $y = -2x^2 + 12x - 14$?

(A) $\{y|y \leq -4, y \in R\}$

(B) $\{y|y \geq -4, y \in R\}$

(C) $\{y|y \leq 4, y \in R\}$

(D) $\{y|y \geq 4, y \in R\}$

$P = -\frac{b}{2a} = -\frac{12}{2(-2)} = 3$

$g = -2(3)^2 + 12(3) - 14$
$g = 4$

$y|y \leq 4$

6. What is the maximum number of turning points of $f(x) = -3x^3 + 2x^2 - 8x - 12$?

   (A) 0

   (B) 1

   (C) 2

   (D) 3

7. Which function passes through the point $(-1, 4)$?

   $x \, y$

   (A) $f(x) = -x^3 + 2x + 4$

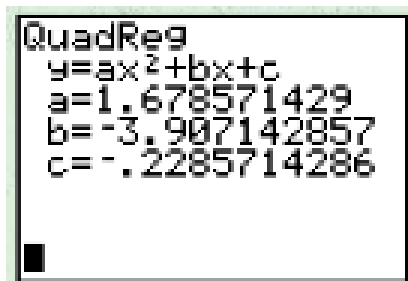   (B) $f(x) = -x^3 - 2x - 4$

   (C) $f(x) = -x^3 + 2x + 5$ $-(-1)^3 + 2(-1) + 5 = 4$

   (D) $f(x) = -x^3 - 2x - 5$

8. A quadratic regression was performed on the data in the table of values.

   What is the y-value when $x = 7$? (Round a, b, and c to two decimal places.)
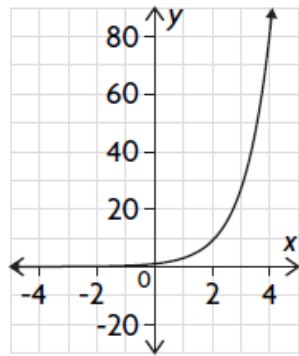
   (A) 25.25

   (B) 54.79

   (C) 110.77

   (D) 159.80

   QuadReg
   y=ax²+bx+c
   a=1.678571429
   b=-3.907142857
   c=-.2285714286

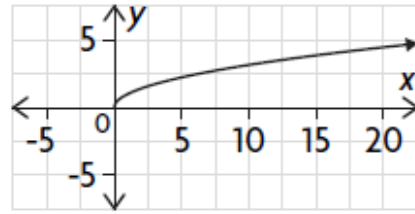 | x | y |
   |-----|-----|
   | -1 | 6 |
   | 0 | -1 |
   | 1 | -3 |
   | 2 | -1 |
   | 3 | 5 |
   | 4 | 10 |

   $Y = 1.68x^2 - 3.91x - 0.23$
   $= 54.72$

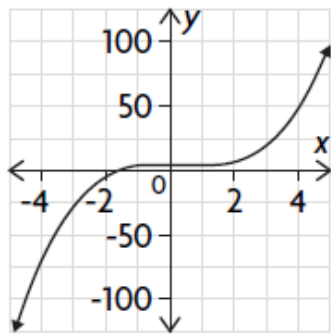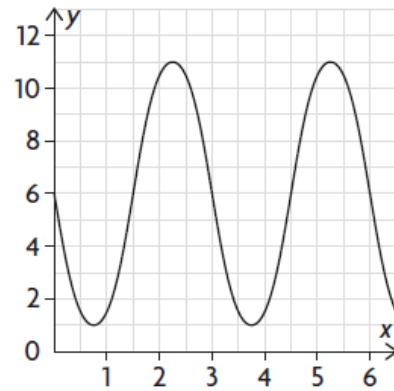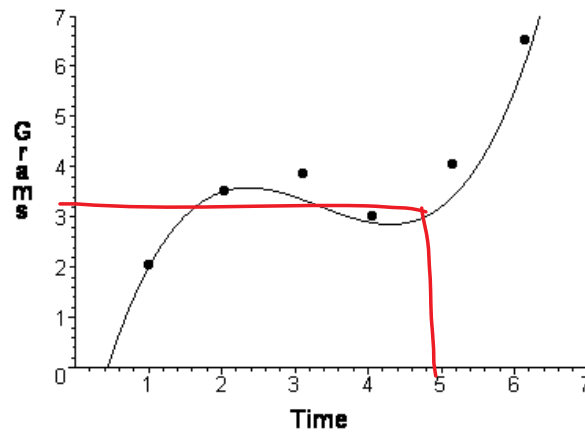9. Which graph represents a polynomial function?

(A)

(B)

(C)

(D)

10. The graph shows the growth of bacteria (grams) over time (days). According to the curve of best fit, what would be the approximate number of bacteria, in grams, on day 5?

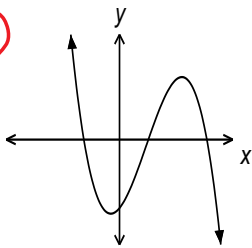(A)   2

(B)   3

(C)   4

(D)   5

11.   What is the *y*-intercept of the graph of the function $f(x) = 4x^3 + x^2 + 2x + 1$?
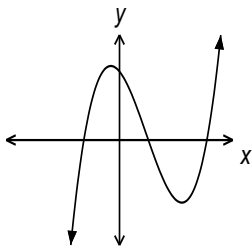
(A)   1

(B)   2

(C)   3

(D)   4

12.   Which graph best represents a function with the characteristics listed below?

- Three x-intercepts
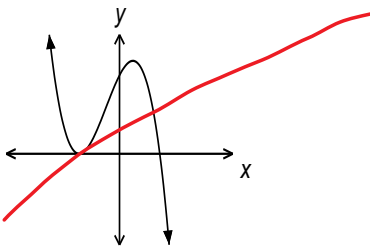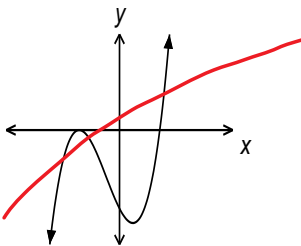- Extending from Quadrant II to Quadrant IV

(A)

(B)

(C)
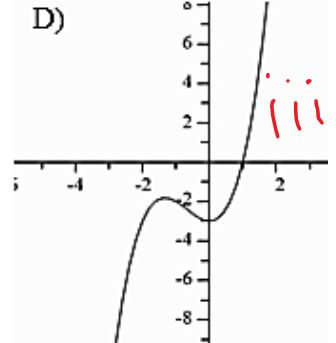

(D)

Answers to multiple choice.
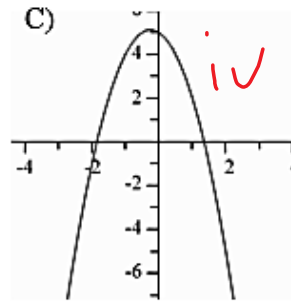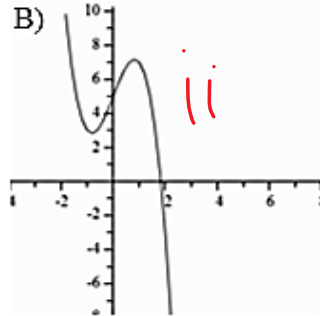
1.____   2.____   3.____   4.____   5.____

6.____   7.____   8.____   9.____   10.____

11.____   12.____

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

4   11.   Determine the correct polynomial function for each graph indicated. Each graph
matches to exactly ONE function, so there will be two functions left over.

A)   B)   C)   D)
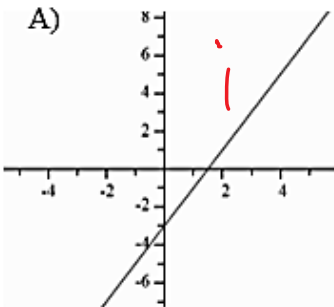
i. $f(x) = 2x - 3$ ii. $f(x) = -2x^3 + 4x + 5$ iii. $f(x) = x^3 + 2x^2 - 3$

iv. $f(x) = -2x^2 - x + 5$ v. $f(x) = 5x^2 - 3$ vi. $f(x) = -x - 3$

12. Write a possible equation for a polynomial function that satisfies each set of characteristics.

1.5 (A) Extending from Quadrant II to Quadrant I, y-intercept of -6.

$$y = x^2 - 6$$

or $$y = 2x^2 - 7x - 6$$

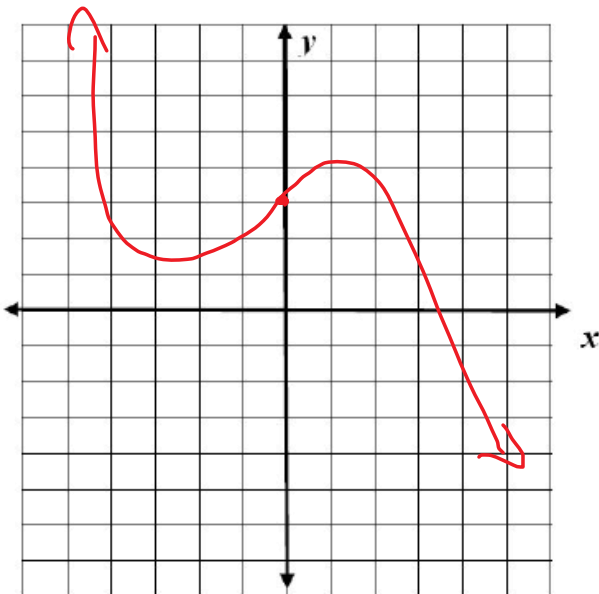1.5 (B) Decreasing function, degree 1, y-intercept of 2.

$$y = -x + 2$$

13. Sketch possible graphs of polynomial functions that satisfies each set of characteristics.
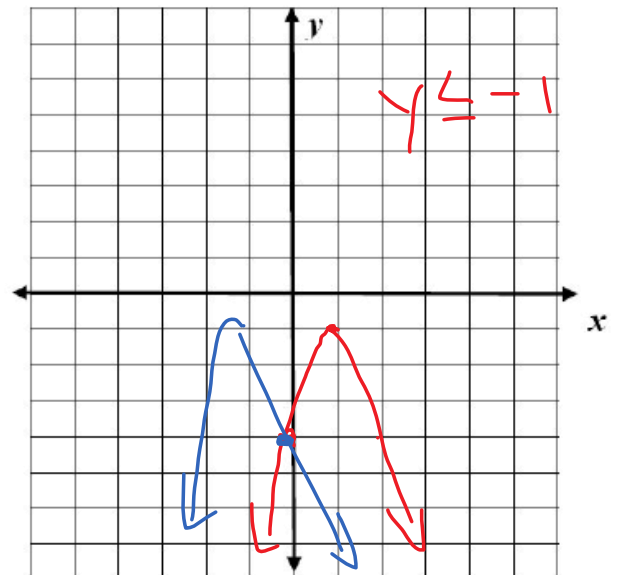
2 (A) Two turning points, negative leading coefficient, constant term 3.

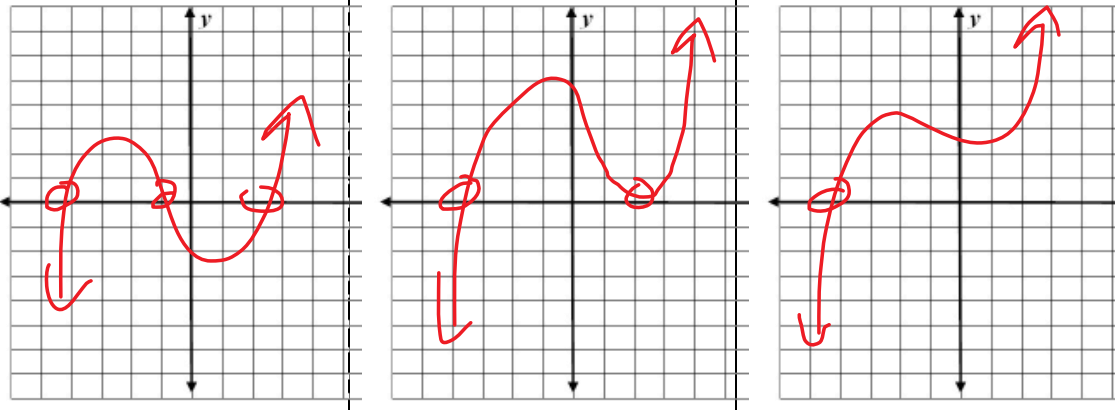2 (B) Range of $y \leq -1$, constant term -4, one turning point

A

B

$$y \leq -1$$

5   14.   Complete the table to describe the characteristics of the indicated polynomial function.

Type of function	Cubic
Standard Form	$y = ax^3 + bx^2 + cx + d$
Possible number(s) of x-intercepts	$1, 2, 3$
Domain	$\{x \mid x \in \mathbb{R}\}$
Range	$\{y \mid y \in \mathbb{R}\}$
End behaviour when leading coefficient > 0	falls left/rises right Q III → Q I
End behaviour when leading coefficient < 0	rises left/falls right Q II → Q IV
Possible number(s) of turning points	2 or 0
Sketch graphs for 1, 2 and 3 x-intercepts, assume $a > 0$	

Name: _____

REGRESSION: Graphing calculators or Smart technologies are permitted for this question.

NOTE: If you are using DESMOS the quadratic form for regression is $y \sim ax_1^2 + bx_1 + c$

15. The table shows the number of males who entered a trade program in Canada in the odd numbered years after 1990.

$a = 1471.5$

$b = -16364$

$c = 198120$

Years After 1990	Number of Males
1	184 705
3	160 020
5	151 945
7	157 875
9	170 710
11	195 220

Statistics Canada

2   (A) Determine the equation for the **quadratic** regression function that models the data.

$$y = 1471.5x^2 - 16364x + 198620$$

2   (B) Use your equation to interpolate the number of males enrolled 4 years after 1990.

$$y = 156208$$