

Name: \_\_\_\_\_

Student #: \_\_\_\_\_

Date: \_\_\_\_\_

T.A. #: \_\_\_\_\_

## Mathematics 12 Pre-Calculus LEARNING GUIDE 5 QUIZ– POLYNOMIAL FUNCTIONS

**\*NO GRAPHING CALCULATORS PERMITTED**

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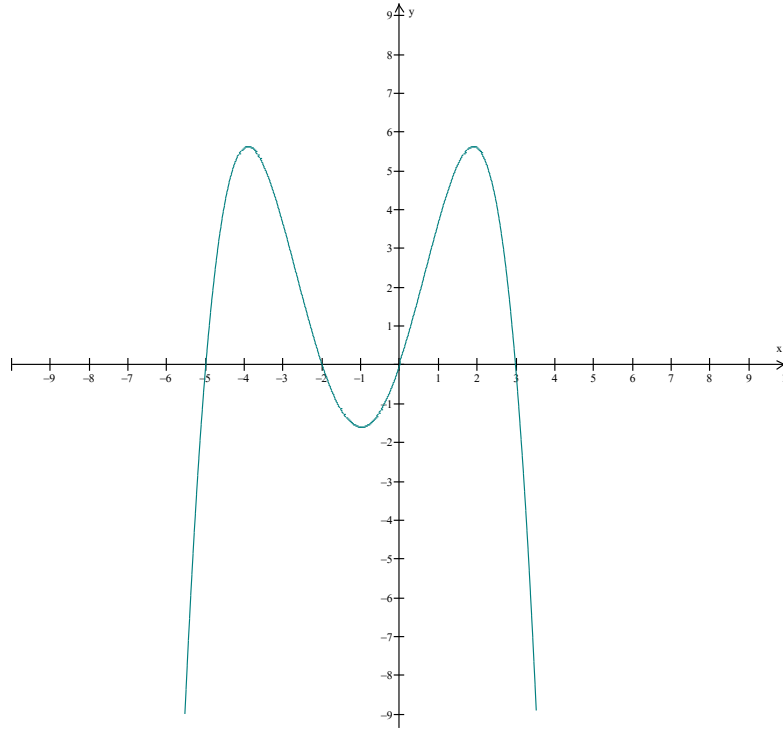
**\*Full marks will NOT be given for the final answer only.**

When using a calculator, you should provide a decimal answer that is correct **to at least two decimal places** (unless otherwise indicated). Such rounding should occur **only** in the final step of the solution.

1. Write an example of a polynomial function. Explain why it is a polynomial function. (2 marks)
  
  
  
  
  
  
  
  
  
  
2. For the polynomial function  $f(x) = 7x - 3 - 8x^3$  state: (2 marks)
  - a) The degree:
  - b) Name of the polynomial function:
  - c) Leading coefficient:
  - d) Constant term:

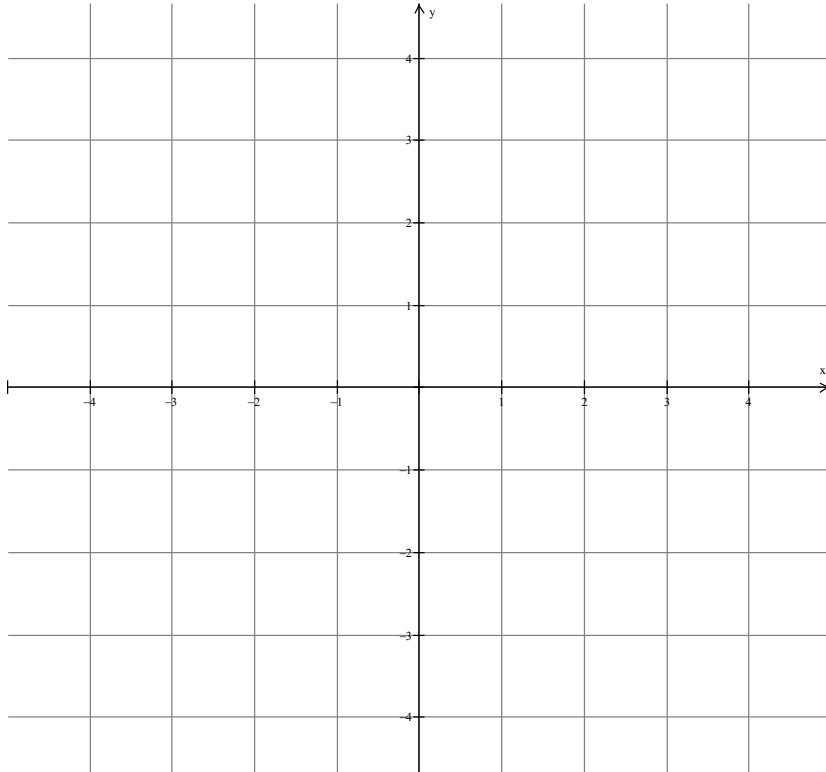
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3. Given the graph below:



- a) What degree is this function? (1 mark each)
  - b) Is the leading coefficient positive or negative?
  - c) How many roots does this function have?
4. Given the function  $y = ax^n + 2x + b$ , what are the conditions on  $a$ ,  $n$ , and  $b$  for this function to have a minimum value with a negative  $y$  intercept? (3 marks)

5. Sketch the graph of the polynomial function  $f(x) = -(x + 2)^2(x - 3)$ . (3 marks)



6. Given the function  $f(x) = x^4 - 16x^2$  (4 marks)

- a) Degree and end- behavior:
- b) The zeros and their multiplicity:
- c) The y-intercept:

7. Determine the quotient:

(3 marks)

$$(2x^3 + 3x^2 - 9x - 10) \div (x - 2)$$

8. Use the remainder theorem to determine the remainder when  $2x^2 - 7x + 4$  is divided by  $x + 2$ . (1 mark)

9. When  $x^3 - kx^2 + 6$  is divided by  $x - 3$ , the remainder is 4. Determine  $k$ . (2 marks)

10. For the function  $f(x) = x^3 - 2x^2 - 9x + 18$

a) List the possible integral factors. (1 mark)

b) Factor fully. (2 marks)

11. Show that  $x + a$  is a factor of the polynomial:

$$P(x) = (x + a)^2 + (x + c)^2 - (a - c)^2$$

(3 marks)