

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

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

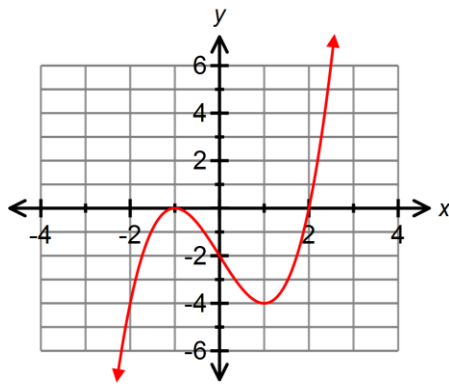
**Part A: Selected Response:** Place the letter of the correct response in the space provided.  
(13 marks)

1. If  $(x - 2)$  is a factor of  $x^3 + 7x^2 - 4x + (3 - k)$ , what is the value of  $k$ ? 1. \_\_\_\_\_

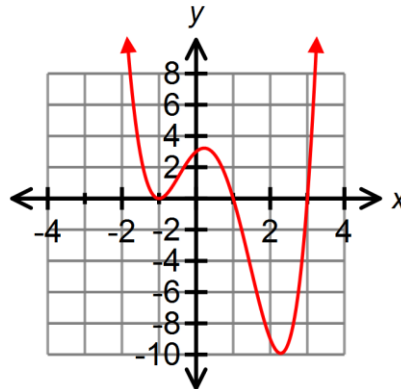
- (A) -31
- (B) -28
- (C) 28
- (D) 31

2. Which graph below represents the graph of an even degree function? 2. \_\_\_\_\_

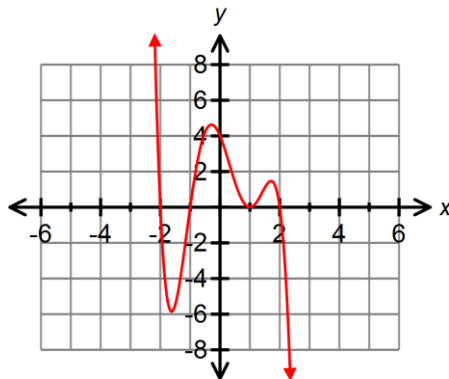
(A)



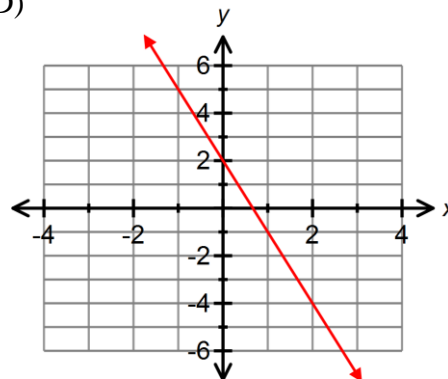
(B)



(C)

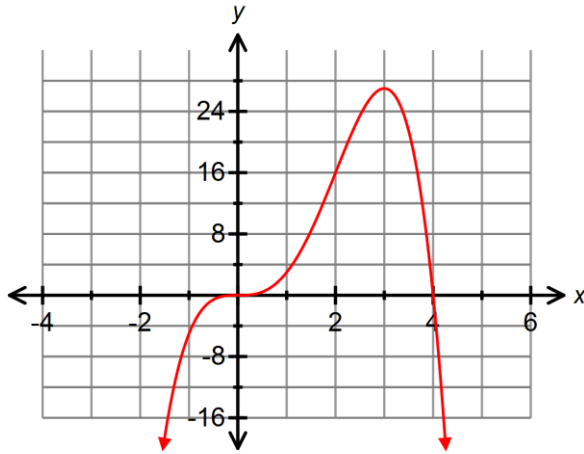


(D)



3. Which of the equations below is best represented by the given graph?

3. \_\_\_\_\_



- (A)  $y = -x^4 + 4x^3$
- (B)  $y = x^4 - 4x^3$
- (C)  $y = x^3 - 4x^2$
- (D)  $y = -x^3 + 4x^2$

4. Which statement is true for a polynomial function?

4. \_\_\_\_\_

- (A) All even degree polynomial functions have at least one  $x$ -intercept.
- (B) Some odd degree polynomial functions have no  $x$ -intercepts.
- (C) Even degree polynomial functions always have an even number of  $x$ -intercepts.
- (D) All odd degree polynomials have at least one  $x$ -intercept.

5. Which function has each of the characteristics:

5. \_\_\_\_\_

- ✓ an even function
- ✓ end behavior in the third and fourth quadrants
- ✓  $y$  – intercept is  $-6$

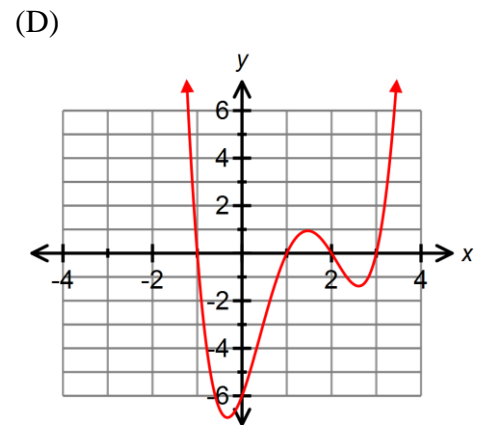
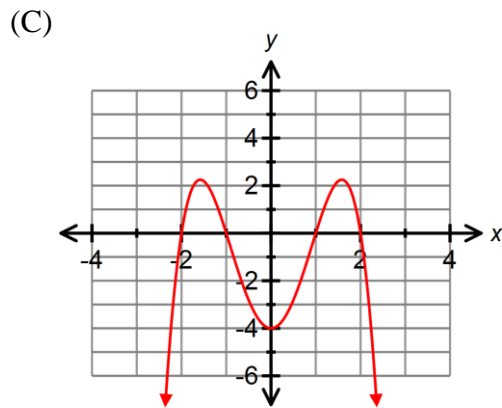
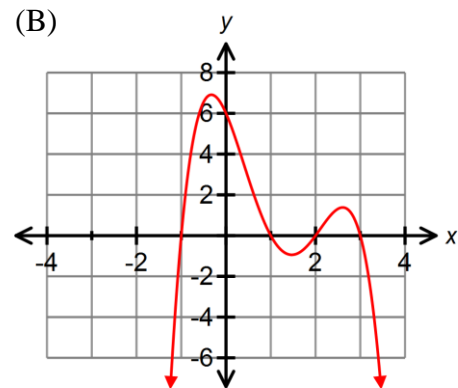
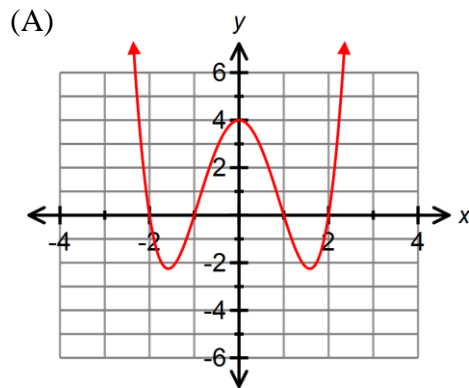
- (A)  $P(x) = x^4 - 5x^2 - 6$
- (B)  $P(x) = -x^4 + 3x^3 + 6$
- (C)  $P(x) = -(x + 2)(x + 3)$
- (D)  $P(x) = -x^3 + x - 6$

6. Which represents the value of  $k$  if the remainder is 5 for  $(2x^3 + 4x^2 + kx - 3) \div (x + 1)$ ? 6.\_\_\_\_
- (A)  $-6$   
(B)  $-2$   
(C)  $2$   
(D)  $6$
7. What are the  $x$ -intercepts of  $y = 4x^3 - 12x^2 + 8x$ ? 7.\_\_\_\_
- (A)  $x = -4, -2, -1$   
(B)  $x = -2, -1, 0$   
(C)  $x = 0, 1, 2$   
(D)  $x = 1, 2, 4$
8. List all possible integral zeros for  $P(x) = x^4 + 3x^3 - 2x^2 - 12x - 8$ . 8.\_\_\_\_
- (A)  $\pm 1, \pm 8$   
(B)  $\pm 1, \pm 2, \pm 3, \pm 4, \pm 6, \pm 12$   
(C)  $\pm 1, \pm 2, \pm 4, \pm 8$   
(D)  $\pm 2, \pm 4$
9. The volume of a rectangular prism is  $V = 2x^3 - 5x^2 - x + 6$ . If two of the dimensions are  $x - 2$  and  $x + 1$ , what is an expression for the other dimension? 9.\_\_\_\_
- (A)  $x - 6$   
(B)  $x - 6$   
(C)  $2x - 3$   
(D)  $2x + 3$
10. What are the  $x$ -intercepts of  $f(x) = x^2(x + 3)(x - 2)$ ? 10.\_\_\_\_
- (A)  $-3$  and  $2$   
(B)  $3$  and  $-2$   
(C)  $0, -3,$  and  $2$   
(D)  $0, 3,$  and  $-2$

11. What is the quotient and remainder for  $(2x^3 - x^2 + 2x + 4) \div (x - 3)$ ? 11.\_\_\_\_

- (A) The quotient is  $2x^2 + x + 5$ , and the remainder is 19.
- (B) The quotient is  $2x^2 + 5x + 7$ , and the remainder is 29.
- (C) The quotient is  $2x^2 + 5x + 17$ , and the remainder is 55.
- (D) The quotient is  $2x^2 + x + 3$ , and the remainder is 7.

12. Which sketch best represents the graph of  $y = ax^4 + bx^3 + cx^2 + dx + e$  if  $a > 0$  and  $e < 0$ ? 12.\_\_\_\_



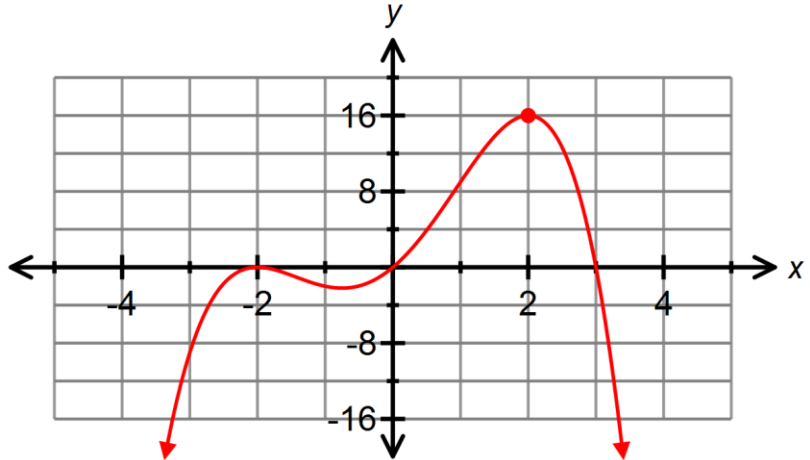
13. How many  $x$ -intercepts are possible for the polynomial function  $P(x) = ax^5 + bx^4 + cx^3$ ? 13.\_\_\_\_

- (A) 1
- (B) 3
- (C) 4
- (D) 5

**Part B: Constructed Response:** Show workings to all problems.

14. For what value of  $k$  will the polynomial  $P(x) = 4x^3 - 3x^2 + kx + 6$  have the same remainder when it is divided by both  $x-1$  and  $x+3$ ? /3

15. Given the graph, determine the equation of the polynomial in factored form. /3



16. Give that  $x = 2$  is a root of the function,  $P(x) = 2x^4 - 3x^3 - 6x^2 + 5x + 6$ , determine the other roots. /4

17. The height of a square-based box is 4 cm more than the side length of its square base. The volume of the box is  $225 \text{ cm}^3$ . Create an equation to represent this situation and use it to algebraically determine the dimensions of the box? /4

