Name:_____ Date:_____

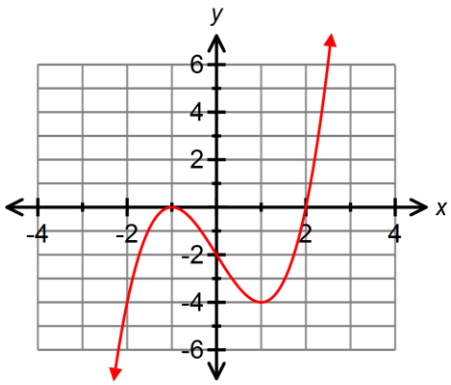
Part A: Selected Response: Place the letter of the correct response in the space provided. (13 marks)

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

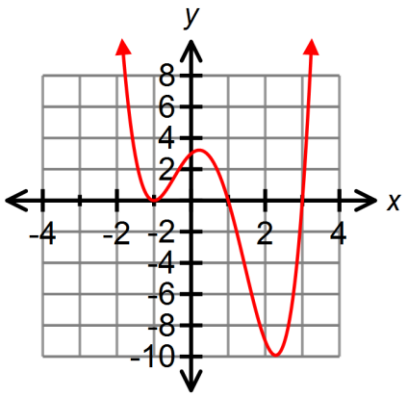
(A) -31
(B) -28
(C) 28
(D) 31

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

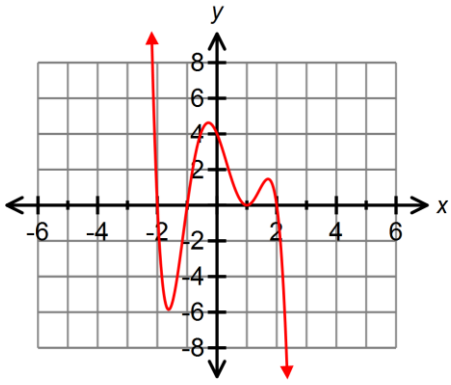
(A)



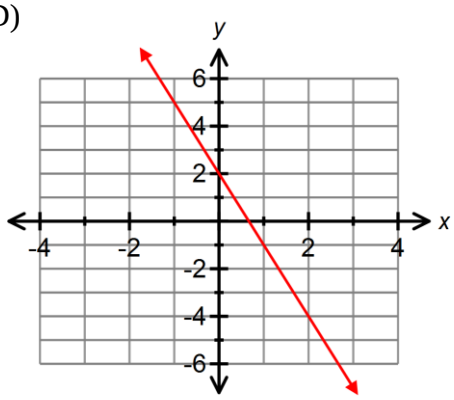
(B)



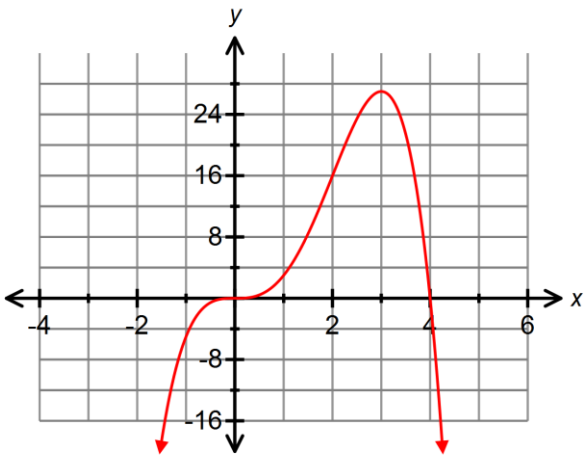
(C)



(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) ±1, ±8
(B) ±1, ±2, ±3, ±4, ±6, ±12
(C) ±1, ±2, ±4, ±8
(D) ±2, ±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.___

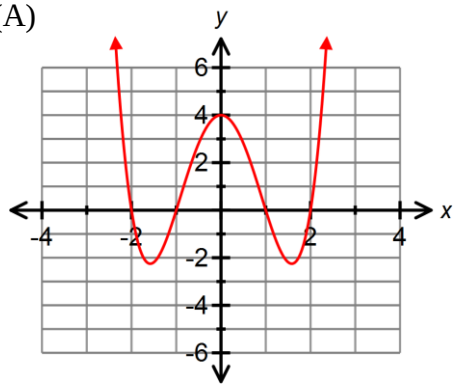
(A) −3 and 2
(B) 3 and −2
(C) 0, −3, and 2
(D) 0, 3, and −2

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

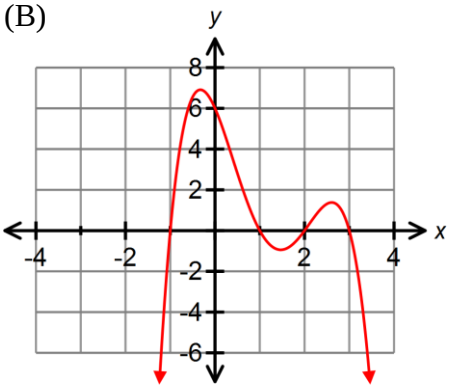
(A) The quotient is $2x^2 + x + 5$, and the remainder is 19.
(B) The quotient is $2x^2 + 5x + 7$, and the remainder is 29.
(C) The quotient is $2x^2 + 5x + 17$, and the remainder is 55.
(D) The quotient is $2x^2 + x + 3$, and the remainder is 7.

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

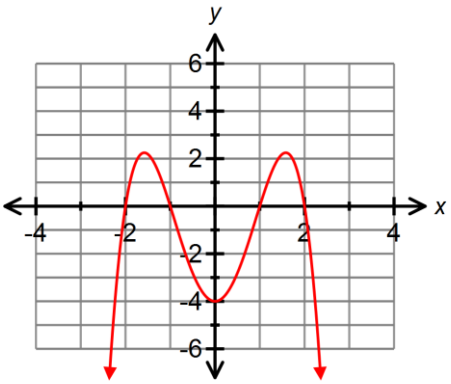
(A)



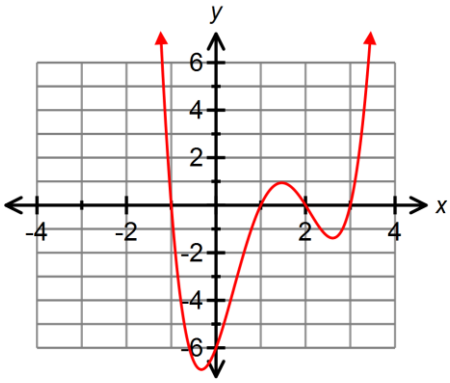
(B)



(C)



(D)



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

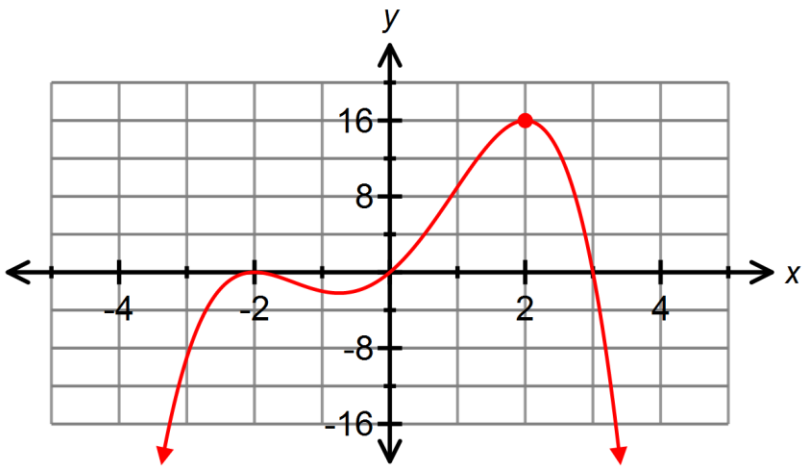
(A) 1 (B) 3

(C) 4 (D) 5

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

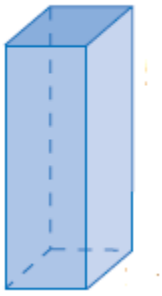
14. For what value of k will the polynomial $P(x) = 4x^3 - 3x^2 + kx + 6$ have the same remainder when it is divided by both $x-1$ and $x+3$? /3

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 cm^3. Create an equation to represent this situation and use it to algebraically determine the dimensions of the box? /4



18. For the polynomial function $f(x) = -\frac{1}{2}(x+3)(x+1)^2(x-2)^2$ determine the following characteristics:

(i) the zeros

(ii) the *y*-intercept

(iii) degree of the function

(iv) sketch the graph

(v) the intervals where the function is positive and negative

/6