1. For the polynomial, $3x^3 - 2x^8 + 2x - 7$,

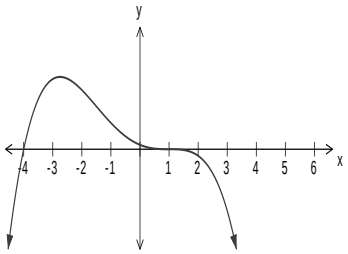
   a) state the degree

   b) state the linear term

   c) state the leading coefficient

2. Write a cubic polynomial with a leading coefficient of 4, no quadratic term, a linear coefficient of -2, and a constant term of 6.

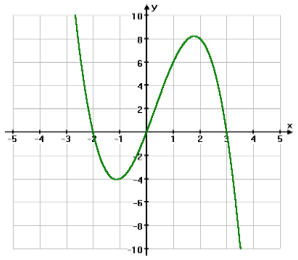
3. Which function best describes the graph shown below?



(A) $f(x) = -(x-1)^2(x+4)$ (B) $f(x) = -(x-1)^3(x+4)$

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

4. Which of the following describes the type of polynomial function in the graph below?



(A) linear
(B) quadratic
(C) cubic
(D) quartic

5. Which of the following represents the zeros for $p(x) = x^2(3x-2)(x+4)$?

(A) 0, $\frac{2}{3}$, -4 (B) 0, $-\frac{2}{3}$, 4 (C) $\frac{2}{3}$, -4 (D) 0, $\frac{3}{2}$, -4

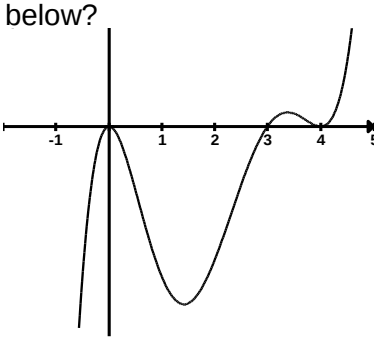
6. What is the remainder when $(2x^4 + 3x^3 - 7x - 8) \div (x+2)$?

(A) –2 (B) 0 (C) 14 (D) 34

7. What is the value of k if -3 is a zero of $h(x) = kx^2 + 2x - 12$?

(A) $\frac{2}{3}$ (B) $-\frac{2}{3}$ (C) -2 (D) 2

8. Which function represents the polynomial graphed below?



(A) $y = -(x - 3)(x - 4)^2 (x)$

(B) $y = (x + 3)(x + 4)^2 (x^2)$

(C) $y = (x - 3)(x - 4)^2 (x^2)$

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

9. What are the *x*-intercepts of $y = 4x^3 - 12x^2 + 8x$?

A) x= 1, x=2 B) x= -1, x=-2
C)x= 0, x= -1, x=-2 D) x = 0, x= 1, x=2

10. State the degree of the polynomial, $P(x) = -x^3 (x-1)^2 (x+2)$.

(A) 3 (B) 4 (C) 5 (D) 6

11. What is the remainder when $f(x) = 2x^{78} - 3x^9 + 4$ is divide by $x+1$?

(A) -1 (B) 1 (C) 3 (D) 9

12. A polynomial $P(x)$ is divided by $x+1$ and the answer is expressed in the form, $\frac{P(x)}{x+1} = 2x^2 + x - 1 - \frac{4}{x+1}$, what is $P(x)$?

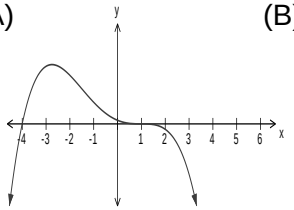
13. What are the possible integral roots of $P(x) = 2x^7 - 2x^5 + 4$?

(A) $\pm 2, \pm 4$ (B) $\pm 1, \pm 2, \pm 4$

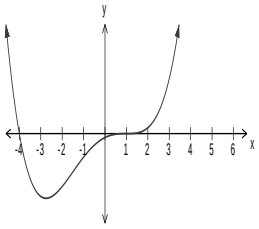
(C) $\pm 1, \pm 2$ (D) $\pm 1, \pm 2, \pm 4, \pm 8$

14. Which of the graphs is that of a polynomial of even degree with a root of multiplicity 2 and a negative leading coefficient?

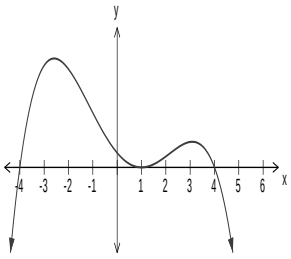
(A)



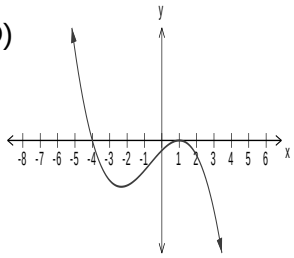
(B)



(C)



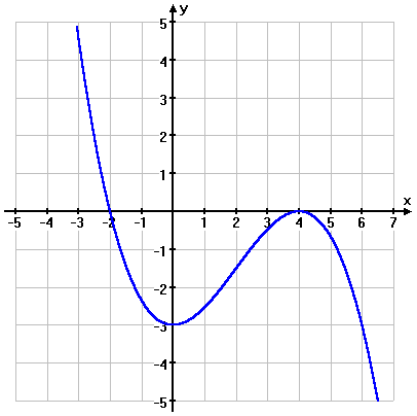
(D)



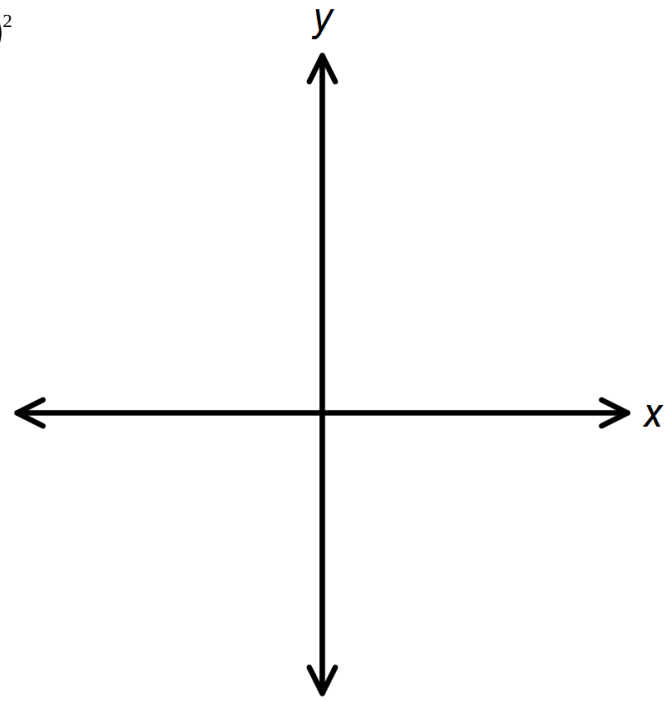
15. What is the maximum number of turns in the graph of the polynomial, $P(x) = 7x^6 - 2x^5 + 4$?

(A) 7 (B) 6 (C) 5 (D) 3

16. Determine the equation of the polynomial function (**in factored form**) based on the graph given below.



17. Sketch the graph of the function: $P(x)=\frac{1}{2}(x+2)(x-3)(x-4)^2$



18. Determine the quotient and remainder for, $(2x^4-5x^2+2x-3)\div(x-2)$

19. Write the equation of a cubic polynomial given, $P(1)=P(-2)=P(4)=0$ and $P(2)=16$

20. If $(x+2)$ is a factor of $\frac{k^2x^3}{4}-kx^2+3x+12$, find the value of *k*.

21. Which statement is true for a polynomial function?

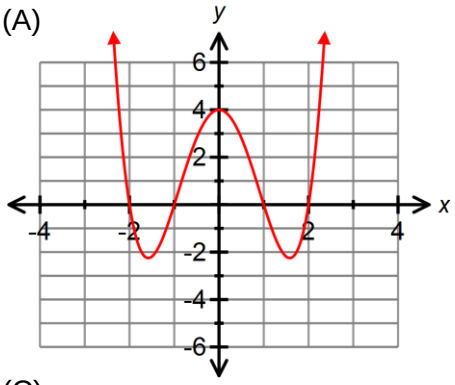
(A) All even degree polynomial functions have at least one *x*-intercept.
(B) Some odd degree polynomial functions have no *x*-intercepts.
(C) Even degree polynomial functions always have an even number of *x*-intercepts.
(D) All odd degree polynomials have at least one *x*-intercept.

22. 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?

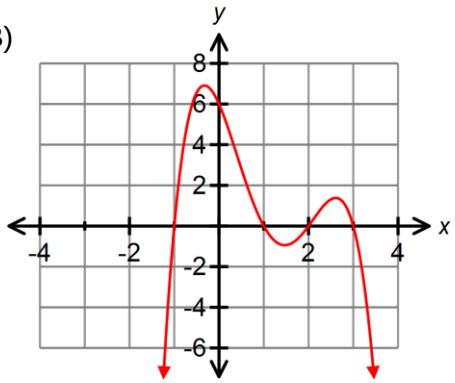
(A) $x-6$
(B) $x-6$
(C) $2x-3$
(D) $2x+3$

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

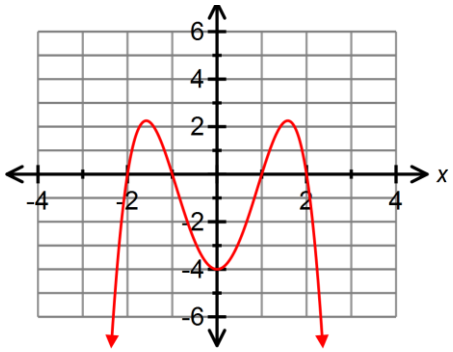
(A)



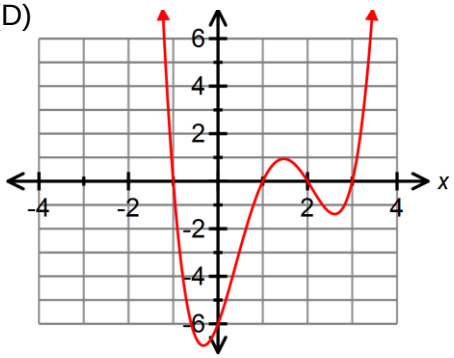
(B)



(C)



(D)

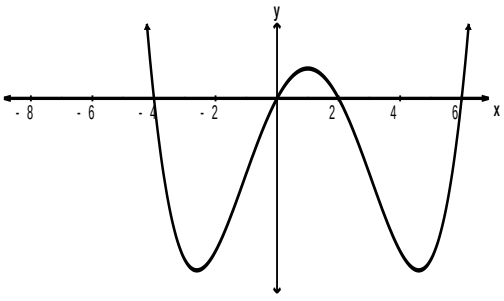


24. For what value of k will the polynomial $P(x) = 4x^3 - 3x^2 + kx + 6$ have the same remainder when it is divided by both $x - 1$ and $x + 3$?

25. When a polynomial $P(x)$ is divided by $(x - 2)$, the quotient is $(x^2 - 4x + 6)$ and the remainder is -7. What is the polynomial?

26. Which interval describes where the function is negative?

A) $x \in (-\infty, -4) \cup (0,2) \cup (6, \infty)$
B) $x \in (-\infty, -4] \cup [0,2] \cup [6, \infty)$
C) $x \in (-4,0) \cup (2,6)$
D) $x \in [-4,0] \cup [2,6]$



27. Algebraically determine the zeroes of the polynomial function $P(x) = x^3 - x^2 - 14x + 24$

28. Complete the following for the polynomial function $P(x) = -2x^4 - 10x^3 + 8x^2 + 40x$

(i) Describe the end behaviour of this function.

(ii) Algebraically determine all intercepts

29. The polynomial function $P(x) = 4x^4 - 7x^3 + mx^2 + nx + 6$ has $(x - 1)$ as one of its factors. When it is divided by $(x + 1)$, the remainder is 30. Algebraically determine the values of m and n.

Answers

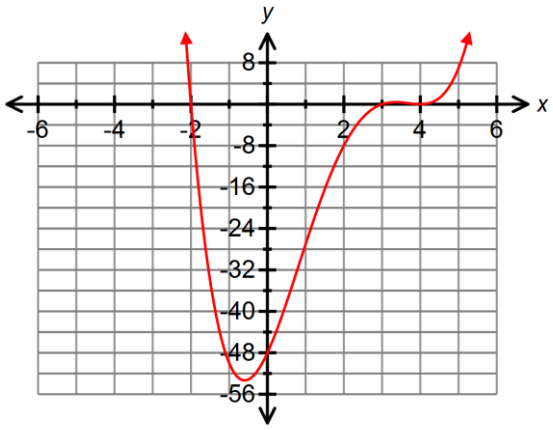
1 a) 8 b) $2x$ c) -2 2. $4x^3 - 2x + 6$

3.B 4. C 5. A 6. C 7. D 8. C 9. D

10. D 11. D 12. $P(x) = 2x^3 + 3x^2 - 5$ 13. B 14. C 15. C

16. $P(x) = -\frac{3}{32}(x+2)(x-4)^2$

17.



18. Q: $2x^3 + 4x^2 + 3x + 8$ R: 13 19. $P(x) = -2(x-1)(x+2)(x-4)$

20. $k = -3, 1$ 21. D 22.C 23. D 24. *K*=34

25. $P(x) = x^3 - 6x^2 - 2x - 19$ 26. C

27. zeros are x = 2, x=-4, x=3

28. (i) extending from Quadrant III to Quadrant IV
(ii) x-intercepts x= 0, x=-5, x=-2
y-intercept 0

29. m= 5 n= -8