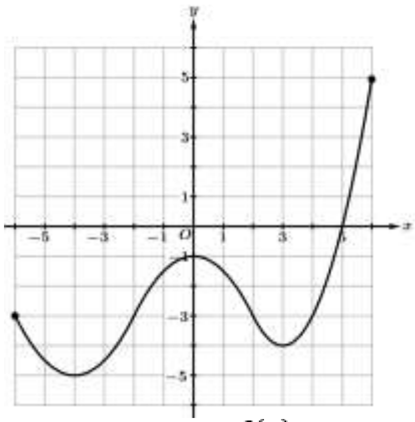
Worksheet B: (Topics 1.1 -1.6) Polynomial Review Name:

Directions: Read each question carefully. Determine the intervals for each of the following problems. Write your answers in interval notation.

1.



Graph of $f(x)$

The graph of the polynomial function f is shown above, where $-6 \leq x \leq 6$. Use the graph of f to answer the following, or write "None"

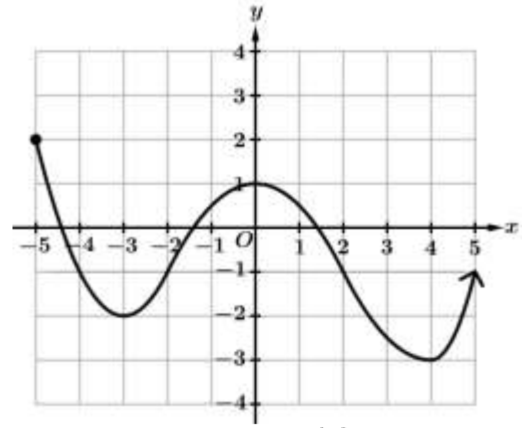
1a) f has a local minimum at $x =$_________.

1b) f has a local maximum at $x =$_________.

1c) The absolute maximum of f is _____ at $x =$ ______.

1d) The absolute minimum of f is _____ at $x =$ ______.

2.



Graph of $g(x)$

The graph of g is shown above, where $-5 \leq x < \infty$. Use the graph of g to answer the following, or write "None".

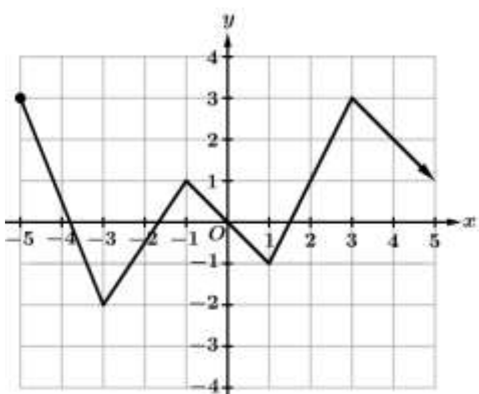
2a) g has a local minimum at $x =$_________.

2b) g has a local maximum at $x =$_________.

2c) The absolute maximum of g is _____ at $x =$______.

2d) The absolute minimum of g is _____ at $x =$______.

3.



Graph of $h(x)$

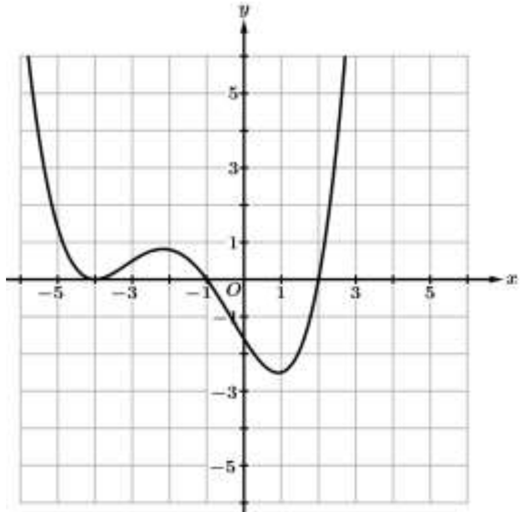
The graph of h, shown above, has domain $-5 \leq x < \infty$. Use the graph of h to answer the following, or write "None"

3a) h has a local minimum at $x =$_________.

3b) h has a local maximum at $x =$_________.

3c) The absolute maximum of h is _____ at $x =$______.

3d) The absolute minimum of h is _____ at $x =$______.



Graph of $k(x)$

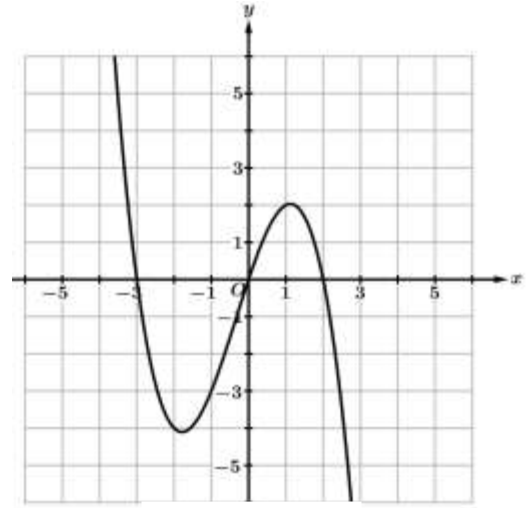
4. The graph of the polynomial function k is shown above. Which of the following could be an expression for k?

(A) $-\dfrac{1}{20}(x+4)^2(x+1)(x-2)$

(B) $\dfrac{1}{20}(x+4)^2(x+1)(x-2)$

(C) $\dfrac{1}{20}(x-4)^2(x-1)(x+2)$

(D) $\dfrac{1}{20}(x+4)(x+1)(x-2)$



Graph of $p(x)$

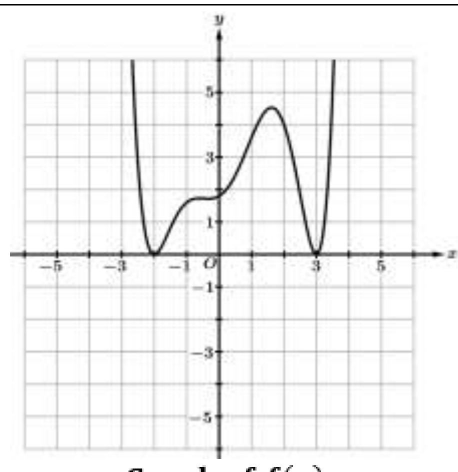
5. The graph of the polynomial function p is shown above. Which of the following could be an expression for p?

(A) $\dfrac{1}{2}(x+3)(x-2)$

(B) $\dfrac{1}{2}x(x+3)(x-2)$

(C) $-\dfrac{1}{2}x(x+3)(x-2)$

(D) $-\dfrac{1}{2}x^2(x+3)(x-2)$



Graph of $f(x)$

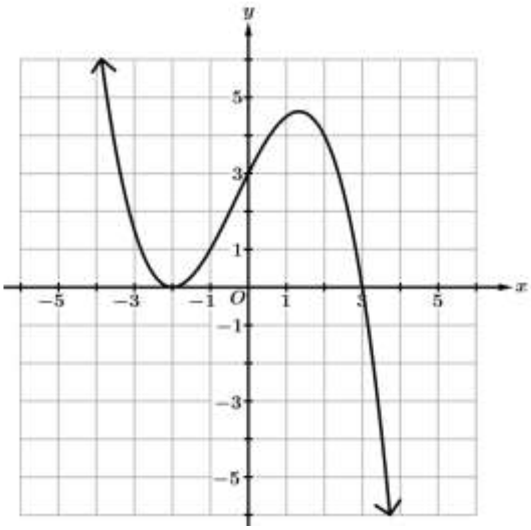
6. The graph of the polynomial function f is shown above. Which of the following could be the equation for f?

(A) $f(x)=\dfrac{1}{20}(x+2)(x-3)$

(B) $f(x)=\dfrac{1}{20}(x-2)^2(x+3)^2$

(C) $f(x)=-\dfrac{1}{20}(x+2)^2(x-3)^2$

(D) $f(x)=\dfrac{1}{20}(x+2)^2(x-3)^2(x^2+1)$

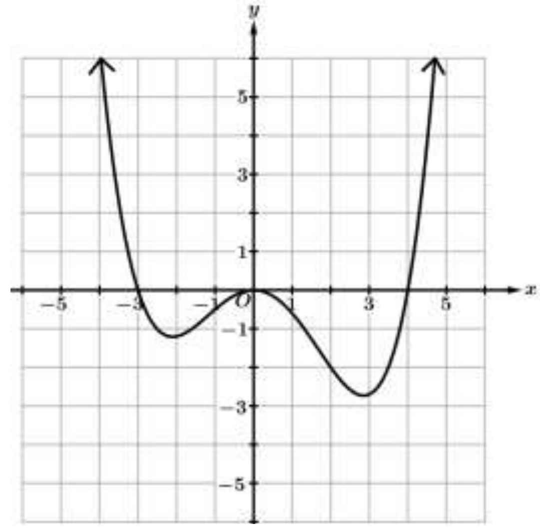


Graph of $g(x)$

7. The graph of the polynomial function g is shown above. Use the graph to solve the following. Write your answers in interval notation.

7a) Find where $g(x) > 0$.

7b) Find where $g(x) \leq 0$.



Graph of $h(x)$

8. The graph of the polynomial function h is shown above. Use the graph to solve the following. Write your answers in interval notation.

8a) Find where $h(x) \leq 0$.

8b) Find where $h(x) > 0$.

Directions: For 9 – 14, solve the following inequalities. Write your answers in interval notation.

9. $(x+4)(x-3)(x+1) \geq 0$

10. $-3(x+2)(x-1)(x-5) < 0$

11. $8(x-5)^2(x+2)(x-3) \leq 0$

12. $4x(x+5)^2(x+1)(x-6)^2 > 0$

13. $-3x^2(x+7)(x-4) \geq 0$

14. $4x^3(x+8)^2(x-5)(x-1)^2 \leq 0$

Directions: For 15 – 24, find all **real zeros** and indicate the multiplicity of each zero.

15. $f(x) = 5(x-3)^4(x+2)(x-1)$ **Zeros (w/ multiplicity):**	16. $g(x) = -2x(x+3)(x-2)^3$ **Zeros (w/ multiplicity):**
17. $y = x^2(x+2)^3(x-6)^2$ **Zeros (w/ multiplicity):**	18. $h(x) = 4x^3(x+7)^2(x-3)$ **Zeros (w/ multiplicity):**
19. $k(x) = (x^2-9)(x^2+6x+9)$ **Zeros (w/ multiplicity):**	20. $y = -2x(x^2-4)(x^2-4x+4)(x^2-2x-8)$ **Zeros (w/ multiplicity):**
21. $p(x) = (x^3-3x^2-10x)(x^2+7x+10)$ **Zeros (w/ multiplicity):**	22. $m(x) = (x^3+x^2-12x)(x^4-9x^2)$ **Zeros (w/ multiplicity):**
23. $k(x) = (2x^2+x-6)(x^2+5x+6)$ **Zeros (w/ multiplicity):**	24. $y = x^2(3x^2-7x-6)(x^2-3x)$ **Zeros (w/ multiplicity):**

$$\lim_{x\to-\infty} f(x) = -\infty \quad \text{and} \quad \lim_{x\to\infty} f(x) = -\infty$$

25. The polynomial function f has end behavior described above. Which of the following functions could be $f(x)$?

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

(B) $f(x) = 2x^3 - 4x^2 + 3x + 7$

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

(D) $f(x) = -2x^3 - 4x^2 + 3x + 7$

$$\lim_{x\to-\infty} g(x) = \infty \quad \text{and} \quad \lim_{x\to\infty} g(x) = -\infty$$

26. The polynomial function g has end behavior described above. Which of the following functions could be $g(x)$?

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

(B) $g(x) = 2x^3 - 4x^2 + 3x + 7$

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

(D) $g(x) = -2x^3 - 4x^2 + 3x + 7$

$$\lim_{x\to-\infty} h(x) = -\infty \quad \text{and} \quad \lim_{x\to\infty} h(x) = \infty$$

27. The polynomial function h has end behavior described above. Which of the following functions could be $h(x)$?

(A) $h(x) = -2x(x-3)^2(x+2)^5$

(B) $h(x) = 2x(x-3)^2(x+2)^5$

(C) $h(x) = -2x^2(x-3)^2(x+2)^5$

(D) $h(x) = 2x^2(x-3)^2(x+2)^5$

28. Let $k(x) = 4x + 3x^2 + 6x^3 - 7x^4 + 6$. Which of the following pairs of statements about the end behavior of k is correct?

(A) $\lim_{x\to-\infty} k(x) = -\infty$ and $\lim_{x\to\infty} k(x) = -\infty$

(B) $\lim_{x\to-\infty} k(x) = -\infty$ and $\lim_{x\to\infty} k(x) = \infty$

(C) $\lim_{x\to-\infty} k(x) = \infty$ and $\lim_{x\to\infty} k(x) = -\infty$

(D) $\lim_{x\to-\infty} k(x) = \infty$ and $\lim_{x\to\infty} k(x) = \infty$

x	$f(x)$
1	-2
3	-1
5	3
7	10
9	20

29. The table shows values for a function f at selected values of x. Which of the following claim and explanation statements best fit these data?

(A) f is best modeled by a linear function because the rate of change over consecutive equal-length input-value intervals is constant.

(B) f is best modeled by a linear function because the rate of change over consecutive equal-length input-value intervals is linear.

(C) f is best modeled by a quadratic function because the rate of change over consecutive equal-length input-value intervals is constant.

(D) f is best modeled by a quadratic function because the rate of change over consecutive equal-length input-value intervals is linear.

x	$h(x)$
0	100
10	60
20	40
30	30
40	25

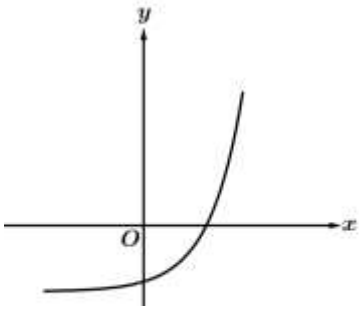
30. The table shows values for a function h at selected values of x. Which of the following claim and explanation statements best fit these data?

(A) The graph of h could be concave up because the average rates of change over consecutive equal-length input-value intervals are positive.

(B) The graph of h could be concave up because the average rates of change over consecutive equal-length input-value intervals are increasing.

(C) The graph of h could be concave down because the average rates of change over consecutive equal-length input-value intervals are negative.

(D) The graph of h could be concave down because the average rates of change over consecutive equal-length input-value intervals are decreasing.



Graph of $f(x)$

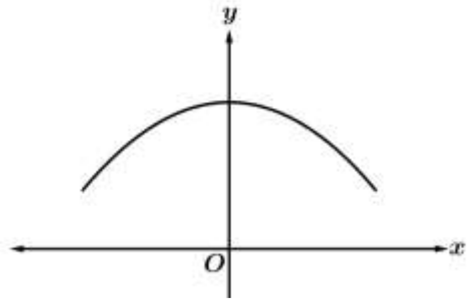
31. The graph of f is shown above. Which of the following statements about f is correct?

(A) The function f is positive and increasing.

(B) The rate of change of f is positive and increasing.

(C) The function f is negative and increasing.

(D) The rate of change of f is negative and increasing.



Graph of $g(x)$

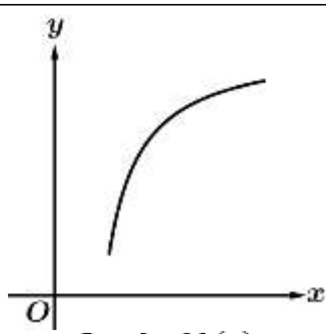
32. The graph of g is shown above. Which of the following statements about g is correct?

(A) g is an even function and the rate of change of g is increasing.

(B) g is an even function and the rate of change of g is decreasing.

(C) g is an odd function and the rate of change of g is increasing.

(D) g is an odd function and the rate of change of g is decreasing.



Graph of $h(x)$

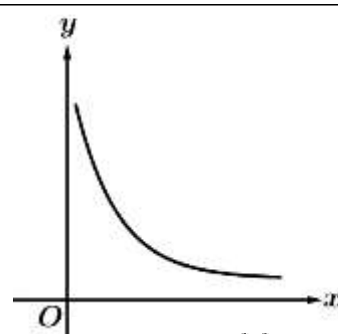
33. The graph of h is shown above. Which of the following statements about h is correct?

(A) h is increasing and the rate of change of h is increasing.

(B) h is increasing and the rate of change of h is decreasing.

(C) h is decreasing and the rate of change of h is increasing.

(D) h is decreasing and the rate of change of h is decreasing.



Graph of $k(x)$

34. The graph of k is shown above. Which of the following statements about k is correct?

(A) k is increasing at an increasing rate.

(B) k is increasing at a decreasing rate.

(C) k is decreasing at an increasing rate.

(D) k is decreasing at a decreasing rate.