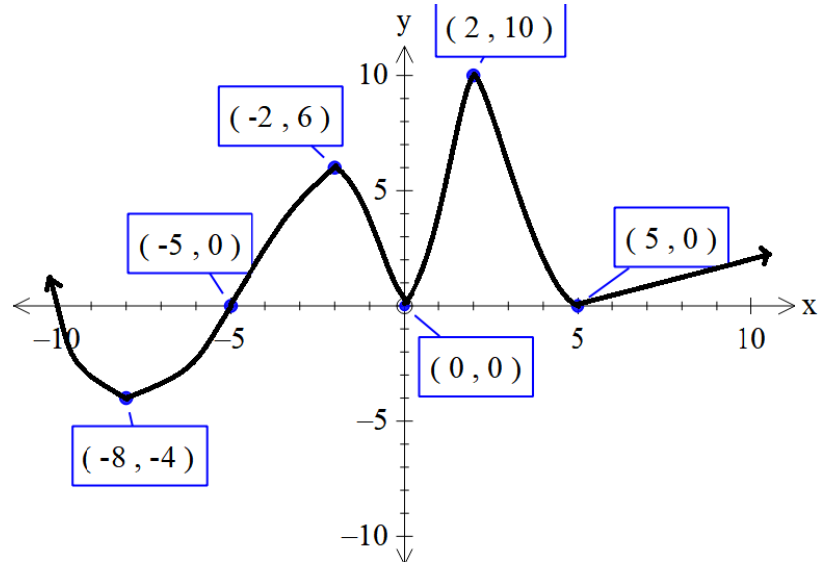


Name _____ Date _____ Period _____

In problems 1-10, use the graph of the function f given.

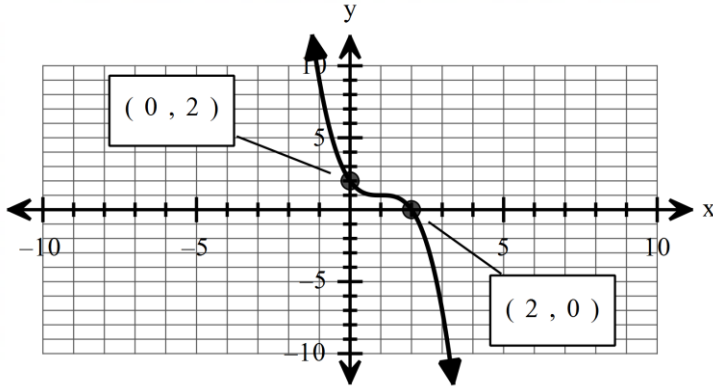
1. Is f increasing on the interval $(-8, -2)$?
2. Is f decreasing on the interval $(-8, -4)$?
3. Is f increasing on the interval $(2, 10)$?
4. Is f decreasing on the interval $(2, 5)$?
5. List the interval(s) on which f is increasing.



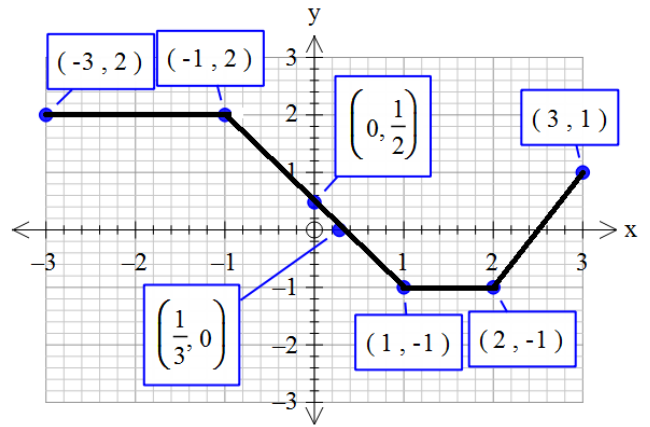
6. List the interval(s) on which f is decreasing.
7. Is there a local maximum value at $x = 2$? If yes, what is it?
8. Is there a local maximum value at $x = 5$? If yes, what is it?
9. List the numbers (the x -values) at which f has a local maximum. What are the local maximum values?
10. List the numbers (the x -values) at which f has a local minimum. What are the local minimum values?

In problems 11-19, use the following graphs.

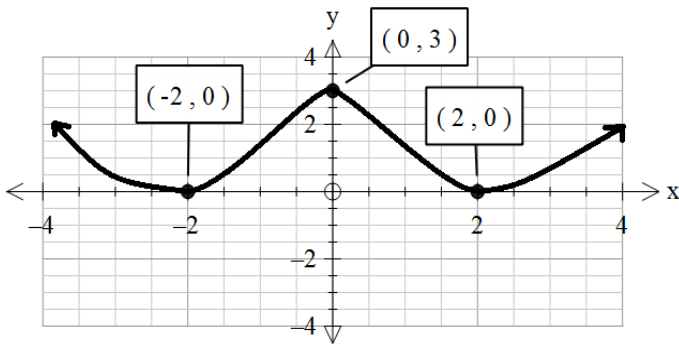
a)



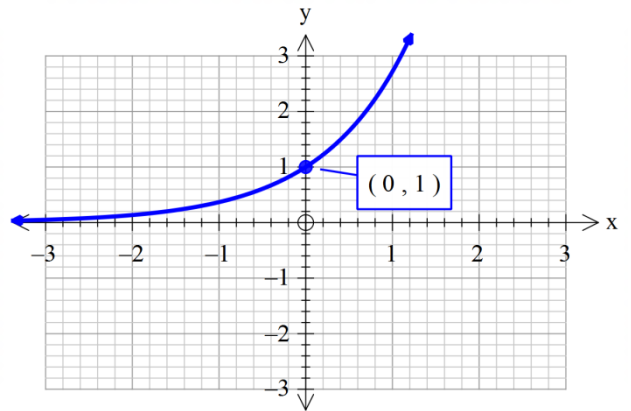
b)



c)



d)



11. Find the domain of graphs a, b, c, and d.

a)

b)

c)

d)

12. Find the range of graphs a, b, c, and d.

a)

b)

c)

d)

13. Find the x-intercepts of graphs c and d.

c)

d)

14. Find the y -intercepts of graphs a and b.

a)

b)

15. State the positive interval(s) for graphs a, b, c, and d.

a)

b)

c)

d)

16. State the negative interval(s) for graphs a, b, c, and d.

a)

b)

c)

d)

17. State the increasing interval(s) for graphs a, b, c, and d.

a)

b)

c)

d)

18. State the decreasing interval(s) for graphs a, b, c, and d.

a)

b)

c)

d)

19. State the constant interval(s) for graphs a, b, c, and d.

a)

b)

c)

d)

Determine algebraically whether each function is even, odd or neither. Show work!

20. $f(x) = 4x^3$

21. $f(x) = -3x^2 - 5$

22. $f(x) = 3x^3 + 5$

23. $f(x) = \sqrt[3]{x}$

24. $f(x) = x + |x|$

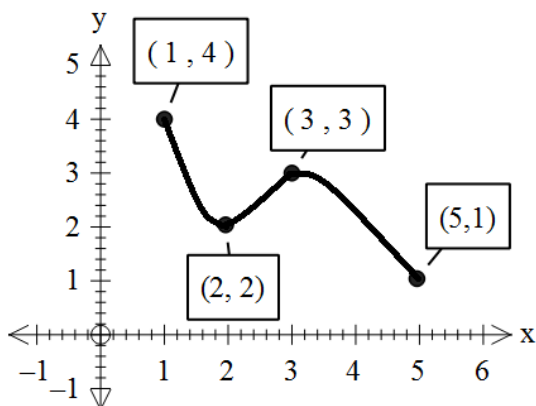
25. $f(x) = \frac{1}{x^2}$

For problems 26-28, for each graph of a function $y = f(x)$,

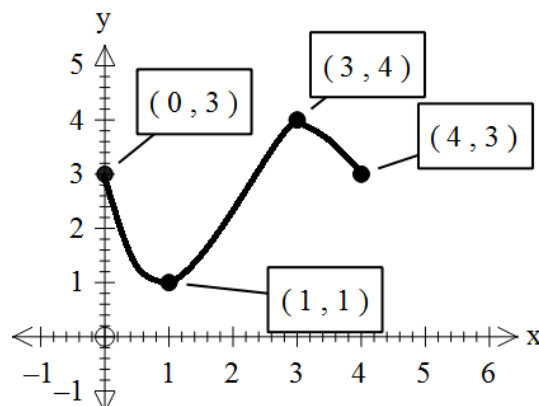
a) find the relative maximum(s) and the relative minimum(s).

b) find the absolute maximum and the absolute minimum, if they exist.

26.



27.



Relative maximum(s) value(s):

Relative minimum(s) value(s):

Absolute maximum value(s):

Absolute minimum value(s):

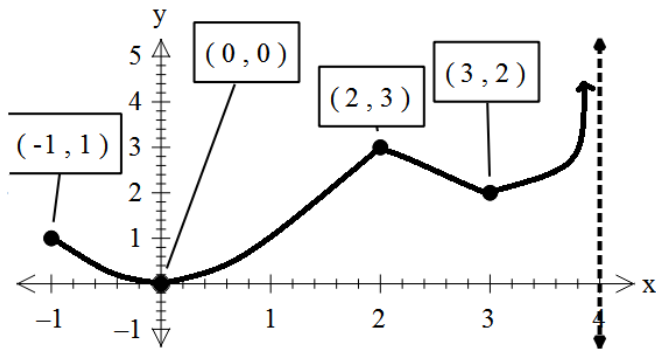
Relative maximum(s) point(s):

Relative minimum(s) point(s):

Absolute maximum point(s):

Absolute minimum point(s):

28.



Relative maximum(s) value(s):

Relative minimum(s) value(s):

Absolute maximum value(s):

Absolute minimum value(s):

Find the average rate of change for each function in the intervals given.

29. $f(x) = -2x^2 + 4$

a) $[0, 2]$

b) $[1, 3]$

c) $[1, 4]$

30. $f(x) = -x^3 + 1$

a) $[0, 2]$

b) $[1, 3]$

c) $[-1, 1]$

31. $f(x) = x^2 - 2x + 3$

a) $[0, 2]$

b) $[2, 5]$

c) $[-1, 1]$

32. A strain of E-coli Beu 397-recA441 is placed into a nutrient broth at 30°C and allowed to grow. The data shown in the table are collected. The population is measured in grams and the time in hours. Since the population P depends on time t and each input corresponds to exactly one output, we can say that population is a function of time; so $P(t)$ represents the population at time t .

Time (hours), t	Population (grams), P
0	0.09
2.5	0.18
3.5	0.26
4.5	0.35
6	0.50

a) Find the average rate of change of the population from 0 to 2.5 hours.

b) Find the average rate of change of the population from 4.5 to 6 hours.

c) What is happening to the average rate of change as time passes?

Review

Factor:

33. $3x^4 - 9x^3 - 12x^2$

34. $25x^2 - 36$

35. $x^3 - 64$

Simplify.

36. $x^2(x^4)$

37. $2x^4 + 3x^4$

38. $x \cdot x$

37. $x + x$

40. $3x^5 \cdot 5x^7$

41. x^{-2}

42. $(x^5)^4$

43. $\frac{3x^7}{6x^4}$