

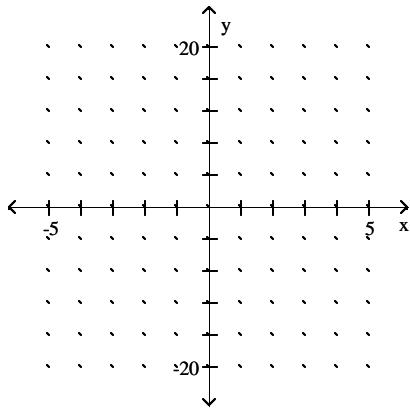
Math 160 - Some practice for Exam 1 - Chapter R and sections 1.1-1.4

Name _____

**ALSO, do the homework assigned from the book for the different sections covered.
Go over the study guide to see all the topics covered.**

**AS you do the problems on this paper, think on WHAT OTHER TYPES of questions could apply to the same problem.
Graph the function.**

$$1) f(x) = \begin{cases} 5x + 2, & \text{for } x < -2, \\ x, & \text{for } -2 = x = 3, \\ 4x - 1, & \text{for } x > 3 \end{cases}$$



Solve the problem.

2) The cost of renting a branch chipping machine is a function of the hours it is rented and is defined by

$$C(x) = \begin{cases} \$150, & \text{for } x = 4, \\ \$150 + 30x, & \text{for } x > 4, \end{cases}$$

x is the number of hours rented. If the rental cost was \$435.00, how many hours was the machine rented?

State the domain of the given function.

$$3) f(x) = \frac{8}{4x - 9}$$

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

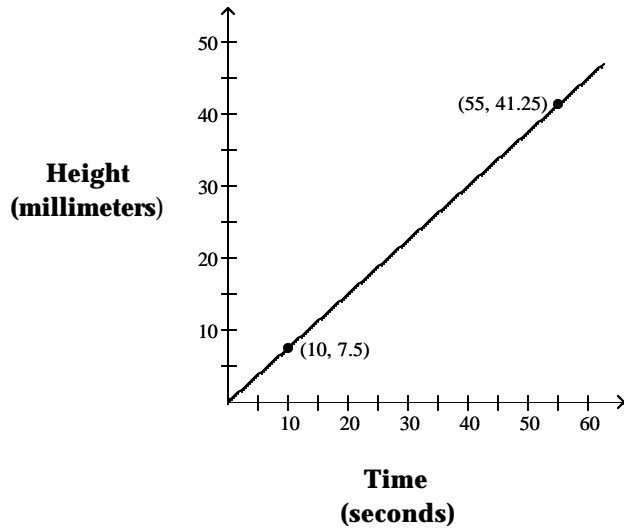
$$5) f(x) = |7x + 9|$$

$$6) f(x) = \sqrt{-x - 7}$$

$$7) f(x) = \frac{(x + 8)(x - 8)}{x^2 - 64}$$

Use the graph to find the average rate of change.

8) **The Height of Sand in an Hourglass**



Solve the problem.

9) A shoe company will make a new type of shoe. The fixed cost for the production will be \$24,000. The variable cost will be \$30 per pair of shoes. The shoes will sell for \$109 for each pair. How many pairs of shoes will have to be sold for the company to break even on this new line of shoes?

10) A construction company uses the function $S(t) = 22,000 - 2000t$ to determine the salvage value $S(t)$ of their trucks t years after it is purchased. What was the initial value of the truck and how long until it depreciates completely?

Convert to an expression with a rational exponent.

11) $\frac{1}{\sqrt{s6}}$

12) $\frac{2}{\sqrt{t11}}$

Convert to an expression using radical notation.

13) $r^{-3/13}$

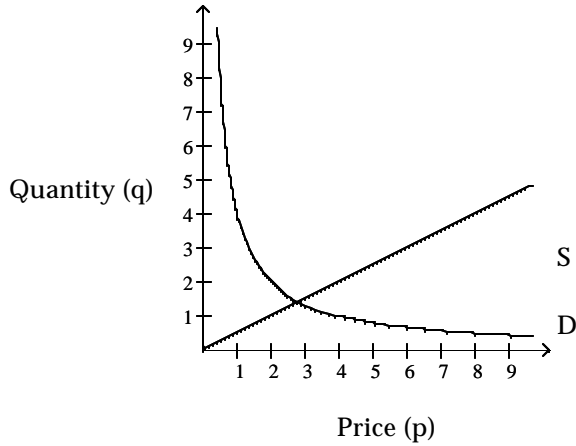
14) $(y^2 - 5)^{1/4}$

Convert to an expression with a rational exponent.

15) $\sqrt[6]{c8}$

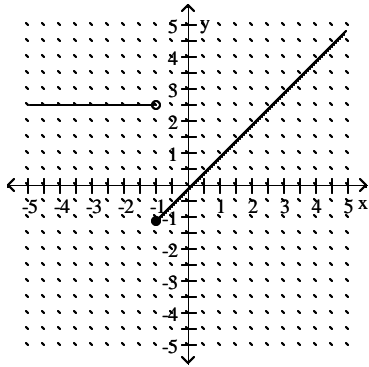
Find the equilibrium point for the supply and demand curves. Round answers to two decimal places.

$$16) D(p) = \frac{4}{p}, S(p) = \frac{p}{2}$$



Use the graph to answer the question.

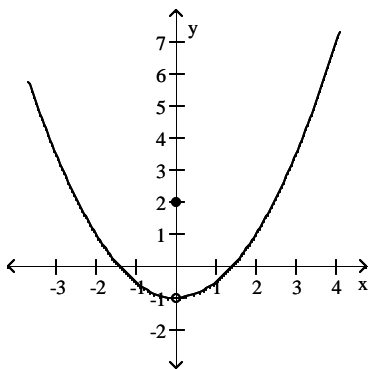
17) Is f continuous at $x = -1$?



Determine the continuity of the function at the given points.

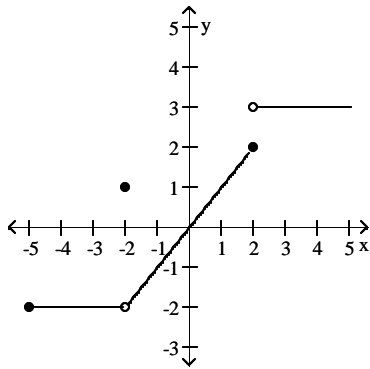
$$18) f(x) = \begin{cases} 2, & \text{for } x = 0, \\ \frac{1}{2}x^2 - 1, & \text{for } x \neq 0 \end{cases}$$

at $x = 0$ and $x = -1$



Use the graph to determine whether each statement is true or false.

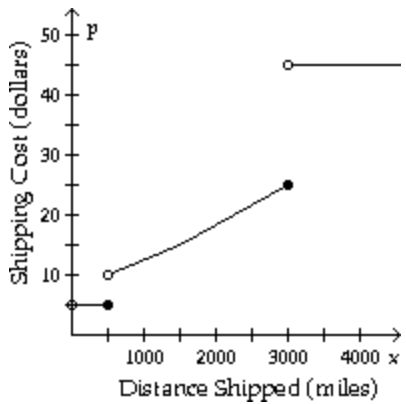
19) $\lim_{x \rightarrow -2} f(x)$ exists.



Solve the problem.

20) Suppose that the cost, p , of shipping a 3-pound parcel depends on the distance shipped, x , according to the function $p(x)$ depicted in the graph. Find each limit, if it exists:

$\lim_{x \rightarrow 100} p(x)$, $\lim_{x \rightarrow 500} p(x)$, $\lim_{x \rightarrow 1500} p(x)$



Find the limit, if it exists.

21) $\lim_{h \rightarrow 0} (-3x - 9h)$

22) $\lim_{x \rightarrow 3} \sqrt{x^2 + 10x + 25}$

23) $\lim_{x \rightarrow 0} (\sqrt{x} - 2)$

24) $\lim_{x \rightarrow 14} \frac{1}{x - 14}$

$$25) \lim_{x \rightarrow 0} \frac{x^3 - 6x + 8}{x - 2}$$

$$26) \lim_{x \rightarrow -7} \frac{x^2 + 8x + 7}{x + 7}$$

Evaluate or determine that the limit does not exist for each of the limits (a) $\lim_{x \rightarrow d^-} f(x)$, (b) $\lim_{x \rightarrow d^+} f(x)$, and (c) $\lim_{x \rightarrow d} f(x)$

for the given function f and number d .

27)

$$f(x) = \begin{cases} 4x - 8, & \text{for } x < 1, \\ 1, & \text{for } x = 1, \\ 4x - 11, & \text{for } x > 1 \end{cases}$$

$$d = 1$$

28)

$$f(x) = \begin{cases} -5x - 1, & \text{for } x = 1, \\ -4x - 2, & \text{for } x > 1 \end{cases}$$

$$d = 1$$

Find the limit by using the TABLE and TRACE features of your graphing calculator.

$$29) \lim_{x \rightarrow 16} \frac{\sqrt{x} - 4}{x - 16}$$

$$30) \lim_{x \rightarrow 0} \frac{\sqrt{4 - x} - 2}{x}$$

Answer the question.

31) Decide whether the function $f(x) = x^5 + 4x - 4$ is continuous for all x , and provide a short statement supporting your conclusion.

32) What conditions, when present, are sufficient to conclude that a function $f(x)$ is continuous at $x = a$?

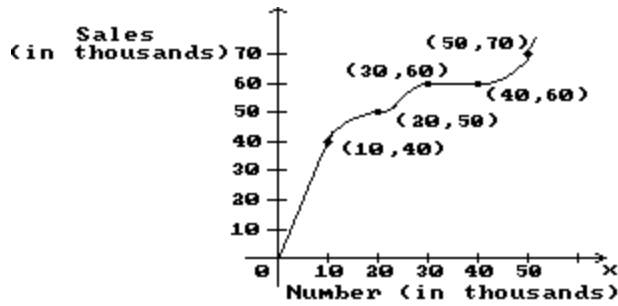
33) Given $f(x) = x + 2$ and $g(x) = x - 9$, where is the function $f(x)/g(x)$ continuous?

Find the average rate of change for the function over the given interval.

$$34) y = \frac{3}{x + 2} \text{ between } x = 1 \text{ and } x = 4$$

Solve the problem.

35) The graph shows the total sales in thousands of dollars from the distribution of x thousand catalogs. Find the average rate of change of sales with respect to the number of catalogs distributed for the change in x .



10 to 20

Find the derivative of the function and evaluate the derivative at the given x -value.

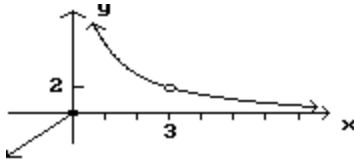
36) $f(x) = x^2 + 11x - 15$ at $x = 1$

Find an equation for the line tangent to the graph of the given function at the indicated point.

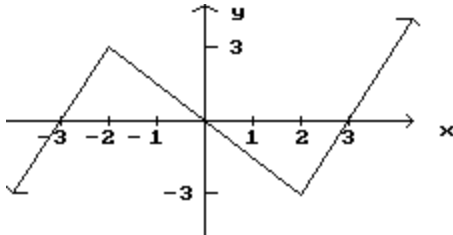
37) $f(x) = x^2 - x$ at $(4, 12)$

List the x -values in the graph at which the function is not differentiable.

38)



39)



40) Classify as true or false. EXPLAIN or give examples to justify your answer.

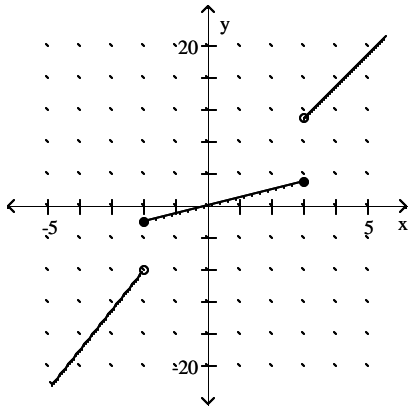
a) If a function is continuous at $x = a$, then it is differentiable at $x = a$

b) If a function is differentiable at $x = a$, then it is continuous at $x = a$.

Answer Key

Testname: EXAM1-REVIEW

1)



2) 9.5 hours

3) $\left(-8, \frac{9}{4}\right) ? \left(\frac{9}{4}, 8\right)$

4) $(-8, 8)$

5) $(-8, 8)$

6) $(-8, -7]$

7) $(-8, -8) ? (-8, 8) ? (8, 8)$

8) .75 mm per second

9) 304 pairs

10) \$22,000; 11 years

11) s^{-3}

12) $2t - 11/2$

13) $\frac{1}{\sqrt[3]{13r^3}}$

14) $\sqrt[4]{y^2 - 5}$

15) $c^{4/3}$

16) (2.83, 1.41)

17) No

18) The function f is continuous at $x = -1$ but not at $x = 0$.

19) True

20) 5; does not exist; 15

21) $-3x$

22) 8

23) -2

24) Does not exist

25) -4

26) -6

27) (a) -4

(b) -7

(c) Does not exist

28) (a) -6

(b) -6

(c) -6

Answer Key

Testname: EXAM1-REVIEW

29) $\frac{1}{8}$

30) $-\frac{1}{4}$

31) Yes, polynomial functions are continuous; there are no breaks in the graph of a polynomial function.

32) $f(a)$ exists, the limit of $f(x)$ as $x \rightarrow a$ exists, and the limit of $f(x)$ as $x \rightarrow a$ is $f(a)$.

33) The function $f(x)/g(x)$ is continuous for all x except $x = 9$.

34) $-\frac{1}{6}$

35) 1

36) $f'(x) = 2x + 11$; $f'(1) = 13$

37) $y = 7x - 16$

38) $x = 0$, $x = 3$

39) $x = -2$, $x = 2$

40)