

Practice Questions for MA 15300 Test 1



Open the bookmark panel by selecting the Bookmarks icon  along the side margin to easier navigation.

1) True or False:

Given that the point (5, 8) is on the graph of f is enough information to find the value of $f(5)$.

2) Tuition cost T (in dollars) for part-time students at a college is given by $T = 300 + 200C$, where C represents the number of credits taken.

a) Find the tuition cost for six credits.

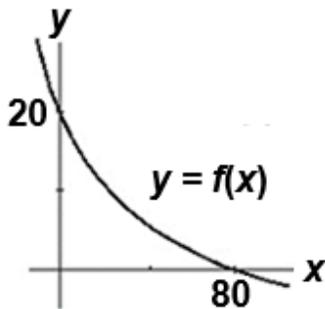
b) Find the tuition cost for six credits.

Taking six credits costs \$_____

c) How many credits were taken if the tuition was \$2,100?

\$2,100 is the cost of taking _____ credits.

3) Suppose $y = f(x)$ is given by the graph below. Use the graph to find complete the blanks.



a) $f(0) = \underline{\hspace{2cm}}$

b) $f^{-1}(\underline{\hspace{2cm}}) = 0$

c) $f^{-1}(0) = \underline{\hspace{2cm}}$

d) $f(\underline{\hspace{2cm}}) = 0$

4) The table gives the amount of garbage, G , in tons, produced in a country in year t , so $G = f(t)$ since 1950.

t , years since 1950	G , tons of garbage
30	30
40	35
50	40
60	45

a) Find $f(40)$ and interpret.

b) Solve $f(t) = 40$ for t and interpret.

c) Find the average rate of change of the function f from 1980 to 1990. **Report units in your answer.**

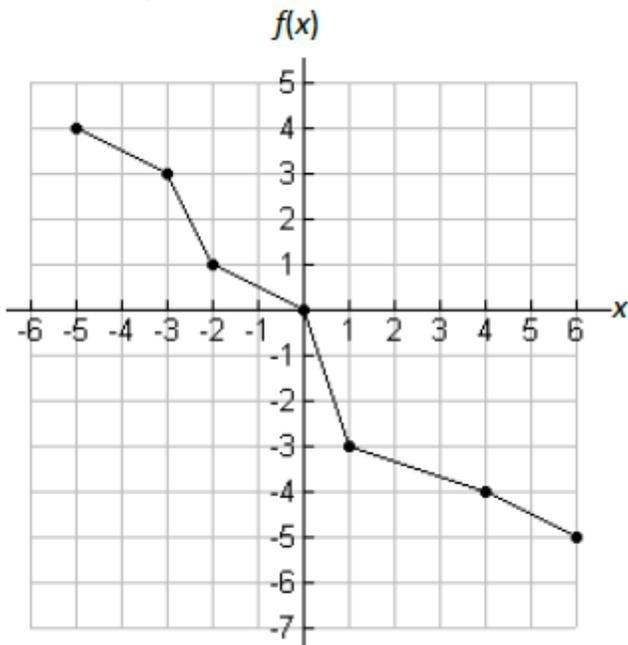
d) Find a formula for $f(t)$ assuming the garbage increases at a steady rate.

e) Interpret the slope of your formula in practical terms. Don't write RISE over RUN.

f) Interpret the y -intercept of your formula in practical terms.

g) Predict the amount of garbage in the year 2050, assuming this trend continues.

- 5) In 2006, the population of a town was 15,423 and growing by 200 people per year. Find a formula for P , the town's population, in terms of t , the number of years since 2006.
- 6) Explore the graph below and determine two intervals on which the average rate of change is the same.



Complete the blanks:

The average rate of change from $x = \underline{\hspace{2cm}}$ to $x = \underline{\hspace{2cm}}$ is the same value as the average rate of change $x = \underline{\hspace{2cm}}$ to $x = \underline{\hspace{2cm}}$.

7) $f(x) = \frac{4x}{x^2+4}$. Evaluate $f(-1)$.

8) $f(x) = \sqrt{16x + 4}$

- Evaluate $f(0)$.
- Solve the equation $f(x) = 0$. Show work using algebra.
- Sketch a graph of the function and label the points that correspond to what you found in a) and b)
- Report the domain and range.

9) Find the domain and range of each of these functions.

a) $f(x) = \frac{2}{x-3}$

b) $g(x) = \sqrt{x+3}$

c) $h(x) = \sqrt{3-x}$

d) $p(x) = \sqrt{x-3}$

e) $q(x) = \frac{2}{(x-3)^2}$

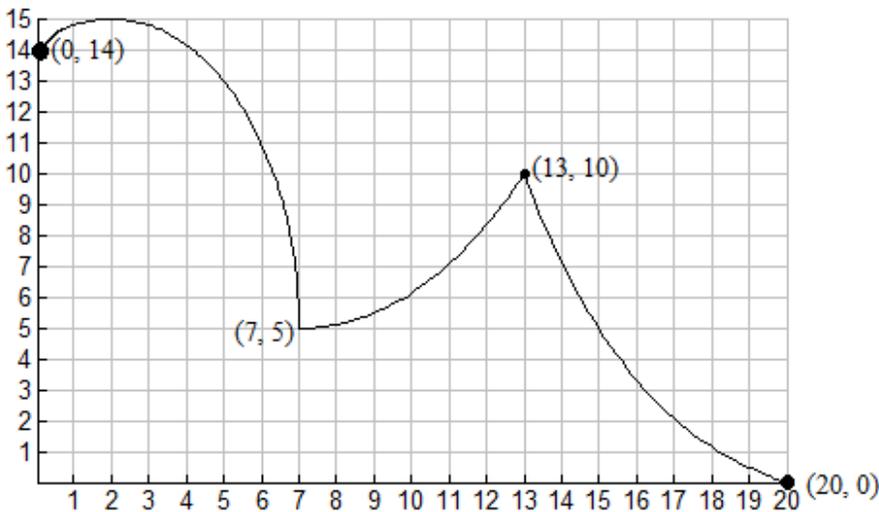
10) The entire graph of $g(x)$ is shown.



Provide answers which are whole numbers.

- What is the domain of g ?
- What is the range of g ?
- Report all values of x which solve the equation $g(x) = 8$.
- Solve $g(x) \geq 8$. Express your answer using inequality or interval notation.
- Solve $g(x) < 8$. Express your answer using inequality or interval notation.
- For what values of x is the function increasing? $\underline{\quad} < x < \underline{\quad}$

11) The entire graph of $y = h(x)$ is shown.



Report on which open intervals of x is $h(x)$ the following.

- concave down? $\underline{\quad} < x < \underline{\quad}$
- increasing and concave down? $\underline{\quad} < x < \underline{\quad}$
- increasing and concave up? $\underline{\quad} < x < \underline{\quad}$
- decreasing and concave down? $\underline{\quad} < x < \underline{\quad}$
- decreasing and concave up? $\underline{\quad} < x < \underline{\quad}$

12) You need to rent a car and compare the charges of three different companies.

- Company A charges 5 cents per mile plus 33 dollars per day.
- Company B charges 44 dollars per day with no mileage charge.
- Company C charges 15 cents per mile plus 31 dollars per day.

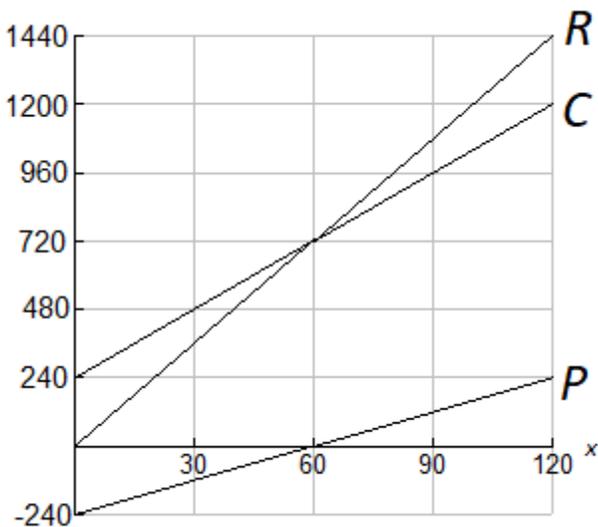
- Find formulas for the cost of driving cars rented from companies A, B, and C, in terms of x , the distance driven in miles in one day.
- Graph the costs for each company for $0 \leq x \leq 500$. Put all three graphs on the same set of axes. Use this graph to find under what circumstances company A is the cheapest. Find under what circumstances company B is the cheapest. Find under what circumstances company C is the cheapest.

13) You start 122 miles east of Pittsburgh and drive **west** at a constant speed of 43 miles per hour toward the town. (Assume that the road is straight and permits you to do this.) Find a formula for d , your distance east of Pittsburgh as a function of t , the number of hours of travel. (This model will be valid for values of d between 0 and 122 miles east of the town.)

14) In a college meal plan you pay a membership fee; then all your meals are at a fixed price per meal. Suppose 30 meals cost \$265 and 60 meals cost \$460.

- Write a formula for the cost of a meal plan, C , in terms of the number of meals, n .
- What is the price per meal?
- What is the membership fee?

15) The revenue $R(x)$, cost $C(x)$, and profit $P(x)$ for a product are graphed in the figure below, where x is the quantity produced and sold. Note: $P(x) = R(x) - C(x)$.



- Determine the number of items that must be sold to break even, i.e., revenue is equal to costs. The break-even quantity is _____ units sold.
- Find the formulas of the three functions revenue $R(x)$, cost $C(x)$, and profit $P(x)$.

16) Given $f(x) = \frac{x}{x+8}$ and $g(x) = 4x - 3$, find $f(g(x))$ and simplify. Select **one**.

A. $f(g(x)) = \frac{4x}{x+8} - 3$

B. $f(g(x)) = \frac{4x-3}{4x+11}$

C. $f(g(x)) = \frac{4x-3}{4x+5}$

D. $f(g(x)) = \frac{-3}{11}$

E. $f(g(x)) = \frac{-3}{5}$

F. $f(g(x)) = \frac{x}{x+8} \cdot (4x - 3)$

G. None of these.

17) Given $f(x) = \frac{x}{\sqrt{x+2}}$ and $g(x) = x^2 - 1$, find $f(g(x))$ and simplify. Select **one**.

A. $f(g(x)) = \frac{x}{\sqrt{x+2}} - 1$

B. $f(g(x)) = \frac{x^2}{x+2} - 1$

C. $f(g(x)) = \frac{x^2-1}{\sqrt{x^2+3}}$

D. $f(g(x)) = \frac{x^2-1}{x+1}$

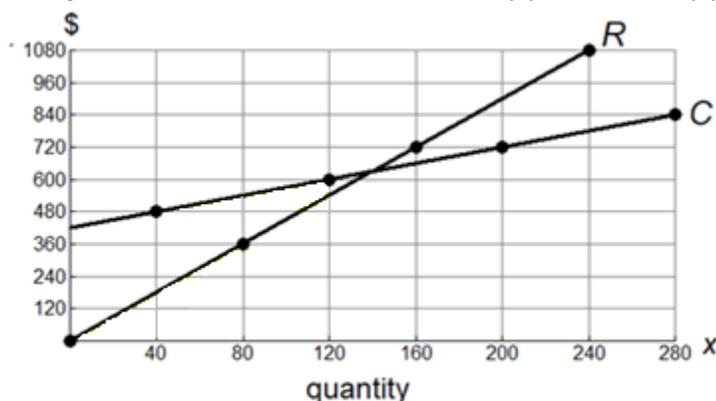
E. $f(g(x)) = \frac{x^2-1}{\sqrt{x^2+1}}$

F. $f(g(x)) = x - 1$

G. $f(g(x)) = -1$

H. None of these.

18) The graph below shows the revenue $R(x)$ and cost $C(x)$ functions for x units produced and sold.



- Find and interpret the slope of R . Then give its formula.
- Find and interpret the slope of C . Then give its formula.
- Find and interpret the slope of the profit function P . Then give its formula. Hint: $P = R - C$.
- Write and solve an equation to find the break-even quantity.

19) Scoop Dogg runs an Ice Cream Parlor in a small town in Alaska.

At a price of $p = \$0.20$ per scoop, $q = 950$ scoops per day are sold.

At a price of $p = \$1.00$ per scoop, $q = 850$ scoops per day are sold. Assume linearity.

- Find a formula which gives q (quantity, in scoops) as a function of p (price, in dollars).
- Find each. Include units.
 - $f(0) = \underline{\hspace{2cm}}$
 - $f^{-1}(0) = \underline{\hspace{2cm}}$
- Interpret the meaning of your answer to part **bi**. in practical, real world terms.
- Interpret the meaning of your answer to part **bi**. in practical, real world terms.
- Use part b to complete the blanks:
 - $f^{-1}(\underline{\hspace{1cm}}) = 0$
 - $f(\underline{\hspace{1cm}}) = 0$
- Write a formula for $p = f^{-1}(q)$ which gives p in terms of q .

For a worked out key, see your Brightspace course.

Would you like more practice over specific topics?

See the Flash Cards for Sections 1.1-1.5, 2.1, 2.2, and 2.5-2.6 as well as the Just for Practice sets.

Find these in your Brightspace course in the module **Flash Cards and Just for Practice Sets**.