Department of Economics
University of Western Ontario
Mathematics for EC 2200 Required Courses

Introduction

The Self-Assessment Multiple Choice Quiz 2 (EC 2200 required courses) will help you assess and review your mathematics skills to prepare you for studying EC 2200 required courses.

You should attempt this Self-Assessment Multiple Choice Quiz 2 after completing the Self-Assessment Multiple Choice Quiz 1 and reviewing the recommended topics. Try to complete the Self-Assessment Multiple Choice Quiz 1, review of the topics and the Self-Assessment Multiple Choice Quiz 2, in maintaining the sequence, early in the semester.

This quiz does not aim to provide a complete list of examples of the math skills required to do well in the intermediate economics classes. All questions in this quiz may not be relevant for a specific course. However, this quiz should give you a good idea of where you stand, as it will provide you with a score and a recommendation for how to continue to improve your math skills.

Instructions

This test contains 35 multiple choice questions. Select the correct answer by clicking on the button to the left. After answering all questions, click the feedback box at the bottom to know how many of your answers are correct and to see the feedback.

If you do not know how to solve a question, please choose the option "**I don't know**" rather than guessing a multiple-choice answer randomly. This strategy will provide you with a more accurate self-assessment of your math skills.

Notes

We welcome comments and suggestions. Please direct any errors, confusion and (or) suggestions about this quiz to Iftekher Hossain (mhossa87@uwo.ca).

Math preliminaries (Question 1 – Question 4)

1. Find $\frac{0.4x^{-0.6}y^{0.6}}{0.6x^{0.4}y^{-0.4}}$ when $y = 6$ and $x = 2$.

a) 5

b) 4

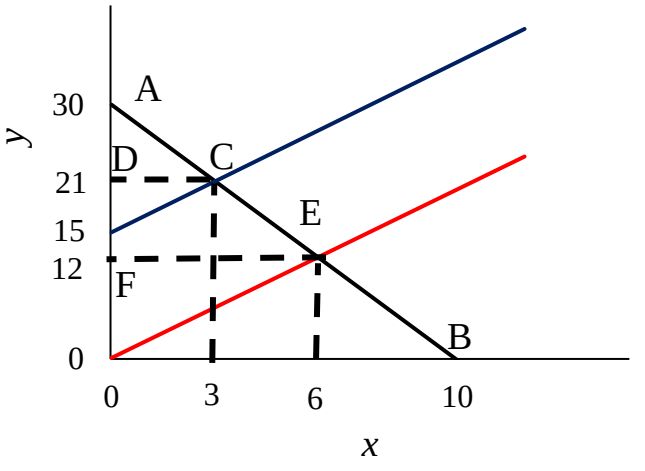
c) 3

d) 2

e) I don't know

2. Calculate the area DCEF.

Figure 1



a) 40.5

b) 50.5

c) 60.5

d) 80.5

e) I don't know

3. Consider a function $f(x)$. Suppose that the percentage change in $f(x)$ divided by the percentage change in x is -1.33. Which of the following options is true?

a) Every 1 percent increase in x causes a 1.33 percent increase in $f(x)$.

b) Every 1 percent increase in x causes a 0.33 percent decrease in $f(x)$.

c) Every 1 percent decrease in x causes a 1.33 percent increase in $f(x)$.

d) Every 1 percent decrease in x causes a 1.33 percent decrease in $f(x)$.

e) I don't know

4. Solve for x if

$$3x^2 - 12x + 30 = 0$$

a) $-1, 3$

b) $2, -4$

c) $-3, 6$

d) No real-values roots

e) I don't know

Functions and graphs (Question 5 – Question 12)

5. Which of the following expressions has the graph with slope $-1/2$?

a) $6y - 3x = 20$

b) $2y + 3x = 15$

c) $8y + 4x = 32$

d) $2y + 4x = 10$

e) I don't know

6. Which of the following statement is not true?

a) A function f is increasing if $x_1 > x_2$ implies that $f(x_1) > f(x_2)$.

b) A function f is increasing if $x_1 < x_2$ implies that $f(x_1) > f(x_2)$.

c) A function f is decreasing if $x_1 > x_2$ implies that $f(x_1) < f(x_2)$.

d) A function f is decreasing if $x_1 < x_2$ implies that $f(x_1) > f(x_2)$.

e) I don't know.

7. The straight line joining the points $(4,6)$ and $(0,7)$ goes through the point:

(a) $(12, 4)$
(b) $(14, 5)$
(c) $(0,\ 1)$
(d) $(16, 0)$
(e) I don't know

8. Evaluate the truthfulness of the following statements:

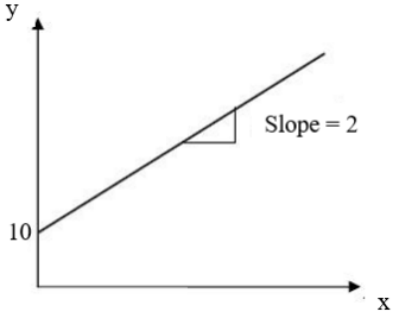
Statement 1: Polynomial functions of degree zero have linear graphs.

Statement 2: Polynomial functions of degree one have linear graphs.

a) Statement 1 is true; Statement 2 is false.
b) Statement 1 is false; Statement 2 is true.
c) Statement 1 is true; Statement 2 is true.
d) Statement 1 is false; Statement 2 is false.
e) I don't know

9. Consider the function in Figure 2. For which value of x the value of $y = 30$?

Figure 2



a) 5
b) 10
c) 15
d) 20
e) I don't know.

10. Given the function $y = f(x) = a - bx$. If $b > 1$ which of the following is true about its inverse function $x = g(y)$?

a) $g(y)$ does not exist.

b) $g(y)$ is upward sloping.

c) $g(y)$ is steeper than $f(x)$.

d) $g(y)$ is flatter than $f(x)$.

e) I don't know.

11. Originally the expression is $2y + 4x = 100$. Then the coefficient of x becomes 3 times larger, the coefficient of y becomes 2 times larger, and the constant becomes 1.5 times larger. If we draw these two expressions, where the initial expression is solved as $f(x)$ and the new expression is solved as $g(x)$:

a) $f(x)$ lies left of the $g(x)$ for all $x, f(x) \geq 0$

b) $f(x)$ lies right of the $g(x)$ for all $x, f(x) \geq 0$

c) $f(x)$ and $g(x)$ are parallel for all $x, f(x) \geq 0$

d) Initially $f(x)$ lies right of the $g(x)$, later it lies left of the $g(x)$ for all $x, f(x) \geq 0$

e) I don't know.

12. Consider the function $f(x) = 2 + 2|x|$. The slope of this function is:

a) -2 for all $x \in \mathbb{R}$

b) 2 for all $x \in \mathbb{R}$

c) undefined at (0,2)

d) undefined at (0,0)

e) I don't know.

Simultaneous equations (Question 13 – Question 17)

13. Solve the following systems of simultaneous equations. For which system the result is $(x = 2, y = -3)$?

a) $x - 2y = 8,\ 2x - 4y = 12$

b) $x - 2y = 8,\ 3x - y = 3$

c) $x + 2y = 10,\ 2x - y = 8$

d) $x - 2y = 8,\ 3x + y = 3$

e) I don't know

14. See the following system of simultaneous equations:

$$2x + ay = 14$$

$$4x + by = 40$$

Which of the following restrictions must be placed on the coefficient a & b for the existence of a unique solution?

a) $a \neq 2b$

b) $a = 2b$

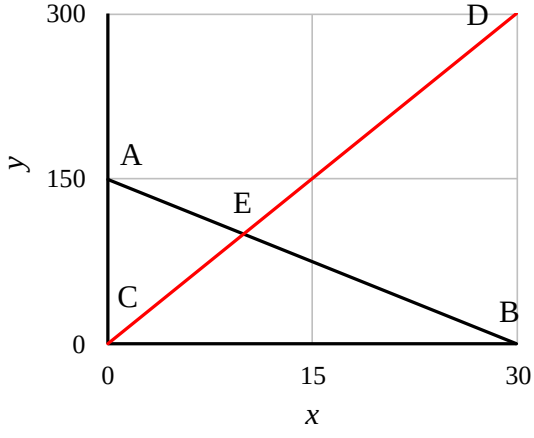
c) $b > 0$

d) $b \neq 2a$

e) I don't know

15. See Figure 3. Find the value of x at the intersection point.

Figure 3



a) 8
b) 9
c) 10
d) 11
e) I don't know.

16. Which of the following systems of simultaneous equations cannot be solved?

a) $10x + 2y = 50,\ x - 2y = 50$

b) $10x + 2y = 50,\ 20x + 4y = 100$

c) $3x - 9y = 15,\ x - 3y = 10$

d) $y = 5x,\ 5x + y = 50$

e) I don't know

17. Solve the following system of simultaneous equations.

$$y = 5x$$

$$5x + 2y = 150$$

a) $x = 10, y = 50$

b) $x = 50, y = 10$

c) $x = 10, y = 10$

d) $x = 50, y = 50$

e) I don't know

Rules of differentiation (Question 18– Question 24)

18. For each of the following functions calculate the slope of the tangent line at $x_0 = 5$. For which of the functions, the slope of the tangent line is 0.2 at x_0?

a) $f(x) = 10 - 3x$

b) $f(x) = ln\ x$

c) $f(x) = x^2 - 3x$

d) $f(x) = 1/x$

e) I don't know.

19. Find the derivative of the following function at $x = 3$.

$$f(x) = x^3 - 6x^2 + 15x + 100$$

a) 2

b) 4

c) 6

d) 8

e) I don't know

20. Find which of the following statement is true if

$$f(x) = \frac{x+1}{x-1}$$

a) The slope of the function is zero.

b) The slope of the function is $\frac{2}{(x-1)^2}$

c) The slope of the function is always negative.

d) The slope of the function is positive.

e) I don't know.

21. Find the derivative of the following natural exponential function at an arbitrary point.

$$f(x) = 5xe^{x^2+10}$$

a) $5xe^{x^2+10} + 5e^{x^2+10}$

b) $10xe^{x^2+10}$

c) $5e^{x^2+10} + 10x^2e^{x^2+10}$

d) $10e^{x^2+10}$

e) I don't know.

22. Find the derivative of the following natural logarithmic function at an arbitrary point.

$$f(x) = (2x+1)\ln(x/3)$$

a) $2x\ln(x/3)$

b) $\frac{6x+3}{x}$

c) $2\ln(x/3) + 2$

d) $2\ln(x/3) + \frac{2x+1}{x}$

e) I don't know.

23. Find $\frac{dy}{dx}$ for the following expression:

$$x^{0.6}y^{0.4} = 500$$

a) $\frac{dy}{dx} = 500x^{0.6}y^{0.4}$

b) $\frac{dy}{dx} = -\frac{2y}{3x}$

c) $\frac{dy}{dx} = \frac{0.6}{0.4}x^{0.6-1}$

d) $\frac{dy}{dx} = -\frac{3y}{2x}$

e) I don't know.

24. Consider the function $f(x) = \frac{x-1}{x+1}$. Find the derivative of its inverse function $x = g(y)$ at $x = 2$.

a) $9/2$

b) $2/9$

c) $-2/9$

d) The inverse function does not exist at $x = 2$

e) None of the above.

Uses of the derivative (Question 25 – Question 35)

25. Consider the following fact: If function $f(x)$ is not continuous at x_0, then it is not differentiable at x_0. Which of the following is true?

a) $f(x)$ is continuous at x_0 if and only if $f(x)$ is differentiable at x_0;

b) If $f(x)$ is not differentiable at x_0, then $f(x)$ is not continuous at x_0;

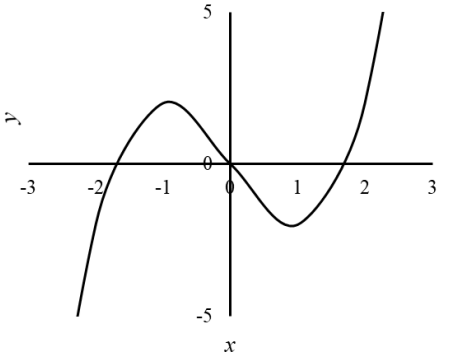
c) If $f(x)$ is differentiable at x_0, then $f(x)$ is continuous at x_0;

d) If $f(x)$ is continuous at x_0, then $f(x)$ is not differentiable at x_0;

e) I don't know

26. See Figure 4. At which point, $f'(x_0) = 0, f''(x_0) > 0$?

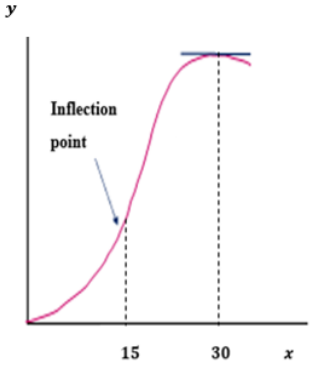
Figure 4



a) $(1, -2)$
b) $(-1,2)$
c) $(0, 0)$
d) $(2, 0)$
e) I don't know.

27. See Figure 5. Which of the following options is not true?

Figure 5



a) $f'(30) = 0$ & $f''(30) < 0$
b) $f''(0) > 0$
c) $f''(15) = 0$
d) for all $x \geq 0$, $f''(x) < 0$
e) I don't know.

28. Consider the function $f(x) = -\frac{1}{3}x^3 - 2x^2 + 480x - 150$. Find Which of the followings is not true.

a) $f'(-24) = 0$

b) $f''(-24) > 0$

c) $f''(20) < 0$

d) $f'(20) < 0$

e) I don't know.

29. Given the function $f(x) = 100\,x - 5x^2$, find the local maxima of the function.

a) 10

b) 250

c) 500

d) 20

e) I don't know

30. For the function $f(x) = x^3 - 3x$ with specified domains $D_1 = [-5, -2]$ & $D_2 = (-\infty, +\infty)$, find the global maximum and the global minimum of f on each D if they exist.

a) Min at -5, max at -2 on domain D_1; no global max or global min on D_2.

b) No global max or global min on D_1; no global max or global min on D_2.

c) Max at -5, min at -2 on domain D_1; no global max or global min on D_2.

d) No global max or min on domain D_1; global max at -1 and global min at 1 on D_2.

e) I don't know.

31. Which of the following differentiable functions has at least one point which is a local max or min?

a) $f(x) = 2x^3 - 3x^2 + 300x + 4000$

b) $f(x) = 100 - 4x$

c) $f(x) = 10 + x^5$

d) $f(x) = -\frac{1}{3}x^3 - 2x^2 + 480x$

e) I don't know.

32. Consider a function $z = \min(2x,\ y^2)$. What is the value of z when $x = 25$ and $y = 6$?

a) $z = 50$

b) $z = 25$

c) $z = 36$

d) $z = 6$

e) I don't know

33. Find the first-order derivative of the expression $6x^{0.5}y^{0.5}$ with respect to x treating y as a constant.

a) $x^{-0.5}$

b) $3x^{-0.5}$

c) $3x^{-0.5}y^{0.5}$

d) $3x^{0.5}y^{-0.5}$

e) I don't know

34. Given the expression $50x^{0.6}y^{0.4}$, find the first derivative with respect to x, treating y as a constant and denote the derivative as f_x. Then find the first derivative with respect to y, treating x as a constant and denote the derivative as f_y. Compute the ratio $\frac{f_x}{f_y}$.

a) $\frac{f_x}{f_y} = \frac{-3y}{2x}$

b) $\frac{f_x}{f_y} = \frac{3y}{2x}$

c) $\frac{f_x}{f_y} = \frac{y}{x}$

d) $\frac{f_x}{f_y} = \frac{3x}{2y}$

e) I don't know

35. Given the expression $2xy = 100$, find the first derivative with respect to x, treating y as a constant and denote the derivative as f_x. Then find the first derivative with respect to y, treating x as a constant and denote the derivative as f_y. Compute the ratio $\frac{f_x}{f_y}$ when $x = 5$ and when $x = 10$.

a) $2, 4$

b) $0.5, 2$

c) $2, 0.5$

d) $4, 2$

e) I don't know

Feedback

Please use the online version to get the feedback and for the list of correct answers.

Thank you.