

Department of Economics University of Western Ontario Mathematics for EC 2100 Required Courses

Introduction

The Self-Assessment Multiple Choice Quiz 2 (EC 2100 required courses) will help you assess and review your mathematics skills to prepare you for studying EC 2100 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 30 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

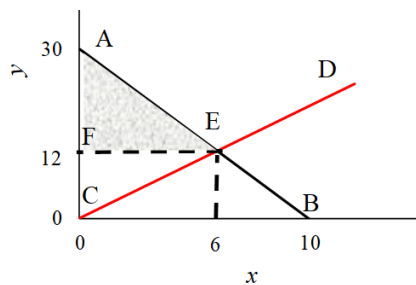
We welcome comments and suggestions. Please direct any errors, confusion and (or) suggestions about this quiz to Iftekher Hossain (mhossa87@uwo.ca). The quiz is copyrighted. No part of the quiz may be reproduced or published in any other form without the prior written permission from the Department of Economics, University of Western Ontario.

Math preliminaries (Question 1 – Question 5)

1. Simplify $\frac{0.6x^{-0.4}y^{0.4}}{0.4x^{0.6}y^{-0.6}}$

- a) $\frac{0.6x}{0.4y}$
 - b) $\frac{3y}{2x}$
 - c) $\frac{0.6y^{1.5}}{0.4x^{1.5}}$
 - d) y/x
 - e) I don't know
2. Suppose $y = f(x)$. When $x = 10$, y is 50. If the value of x increases to $x = 12$, the value of y falls to 45. Calculate the percentage change in y divided by the percentage change in x .
- a) -0.1
 - b) 0.2
 - c) -0.5
 - d) -5
 - e) I don't know
3. Calculate the area of the triangle AEF.

Figure 1



- a) 180
- b) 90
- c) 54
- d) 45
- e) I don't know

4. Solve for x if $\frac{x}{4} - 3 = \frac{x}{5} + 2$

- a) 25
- b) 80
- c) 5
- d) 100
- e) I don't know

5. Solve for x if

$$f(x) = x^2 + x - 6$$

- a) $x = 2, x = 3$
- b) $x = -3, x = 2$
- c) $x = 3, x = 0$
- d) None of above
- e) I don't know

Linear equations: functions and graphs (Question 6 – Question 12)

6. Consider the following function $y = 3.5 \text{ million} - 5000x$. Find y , when $x = 100$.

- (a) 3.0 million
- (b) 4.0 million
- (c) 2.5 million
- (d) 2.0 million
- (e) I don't know

7. Find the formula for the linear function, $f(x) = mx + c$, whose graph goes through the points (2, 3) and (4, 5).

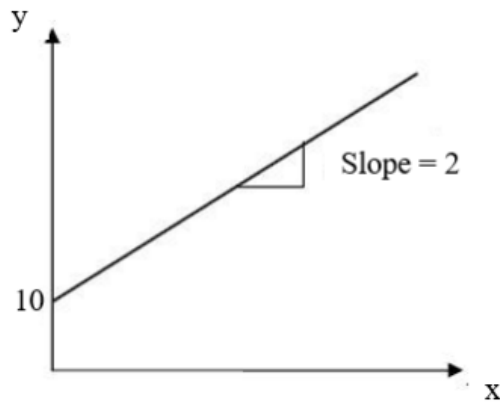
- a) $f(x) = 4x + 1$
- b) $f(x) = x + 1$
- c) $f(x) = 2x - 1$
- d) $f(x) = x$
- e) I don't know

8. Originally the expression is $2y + 5x = 100$. Then the coefficient of x becomes 4 times larger, the coefficient of y becomes 2 times larger, and the constant remains unchanged. What is the slope of the graph of the new expression?

- a) -5
- b) -10
- c) 5
- d) 10
- e) I don't know

9. Consider the function in Figure 2. What is the value of y when $x = 5$?

Figure 2



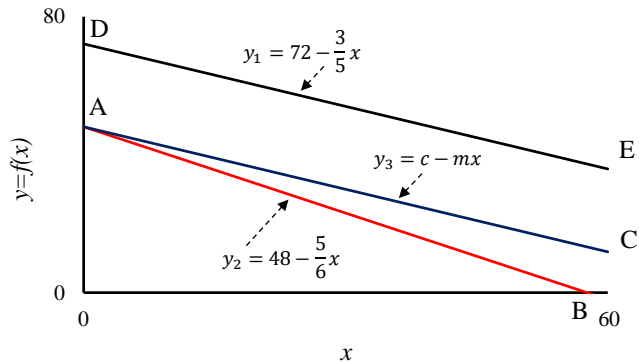
- a) 10
- b) 20
- c) 5
- d) 15
- e) I don't know.

10. Given the function $y = f(x) = 100 - 5x$, compute the slope of the inverse function $x = g(y)$.

- a) 5
- b) -0.5
- c) -0.2
- d) 0.2
- e) I don't know

11. See Figure 3.

Figure 3

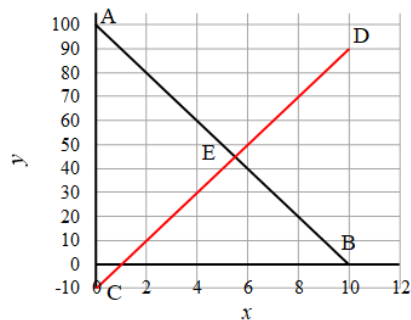


Which of the followings best describes the equation for the line AC?

- a) $y_3 = 72 - \frac{5}{6}x$
- b) $y_3 = 48 - 5x$
- c) $y_3 = 48 - 0.6x$
- d) $y_3 = 72 - 0.6x$
- e) I don't know.

12. What are the equations for Line AB and Line CD?

Figure 4



- a) $y = 100 - 10x, y = -10 + 4x$
- b) $y = 100 - 10x, y = -10 + 10x$
- c) $y = 100 - 5x, y = -10 - 4x$
- d) $y = 100 + 5x, y = -10 - 5x$
- e) I don't know

Simultaneous equations (Question 13 – Question 16)

13. Solve the following system of simultaneous equations to find the value of y .

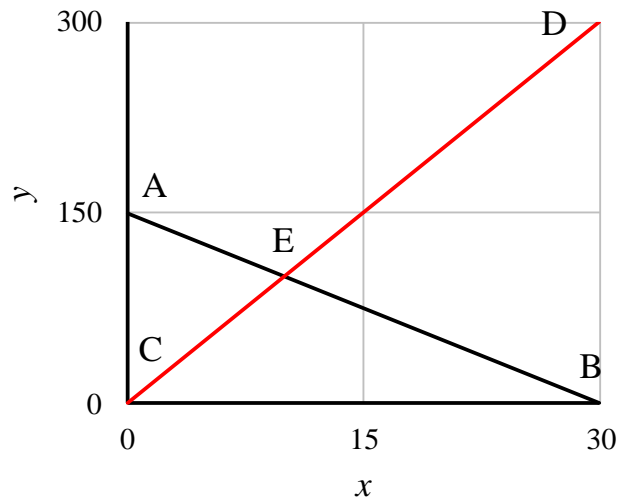
$$y = -\frac{1}{8}x + 250$$

$$y = \frac{1}{12}x + \frac{50}{3}$$

- a) 1120
- b) 90
- c) 110
- d) 110
- e) I don't know

14. See Figure 5. Find x and y at the intersection point.

Figure 5



- a) $x = 10, y = 100$
- b) $x = 5, y = 50$
- c) $x = 8, y = 80$
- d) $x = 12, y = 120$
- e) I don't know.

15. Given $z = y + x$, $y = 50 + 0.75z$, $x = 950$. Find the value of z using the method of substitution.

- a) 3000
- b) 5000
- c) 4000
- d) 6000
- e) I don't know.

16. Solve the following system of simultaneous equations to find the positive value of y .

$$xy = 144$$

$$y = 4x$$

- a) 6
- b) 12
- c) 18
- d) 24
- e) I don't know.

Derivatives and their uses (Question 17 – Question 20)

17. Find the first-order derivative of the following function at an arbitrary point:

$$y = -x^3 - 30x^2 + 360x - 500$$

- a) $-3x^2 - 60x$
- b) $-x^2 - 60x + 360$
- c) $-3x^2 - 60x + 360x - 500$
- d) $-3x^2 - 60x + 360$
- e) I don't know.

18. Find the first-order derivative of the following function at an arbitrary point:

$$f(x) = 10x^{0.6}$$

- a) $10x^{1.7}$
- b) $x^{-0.4}$
- c) $\frac{6}{x^{0.4}}$
- d) $\frac{6}{x^{0.6}}$
- e) I don't know

19. Find the first-order derivative and the second-order derivative:

$$f(x) = x^2 + 10x$$

- a) $f'(x) = 2x + 10, f''(x) = 2$
- b) $f'(x) = 2x, f''(x) = 0$
- c) $f'(x) = 2x + 10, f''(x) = 0$
- d) $f'(x) = x + 10, f''(x) = 1$
- e) I don't know

20. Find the slope of the function $f(x) = 1/x$ at $x = 1$ and $x = 2$

- a) $-1, -0.25$
- b) $-1, -4$
- c) $1, 4$
- d) $1, 0.25$
- e) I don't know

Uses of the derivative (Question 21 – Question 28)

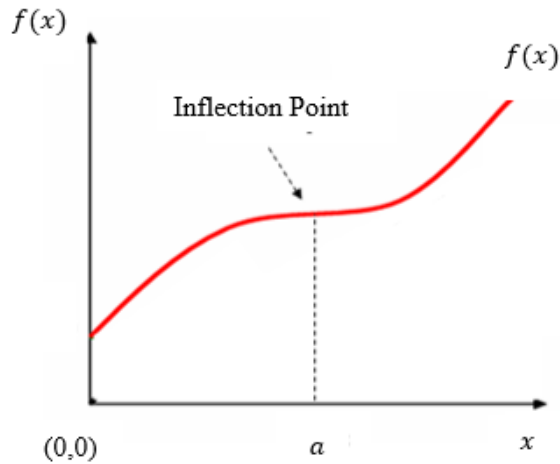
21. Is the following function concave or convex near the immediate neighborhood of $x = 20$?

$$f(x) = -x^3 - 6x^2 + 1440x - 545$$

- (a) Concave
- (b) Convex
- (c) Neither concave, nor convex
- (d) Cannot be determined
- (e) I don't know

22. Consider the following function $y = f(x)$.

Figure 6



Which of the followings is true?

- a) For $0 \leq x < a$, $f''(x) < 0$ and $f''(x) > 0$ for $x > a$.
- b) For $0 \leq x < a$, $f''(x) > 0$ and $f''(x) < 0$ for $x > a$.
- c) For $0 \leq x < a$, $f'(x) < 0$ and $f'(x) > 0$ for $x > a$.
- d) For $0 \leq x < a$, $f''(x) = 0$
- e) I don't know.

23. Find the local maxima of the function $f(x) = 50x - 5x^2$, if any.

- a) 5
- b) 15
- c) 200
- d) 125
- e) I don't know

24. Find the first-order derivative of the expression $x^{0.4}y^{0.6}$ with respect to x treating y as a constant.

- a) y
- b) $0.4 x^{-0.4}y^{0.6}$
- c) $0.4 x^{-0.6}y^{0.6}$
- d) $0.24 x^{-0.4}y^{0.6}$
- e) I don't know.

25. Find the first-order derivative of the expression $x^\alpha y^\beta$ with respect to y treating x as a constant.

- a) x^α
- b) $\alpha x^{\alpha-1} y^\beta$
- c) $\beta x^{-\alpha} y^{\beta-1}$
- d) $\beta x^\alpha y^{\beta-1}$
- e) I don't know.

26. Given the function $x^{0.4} y^{0.6}$, find the first derivative with respect to x , treating y as a constant and denote the derivative as f_x . For the same function, $x^{0.4} y^{0.6}$, 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) $\frac{f_x}{f_y} = \frac{0.6 y}{0.4 x}$
- b) $\frac{f_x}{f_y} = \frac{2y}{3x}$
- c) $\frac{f_x}{f_y} = \frac{x}{y}$
- d) $\frac{f_x}{f_y} = \frac{0.4 y}{x}$
- e) I don't know

27. Find the critical points at which the function may be optimized.

$$f(x) = -x^3 - 7.5x^2 + 1500x - 200$$

- a) $x = 25, x = -20$
- b) $x = 25, x = 20$
- c) $x = -25, x = 20$
- d) $x = -25, x = -20$
- e) I don't know.

28. Given the function $48x - 2x^2 - 6xy - 3y^2 + 72y$, find the first derivative with respect to x , treating y as a constant and denote the derivative as f_x . For the same function, $48x - 2x^2 - 6xy - 3y^2 + 72y$, find the first derivative with respect to y , treating x as a constant and denote the derivative as f_y . Set $f_x = 0$ and $f_y = 0$ and treat them as two simultaneous equations. Solve the simultaneous equations to find x and y .

- a) $x = 0, y = 12$
- b) $x = 12, y = 0$
- c) $x = 12, y = 12$
- d) $x = 0, y = 0$
- e) I don't know.

Miscellaneous (Question 29 – Question 30)

29. Given $2\sqrt{xy} = 32$, $x > 0$, and $y > 0$. Find y when $x = 4$.

- a) $y = 4$
- b) $y = 16$
- c) $y = 32$
- d) $y = 64$
- e) I don't know.

30. Compute the sum represented by $\sum_{x=3}^6 (3x + 2)$

- a) 30
- b) 42
- c) 62
- d) 82
- e) I don't know.

Feedback

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

Thank you.