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

Introduction

The Self-Assessment Multiple Choice Quiz 1 (EC 2200 required courses) will help you assess and review your mathematics skills to prepare you for taking the required EC 2200 intermediate courses.

This quiz does not aim to provide a complete list of examples of the math skills required to do well in the intermediate economics courses. All questions in this quiz may not be relevant for a specific course. However, this quiz should give you a good idea of how prepared you are, as it will provide you with a score and recommendations 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 of the questions, click the feedback box at the bottom to see how many of your answers are correct and to receive 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.

Math Self-Assessment Quiz 2

After completing the Self-Assessment Multiple Choice Quiz 1, please review thoroughly the math materials where you may have a weakness. Then you can test your math skills again using the Self-Assessment Multiple Choice Quiz 2 designed for the required EC 2200 intermediate economics courses.

Notes

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

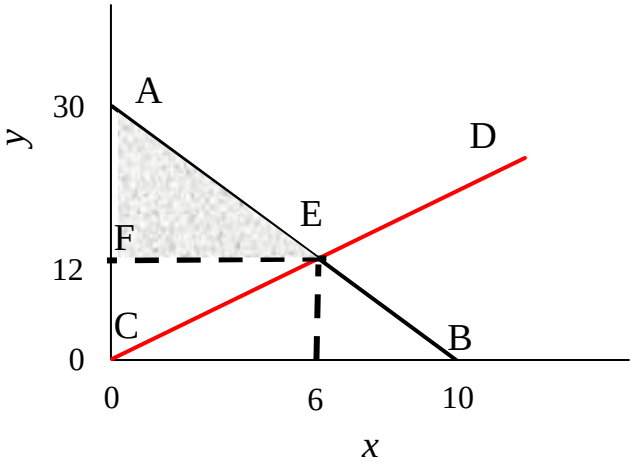
Math preliminaries (Question 1 – Question 4)

1. Simplify $\frac{x^{-0.5}y^{0.5}}{x^{0.5}y^{-0.5}}$

a) $\frac{x}{y}$
b) -1
c) 1
d) $\frac{y}{x}$
e) I don't know

2. Calculate the area of the triangle AEF.

Figure 1



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

3. Suppose $y = f(x)$. When x is 5, y is 100. When x is 5.5, y is 80. Calculate the percentage change in y divided by the percentage change in x considering the initial value of x as 5.

a) -2
b) -1
c) -1.33
d) -0.75
e) I don't know

4. Solve for x if

$$4x^2 + 8x - 12 = 0$$

a) $-1, 3$
b) $1, -4$
c) $-1, 4$
d) $1, -3$
e) I don't know

Functions and graphs (Question 5 – Question 12)

5. What is the slope of the graph of $2y + 3x = 10$?

a) -3
b) 3
c) -1.5
d) 1.5
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. What is the equation of the linear function $y = f(x)$ with slope b which passes through (x_0, y_0)?

(a) $y = bx + bx_0$

(b) $y = bx + y_0$

(c) $y = y_0 - bx_0$

(d) $y = bx + (y_0 - bx_0)$

(e) I don't know

8. Given a linear function $y = bx + c$, which of the followings is not true?

a) The slope of the given function is b.

b) The coefficient b shows how much $f(x)$ increases for each unit increase in x.

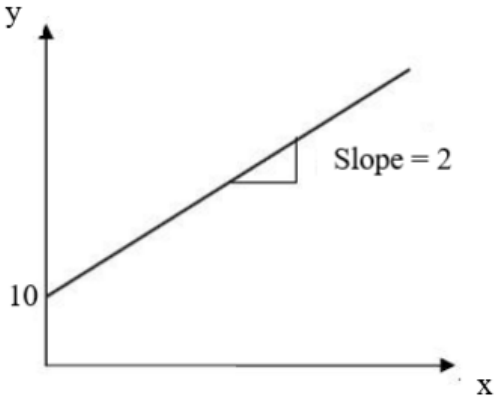
c) The slope b measures the rate of change of the function $f(x)$.

d) The slope b measure the percentage increase in $f(x)$ for the percentage increase in x.

e) I don't know

9. Consider the function in Figure 2. What is the value of y when $x = 10$?

Figure 2



a) 20

b) 30

c) 40

d) 50

e) I don't know.

10. Given the function $y = f(x) = 40 - 2x,$ what is the slope of the inverse function $x = g(y)$?

a) -2

b) 2

c) -0.5

d) 0.5

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. What is the slope of the graph of the new expression?

a) -3

b) -5

c) 3

d) 5

e) I don't know

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

a) -1 for all $x \in \mathbb{R}$

b) 1 for all $x \in \mathbb{R}$

c) -1 for all $x > 0$

d) undefined at (0,0)

e) I don't know.

Simultaneous equations (Question 13 – Question 17)

13. Solve the following system of simultaneous equations:

$$160 - 6x - 2y = 0$$

$$120 - 2x - 4y = 0$$

a) $x = 20, y = 10$

b) $x = 15, y = 10$

c) $x = 12,\ y = 3$

d) $x = 20, y = 20$

e) I don't know

14. See the following system of simultaneous equations:

$$2x + 3y = 14$$

$$4x + by = 40$$

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

a) $b \neq 0$

b) $b \neq 3$

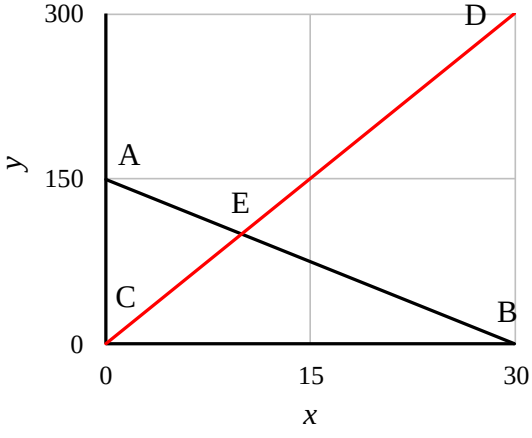
c) $b > 0$

d) $b \neq 6$

e) I don't know

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

Figure 3



a) $y = 100$

b) $y = 95$

c) $y = 80$

d) $y = 120$

e) I don't know.

16. Two simultaneous equations are:

$$y = 400 - 15x + z$$
$$y = 5x$$

Find y when $z = 200$.

a) 50
b) 100
c) 150
d) 200
e) I don't know

17. See the following two simultaneous equations.

$$\frac{y}{x} = 5$$

$$10x + 2y = 200$$

If we plot these two equations in a graph, there exists

a) No intersection points.
b) More than one intersection point.
c) One intersection point when $x > 0, y < 0$.
d) One intersection point when $x > 0, y > 0$.
e) I don't know

Rules of differentiation (Question 18– Question 25)

18. For which of the following functions, the slope of the tangent line is 5 at $x = 4$?

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 an arbitrary point.

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

a) $3x^2 - 12x$

b) $x^2 - 12x + 15$

c) $x - 2x^2$

d) $3x^2 - 12x + 15$

e) I don't know

20. Find the derivative of the following function at an arbitrary point.

$$f(x) = \frac{1}{\sqrt{x}}$$

a) $0.5x^{0.5}$

b) $x^{-0.5}$

c) $-\frac{1}{2\,x^{1.5}}$

d) $-\frac{2}{x^{1.5}}$

a) I don't know.

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

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

a) $\frac{1}{x-1}$

b) $\frac{2}{(x-1)^2}$

c) $\frac{-2}{(x-1)^2}$

d) $\frac{-x}{(x-1)^2}$

e) I don't know.

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

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

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

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

c) xe^{x^2+10}

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

e) I don't know.

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

$$f(x) = 2x\ln(x+2)$$

a) $2x\ln(x+2)$

b) $\frac{2x}{x+2}$

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

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

e) I don't know.

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

$$x^6y^9 = 78$$

a) $\frac{dy}{dx} = 54x^5y^8$

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

c) $\frac{dy}{dx} = \frac{6}{9}x^{\frac{6}{9}-1}$

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

e) I don't know.

25. Consider the following fact: If function $f(x)$ is differentiable at x_0, then it is continuous at x_0. Which of the following is true?

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

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

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

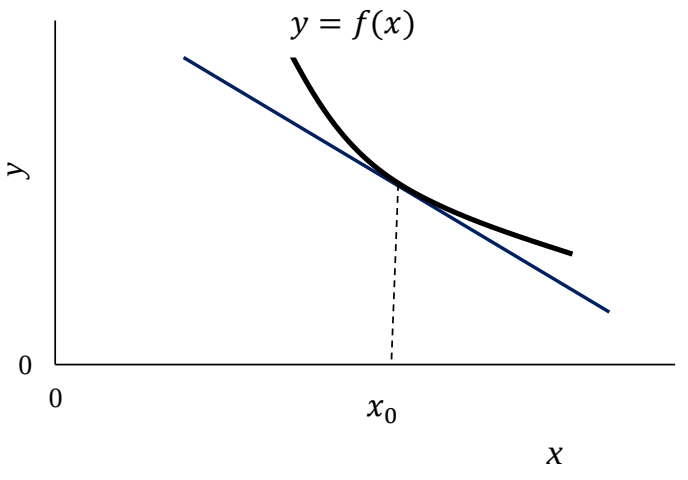
d) If $f(x)$ is not continuous at x_0, then $f(x)$ is differentiable at x_0;

e) I don't know

Uses of the derivative (Question 26– Question 35)

26. See Figure 4. At $x = x_0$, the derivatives of the function are:

Figure 4



a) $f'(x_0) > 0, f''(x_0) > 0$

b) $f'(x_0) < 0, f''(x_0) > 0$

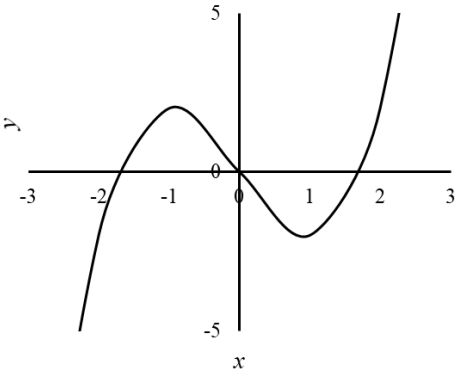
c) $f'(x_0) < 0, f''(x_0) < 0$

d) $f'(x_0) \geq 0, f''(x_0) = 0$

e) I don't know.

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

Figure 5



a) $f'(-1) = 0$ & $f''(-1) < 0$

b) $f'(0) < 0$

c) $f''(2) > 0$

d) $f'(1) = 0$ & $f''(1) < 0$

e) I don't know.

28. Consider the function $f(x) = x^3 - 6x^2 + 15x + 25$. Which of the followings is true at $x = 2$?

a) $f'(2) = 0,\ f''(2) > 0$

b) $f'(2) > 0,\ f''(2) = 0$

c) $f'(2) = 0,\ f''(2) = 0$

d) $f'(2) > 0,\ f''(2) > 0$

e) I don't know.

29. Given the function $f(x) = 50\,x - 5x^2$, find the local maxima of the function.

a) 12.5

b) 125

c) 25

d) 250

e) I don't know

30. For the function $f(x) = x^3 + 3x$ with specified domain $D = (0, 1]$, find the global maximum and the global minimum of f on D, if they exist.

a) No global min on domain D; global max at 1.

b) No global max on domain D; global min at 0.

c) No global max on domain D; global min at 1.

d) No global min on domain D; global max at 0.

e) I don't know.

31. Which of the following differentiable functions has at least one point that satisfies the first- condition but not a local max or min?

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

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

c) $f(x) = 10 + x^4$

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

e) I don't know.

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

a) $x^{-0.5}$

b) $0.5x^{-0.5}$

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

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

e) I don't know

33. Find the first-order derivative of the expression $5x^{0.5}y^{0.6}$ with respect to y treating x as a constant.

a) $y^{-0.6}$

b) $3y^{-0.6}$

c) $3x^{0.5}y^{-0.6}$

d) $3x^{0.5}y^{-0.4}$

e) I don't know

34. Given the function $x^{0.5}y^{0.5}$, find the first derivative with respect to x, treating y as a constant and denote the derivative as f_x. For the same function, $x^{0.5}y^{0.5}$, 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) $\frac{f_x}{f_y} = \frac{x}{y}$

b) $\frac{f_x}{f_y} = \frac{0.5y}{x}$

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

d) $\frac{f_x}{f_y} = \frac{x}{0.5y}$

e) I don't know

35. Given the function $x^{\alpha}y^{\beta}$, find the first derivative with respect to x, treating y as a constant and denote the derivative as f_x. For the same function, $x^{\alpha}y^{\beta}$, 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) $\frac{f_x}{f_y} = \frac{x}{y}$

b) $\frac{f_x}{f_y} = \frac{\alpha y}{\beta x}$

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

d) $\frac{f_x}{f_y} = \frac{\beta x}{\alpha y}$

e) I don't know

Feedback

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

Thank you.