

Full name: _____

Mathematics for Economists – Introductory test + Solutions

1. Simplify:

$$\frac{\sqrt[3]{8a^2b}\sqrt{ab}}{\sqrt{a^3b^5}a^{-1}b^{-1}}$$

Answer: $\frac{2a^{\frac{1}{3}}}{b}$

2. Simplify, find domain of x :

$$\frac{1 + \frac{2}{x+1}}{x - \frac{9}{x}}$$

Answer: $\frac{x}{(x+1)(x-3)}$, $x \neq 0, -1, 3, -3$

3. Solve for x :

$$|x + 2| + 2|x - 1| = 6$$

Answer: $-2, 2$

4. Solve for x :

$$\frac{2x + 1}{x - 3} + 5 \leq 0$$

Answer: $\langle 2, 3 \rangle$

5. Solve the system for $[x, y]$:

$$\begin{aligned} 2x + 3y &= 1 \\ x + 2xy &= -2 \end{aligned}$$

Answer: $[2, -1], [\frac{-3}{4}, \frac{5}{6}]$

6. It is given that 14 machines will produce 270 identical products in 12 hours.

- (a) How many of these products will 21 machines produce in 12 hours?
- (b) How many of these products will x machines produce in 12 hours?
- (c) In how many hours will 21 machines produce 270 products?
- (d) In how many hours will x machines produce 270 products?

Answer: (a) 405, (b) $\frac{135x}{7}$, (c) 8, (d) $\frac{168}{x}$

7. Draw the graph of the function $f(x) = -3x + 2$, find and draw the intercepts with both axes.

Answer: intercepts $P_y = [0, 2]$, $P_x = [\frac{2}{3}, 0]$

8. Draw the graph of the function $f(x) = 2x^2 - 4x - 16$, find and draw the intercepts with both axes, find and draw the vertex of the parabola.

Answer: intercepts $P_y = [0, -16]$, $P_{x1} = [-2, 0]$, $P_{x2} = [4, 0]$, vertex $[1, -18]$

9. Draw the graph of the function $f(x) = \frac{-2x+1}{x+1}$, find and draw the intercepts with both axes, the center and asymptotes of the hyperbola.

Answer: center $[-1, -2]$, intercepts $P_x = [\frac{1}{2}, 0]$, $P_y = [0, 1]$

10. Solve for x :

$$\log(x + 2) + \log(x - 7) = 2 \log(x - 4)$$

Answer: 10