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: $\langle 2, 3)$

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.

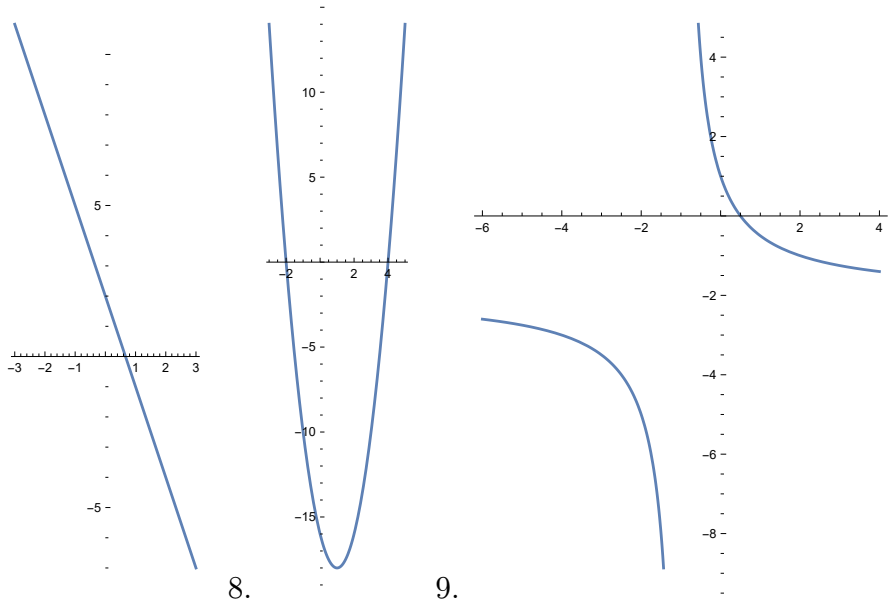
Answer: intercepts $P_y = [0, 2], P_x = [\frac{2}{3}, 0]$

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 $P_y = [0, -16], P_{x1} = [-2, 0], P_{x2} = [2, 0]$, 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 $P_x = [\frac{1}{2}, 0], P_y = [0, 1]$



7. 8. 9.

10. Solve for x:

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

Answer: 10