



MATH 150 - WEEK-IN-REVIEW 8

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PROBLEM STATEMENTS

You should attempt the problems yourself first. The next section contains the solutions.

1. Simplify the expression with positive exponents $\left(\frac{x^{-3}y^4}{5}\right)^{-3}$
2. Factor the following expression.
$$-6z^2 + 17z + 3$$
3. Find the domain of the following expressions.
 - a. $\frac{x^2 - 5x + 6}{x^2 + 2x - 8}$
 - b. $\frac{1}{\sqrt{x - 7}}$
4. Perform the multiplication and simplify.
$$\frac{t^2 - t - 6}{t^2 + 6t + 9} \cdot \frac{t + 3}{t^2 - 4}$$
5. Solve the following equation.
$$x^2 + 8x + 10 = 0$$
6. Solve the following inequality.
$$|9 - 2x| - 2 \leq -1$$
7. Write the equation of the line parallel $5x - 4y = 8$ passing through the point $(3, -2)$.
8. Write the standard form of $g(x) = -x^2 + 4x + 3$. Identify the vertex, axis of symmetry, and x-intercepts.
9. Find all intercepts, asymptotes, and holes of the following function.
$$f(x) = \frac{x^2 - 11x + 18}{x^2 - 5x + 6}$$



10. Given $y = 3^{x-2} + 1$, state the domain, x -intercept(s), y -intercept(s), and the vertical asymptote(s). Then sketch a graph of y .

Domain:

x -intercept(s):

y -intercept(s):

Horizontal Asymptote(s):

Vertical Asymptote(s):

11. Solve the following logarithmic equation.

$$\log_6(x - 12) - \log_6(x) = \log_6(x - 6)$$

12. Find $\cos\left(\arctan\left(\frac{3}{4}\right)\right)$.

13. Solve the equation on $[0, 2\pi)$

$$\tan^2 x - 2 \tan x = 0$$

14. Find $\mathbf{u} + 3\mathbf{v}$ and $\mathbf{u} \bullet \mathbf{v}$ for $\mathbf{u} = \langle 4, 5 \rangle$ and $\mathbf{v} = \langle 0, -1 \rangle$

15. Compute the difference quotient for $\frac{x}{x+1}$.



SOLUTIONS

Click the boxed answer (also in red) to watch the video solution. You can also see them all by viewing the [Week 8 playlist \(clickable link\)](#). You can turn on closed captions by clicking “CC” inside YouTube as well as adjust the video speed inside of “Settings” by clicking the cog in the bottom right of the player.

1. Simplify the expression with positive exponents $\left(\frac{x^{-3}y^4}{5}\right)^{-3}$

$$\frac{125x^9}{y^{12}}$$

2. Factor the following expression.

$$-6z^2 + 17z + 3$$

$$= (6z + 1)(-z + 3)$$

3. Find the domain of the following expressions.

a. $\frac{x^2 - 5x + 6}{x^2 + 2x - 8}$

$$\text{Domain: } (-\infty, -4) \cup (-4, 2) \cup (2, \infty)$$

b. $\frac{1}{\sqrt{x - 7}}$

$$\text{Domain: } (7, \infty)$$

4. Perform the multiplication and simplify.

$$\frac{t^2 - t - 6}{t^2 + 6t + 9} \cdot \frac{t + 3}{t^2 - 4}$$

$$\frac{t - 3}{(t + 3)(t - 2)}$$

5. Solve the following equation.

$$x^2 + 8x + 10 = 0$$

$$x = -4 \pm \sqrt{6}$$

6. Solve the following inequality.

$$|9 - 2x| - 2 \leq -1$$

$$[4, 5]$$



7. Write the equation of the line parallel $5x - 4y = 8$ passing through the point $(3, -2)$.

$$\begin{aligned}y - (-2) &= \frac{5}{4}(x - 3) \\y &= \frac{5}{4}x - \frac{23}{4} \\5x - 4y &= 23\end{aligned}$$

8. Write the standard form of $g(x) = -x^2 + 4x + 3$. Identify the vertex, axis of symmetry, and x-intercepts.

$$\begin{aligned}g(x) &= -(x - 2)^2 + 7 \\ \text{Vertex: } &(2, 7) \\ \text{Axis of symmetry: } &x = 2 \\ \text{x-int: } &(2 \pm \sqrt{7}, 0)\end{aligned}$$

9. Find all intercepts, asymptotes, and holes of the following function.

$$f(x) = \frac{x^2 - 11x + 18}{x^2 - 5x + 6}$$

$$\begin{aligned}\text{x-intercept(s): } &(9, 0) \\ \text{y-intercept: } &(0, 3) \\ \text{Vertical asymptote(s): } &x = 2 \\ \text{Horizontal asymptote: } &y = 1 \\ \text{Hole(s): } &(2, 7)\end{aligned}$$

10. Given $y = 3^{x-2} + 1$, state the domain, x-intercept(s), y-intercept(s), and the vertical asymptote(s). Then sketch a graph of y .

$$\begin{aligned}\text{Domain: } &(-\infty, \infty) \\ \text{x-intercept: } &\text{None} \\ \text{y-intercept: } &(0, \frac{10}{9}) \\ \text{Vertical asymptote(s): } &\text{None} \\ \text{Horizontal asymptote: } &y = 1\end{aligned}$$

11. Solve the following logarithmic equation.

$$\log_6(x - 12) - \log_6(x) = \log_6(x - 6)$$

$$\text{No solution.}$$



12. Find $\cos\left(\arctan\left(\frac{3}{4}\right)\right)$.

$$\frac{4}{5}$$

13. Solve the equation on $[0, 2\pi)$

$$\tan^2 x - 2 \tan x = 0$$

$$x = 0, \pi, \arctan(2), \arctan(2) + \pi$$

14. Find $\mathbf{u} + 3\mathbf{v}$ and $\mathbf{u} \bullet \mathbf{v}$ for $\mathbf{u} = \langle 4, 5 \rangle$ and $\mathbf{v} = \langle 0, -1 \rangle$

$$\mathbf{u} + 3\mathbf{v} = \langle 4, 13 \rangle, \mathbf{u} \bullet \mathbf{v} = -5$$

15. Compute the difference quotient for $\frac{x}{x+1}$.

$$\frac{1}{(x+1)(x+h+1)}$$