



## MATH 150 - WEEK-IN-REVIEW 1

ALEXANDRA L. FORAN

### PROBLEM STATEMENTS

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

1. Find an equation of the line through the points  $(5, 4)$  and  $(-10, -2)$ .
2. Find an equation of the line through the points  $(5, 4)$  and  $(5, -2)$ .
3. Write an equation of a line a) parallel to and b) perpendicular to the line  $5 + 6x - 4y = 0$  and passing through the point  $(3, 2)$ .
4. Solve the following inequalities. Graph their solution set.
  - (a)  $\frac{x}{3} + \frac{1}{2} > \frac{4x - 1}{6}$
  - (b)  $-3 < \frac{2x - 1}{2} \leq 4$
  - (c)  $|4x - 5| \geq 11$
5. Simplify the following expression. Write your answer so that each variable appears at most once, and all exponents are positive.

$$\frac{12(xy^{-1})^3(x^{-2}y^2)^2}{20(x^{-4})^{-2}(xy^{-3})^2}$$

6. Simplify each radical expression.

(a)  $\frac{\sqrt[3]{-24x^4y^2z^6}}{\sqrt[3]{81xy}}$

(b)  $\sqrt{x^3} + \sqrt{4x^3} - \sqrt{x}$

7. Rationalize the denominator.

(a)  $\frac{x - y}{\sqrt{x} - \sqrt{y}}$

(b)  $\frac{4\sqrt{6} + 3\sqrt{3}}{3\sqrt{6} - 4\sqrt{3}}$



8. Simplify the following expression.

$$\left(\frac{a^{5/4} \cdot a^{-3/8}}{a^{-3/4}}\right)^{2/3}$$

9. Factor each expression.

(a)  $4x^2y^2 - 12xy + 9$

(b)  $10y^2 - 3y - 1$

(c)  $(x - 1)(x^2 + 3) + (x - 1)(x^2 - 5)$

10. Perform the operations and simplify.

(a)  $\frac{x^2 - 3x - 10}{2x^2 - 9x - 5} \div \frac{x^2 - 2x - 8}{2x^2 - 9x + 4}$

(b)  $\frac{x + 1}{x^2 - 4x + 4} - \frac{x - 3}{x^2 - 4}$

(c)  $\frac{\frac{2}{x} + \frac{1}{3x^2}}{\frac{4}{x} - 1}$



## SOLUTIONS

Click the boxed answer (also in red) to watch the video solution. You can also see them all by viewing the [Week 1 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. Find an equation of the line through the points (5, 4) and (−10, −2).

$$y = \frac{2}{5}x + 2$$

2. Find an equation of the line through the points (5, 4) and (5, −2).

$$x = 5$$

3. Write an equation of a line a) parallel to and b) perpendicular to the line  $5 + 6x - 4y = 0$  and passing through the point (3, 2).

$$\text{a) } y - 2 = \frac{3}{2}(x - 3), \text{ b) } y - 2 = -\frac{2}{3}(x - 3)$$

4. Solve the following inequalities. Graph their solution set.

$$\text{(a) } \frac{x}{3} + \frac{1}{2} > \frac{4x - 1}{6}$$

$$x < 2$$

$$\text{(b) } -3 < \frac{2x - 1}{2} \leq 4$$

$$-\frac{5}{2} < x \leq \frac{9}{2}$$

$$\text{(c) } |4x - 5| \geq 11$$

$$x \leq -\frac{3}{2} \text{ OR } x \geq 4$$

5. Simplify the expression  $-\frac{12(xy^{-1})^3(x^{-2}y^2)^2}{20(x^{-4})^{-2}(xy^{-3})^2}$ . Write your answer so that each variable appears at most once, and all exponents are positive.

$$-\frac{3y^7}{5x^{11}}$$



6. Simplify each radical expression.

(a)  $\frac{\sqrt[3]{-24x^4y^2z^6}}{\sqrt[3]{81xy}}$

$$\frac{-2xz^2}{3} \cdot \sqrt[3]{y}$$

(b)  $\sqrt{x^3} + \sqrt{4x^3} - \sqrt{x}$

$$(3|x| - 1)\sqrt{x}$$

7. Rationalize the denominator.

(a)  $\frac{4\sqrt{6} + 3\sqrt{3}}{3\sqrt{6} - 4\sqrt{3}}$

$$18 + \frac{25}{2}\sqrt{2}$$

**Video errata:** Said and wrote 48 at the end when the division showed  $108 \div 6 = 18$ .

(b)  $\frac{x - y}{\sqrt{x} - \sqrt{y}}$

$$\sqrt{x} + \sqrt{y}$$

8. Simplify the expression  $\left(\frac{a^{5/4} \cdot a^{-3/8}}{a^{-3/4}}\right)^{2/3}$ .

$$a^{13/12}$$

9. Factor each expression.

(a)  $4x^2y^2 - 12xy + 9$

$$(2xy - 3)^2$$

(b)  $10y^2 - 3y - 1$

$$(5x + 1)(2x - 1)$$

(c)  $(x - 1)(x^2 + 3) + (x - 1)(x^2 - 5)$

$$2(x - 1)^2(x + 1)$$

10. Perform the operations and simplify.

(a)  $\frac{x^2 - 3x - 10}{2x^2 - 9x - 5} \div \frac{x^2 - 2x - 8}{2x^2 - 9x + 4}$

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



$$(b) \frac{x+1}{x^2-4x+4} - \frac{x-3}{x^2-4}$$

$$\frac{4(2x-1)}{(x-2)(x-2)(x+2)}$$

$$(c) \frac{\frac{2}{x} + \frac{1}{3x^2}}{\frac{4}{x} - 1}$$

$$= \frac{6x+1}{3x(4-x)}$$