Homework 1: Real Numbers, Order of Operations, and Fractions

Course: MATH 1215 **Name:** _____

Instructions: Show clear work for full credit. Write fractions using fraction notation, reduce final fractional answers when possible, and label number lines carefully.

A. Order of Operations and Evaluating Expressions

1. Evaluate. Show each step.

$$5 - 3(-7 - (-4 + 1))^2$$

2. Evaluate the expression when $x = 9$ and $y = 3$. Simplify your final answer.

$$y^2 + \frac{\sqrt{x} + 7}{2y}$$

3. Evaluate.

$$-|-7| + 4^2 - 3(5 - 8)$$

4. Evaluate.

$$\frac{3}{4}(16 - 8) + \frac{5}{2}$$

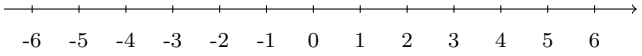
B. Sets, Inequalities, and Number Lines

5. List the elements of the set.

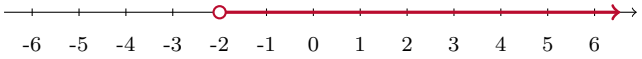
$$\{x \mid x \text{ is a natural number between 7 and 14}\}$$

Answer: _____

6. Graph the real numbers less than 4.



7. Write an inequality represented by the graph below.



Inequality: _____

C. Reducing Fractions and Mixed Numbers

8. Reduce each fraction to lowest terms.

   (a) $\frac{18}{24}$ (c) $\frac{72}{90}$ (e) $\frac{56}{64}$

   (b) $\frac{45}{60}$ (d) $\frac{-36}{48}$ (f) $\frac{81}{108}$

9. Convert each mixed number to an improper fraction. Then reduce if possible.

   (a) $2\frac{1}{3}$ (c) $-3\frac{2}{5}$ (e) $1\frac{9}{12}$

   (b) $4\frac{5}{6}$ (d) $7\frac{4}{8}$ (f) $5\frac{10}{15}$

10. Write each improper fraction as a mixed number or whole number. Reduce if needed.

    (a) $\frac{15}{4}$ (c) $\frac{33}{8}$ (e) $\frac{29}{5}$

    (b) $\frac{21}{7}$ (d) $\frac{48}{12}$ (f) $\frac{54}{9}$

D. Adding, Subtracting, Multiplying, and Dividing Fractions

11. Simplify. Leave each answer as an improper fraction in lowest terms.

    (a) $\frac{3}{4} + \frac{5}{6}$ (b) $\frac{7}{8} - \frac{1}{3}$

(c) $\frac{2}{7} + \frac{5}{3}$

(d) $-\frac{5}{8} - \frac{9}{2}$

(e) $\frac{2}{5} \cdot \frac{11}{-4}$

(f) $\frac{2}{11} \div \frac{5}{4}$

12. Simplify. Write final answers in lowest terms.

(a) $3\frac{1}{2} + 1\frac{3}{4}$

(b) $5\frac{2}{3} - 2\frac{5}{6}$

(c) $2\frac{1}{4} \cdot \frac{8}{9}$

(d) $4\frac{1}{2} \div 1\frac{1}{5}$

E. Fraction Word Problems

13. A recipe uses $\frac{3}{4}$ cup of flour for one batch of muffins. Maria wants to make $2\frac{1}{2}$ batches. How many cups of flour does she need? Write your answer as a mixed number in lowest terms.

14. A student completed $\frac{5}{8}$ of a homework assignment on Monday and $\frac{1}{4}$ of the assignment on Tuesday. What fraction of the assignment has the student completed? What fraction remains?

15. A board is $6\frac{1}{2}$ feet long. It is cut into pieces that are each $\frac{3}{4}$ foot long. How many complete pieces can be cut from the board, and how much wood is left over?

F. Mixed Review

16. Simplify each expression completely.

    (a) $|-12| - |5 - 9|$

    (b) $\frac{6}{10} + \frac{9}{15}$

    (c) $3\left(\frac{2}{5}\right) - \frac{1}{10}$

    (d) $\frac{5}{6} \div \left(-\frac{10}{9}\right)$