

**Part I - Solve each problem. Show all work to receive full credit. Supply explanations where necessary. Each problem is worth 2 points. CALCULATORS ARE ALLOWED ON THIS PORTION OF THE TEST.**

1. Solve the equation:  $-\frac{60}{56}x = \frac{225}{490}$

$$x = \frac{225}{490} \div \left(-\frac{60}{56}\right)$$

$$\Rightarrow x = -\frac{3}{7}$$

2. Evaluate the following expression:

$$\left(\frac{9}{10} \div \frac{12}{25}\right)^2$$

$$\left(\frac{\cancel{9}^3}{\cancel{10}_2} \times \frac{\cancel{25}^5}{\cancel{12}_4}\right)^2 = \left(\frac{15}{8}\right)^2 = \frac{225}{64}$$

3. Compute each of the following.

(a)  $\frac{667}{899} \cdot \frac{558}{621} = \frac{2}{3}$

(b)  $\frac{530}{490} \div \frac{1060}{980} = 1$

4. Simplify:  $\frac{3473}{3197} = \frac{151}{139}$

5. Determine whether these fractions are equal. Show work or explain.

$$\frac{425}{165} \neq \frac{130}{66}$$

$$\left. \begin{array}{l} 425 \cdot 66 = 28050 \\ 165 \cdot 130 = 21450 \end{array} \right\} \text{NOT EQUAL!}$$

**Part II** - Solve each problem. Show all work to receive full credit. Supply explanations where necessary. **CALCULATORS ARE NOT ALLOWED ON THIS PORTION OF THE TEST.**

1. (5 points) Completely simplify each fraction.

(a)  $\frac{-45}{-45} = \boxed{1}$

(b)  $\frac{0}{-5} = \boxed{0}$

(c)  $\frac{180}{240} = \frac{18}{24} = \frac{9}{12} = \boxed{\frac{3}{4}}$

(d)  $\frac{18}{2} = \boxed{9}$

(e)  $\frac{27}{-36} = \boxed{-\frac{3}{4}}$

2. (2 points) There are 16 men in a classroom containing 30 people. What fraction represents the portion of people who are men? Write your fraction in lowest terms.

$$\frac{16}{30} = \boxed{\frac{8}{15}}$$

3. (1 point) Draw a rectangle and shade a portion of the rectangle that represents  $\frac{2}{5}$ .



4. (2 points) Solve for  $x$ :  $2x - 7x = -\frac{10}{9}$

$$-5x = -\frac{10}{9} \Rightarrow 5x = \frac{10}{9}$$

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$$x = \frac{10}{9} \div 5 = \frac{10}{9} \times \frac{1}{5} = \boxed{\frac{2}{9}}$$

5. (6 points) Multiply and simplify.

$$(a) \frac{3}{4} \times 18 = \frac{3}{\cancel{4}_2} \times \frac{\cancel{18}^9}{1} = \boxed{\frac{27}{2}}$$

$$(b) \frac{\cancel{8}^4}{\cancel{10}^5} \cdot \frac{\cancel{45}^9}{\cancel{100}^{25}} = \boxed{\frac{9}{25}}$$

$$(c) \frac{\cancel{2}^1}{5} \cdot \left( -\frac{11}{\cancel{20}^8} \right) = \boxed{-\frac{11}{40}}$$

6. (2 points) A recipe for cookies calls for  $\frac{3}{4}$  cup of oats. Monica is making  $\frac{1}{2}$  of the recipe. How much oats should she use?

$$\frac{1}{2} \times \frac{3}{4} = \boxed{\frac{3}{8} \text{ cup}}$$

7. (2 points) A triangle has a base that measures  $\frac{9}{2}$  m and its height is  $\frac{4}{15}$  m. Find the area of the triangle.

$$A = \frac{1}{2}bh = \frac{1}{2} \left( \frac{\cancel{9}^3}{\cancel{2}^1} \right) \left( \frac{\cancel{4}^2}{\cancel{15}^5} \right) = \boxed{\frac{3}{5} \text{ m}^2}$$

8. (6 points) Divide and simplify.

$$(a) \frac{4}{7} \div \left(-\frac{8}{3}\right) = - \left( \frac{4}{7} \times \frac{3}{8} \right) = \boxed{-\frac{3}{14}}$$

$$(b) -12 \div \frac{2}{3} = - \left( \frac{12}{1} \times \frac{3}{2} \right) = \boxed{-18}$$

$$(c) -\frac{2}{9} \div \left(-\frac{10}{21}\right) = \frac{2}{9} \times \frac{21}{10} = \boxed{\frac{7}{15}}$$

9. (2 points) How many doses, each containing  $\frac{15}{4}$  milliliters, can be obtained from a bottle of antibiotic that contains  $\frac{80}{3}$  milliliters?

$$\frac{80}{3} \div \frac{15}{4} = \frac{80}{3} \times \frac{4}{15} = \boxed{\frac{64}{9} \text{ DOSES}}$$

10. (2 points) What is  $\frac{3}{5}$  of 65?

$$\frac{3}{5} \times \frac{65}{1} = \boxed{39}$$

11. (6 points) Solve each equation. Write your answer in lowest terms.

(a)  $\frac{7}{10} = \frac{-2}{5}y$

$$y = \frac{7}{10} \div \left(-\frac{2}{5}\right) = - \left(\frac{7}{10} \times \frac{5}{2}\right) = \boxed{-\frac{7}{4}}$$

(b)  $\frac{2}{4} = \frac{x}{18}$

$$4x = 36$$

$$\boxed{x = 9}$$

(c)  $-x = \frac{3}{-4}$

$$\boxed{x = \frac{3}{4}}$$

12. (2 points) Determine whether each pair of fractions is equal.

(a)  $\frac{3}{-4} = \frac{-9}{12}$

$$3 \times 12 = 36 = -4 \times -9$$

(b)  $\frac{3}{10} \neq \frac{4}{12}$

$$3 \times 12 = 36 \neq 40 = 4 \times 10$$

13. (2 points) Five-fourths of  $x$  is 10. Find  $x$ .

$$\frac{5}{4}x = 10$$

$$x = \frac{10}{1} \div \frac{5}{4} = \frac{10^2}{1} \times \frac{4}{5} = \frac{8}{1}$$

$$\boxed{x = 8}$$

**Part III** - Circle the best answer for each problem. Each problem is worth 2 points.  
CALCULATORS ARE NOT ALLOWED ON THIS PORTION OF THE TEST.

1. Which one of these fractions is not defined?

(a)  $8/1$

(b)  $-2/23$

(c)  $17/0$

(d)  $0/3$

2. Which one of these is the formula for the area of a triangle?

(a)  $A = \frac{1}{2}bh$

(b)  $A = \ell \cdot w$

(c)  $A = x + y + z$

(d)  $A = \pi r^2$

3. What is the reciprocal of  $3/4$ ?

(a)  $-3/4$

(b) 1

(c) 0

(d)  $4/3$

4. A dime is what fraction of a dollar?

(a)  $1/2$

(b)  $1/4$

(c)  $1/10$

(d)  $1/100$

5. What is the reciprocal of  $-7$ ?

(a)  $-1/7$

(b) 7

(c)  $1/7$

(d) 0