

REVIEW

OPERATIONS

WITH

FRACTIONS

Review: Operations with Fractions

Evaluate each expression, simplifying each answer.

$$1. \quad \frac{3}{22} - \frac{15}{22} = \frac{3-15}{22} \\ = \frac{-12}{22} = \frac{-6}{11}$$

$$2. \quad \frac{2}{3} + \frac{1}{4} = \frac{2}{3} \left(\frac{4}{4} \right) + \frac{1}{4} \left(\frac{3}{3} \right) \\ \text{LCD} = 12 \quad \Bigg| = \frac{8+3}{12} = \frac{11}{12}$$

$$3. \quad \frac{1}{5} - \frac{3}{4} = \frac{1}{5} \left(\frac{4}{4} \right) - \frac{3}{4} \left(\frac{5}{5} \right) \\ \text{LCD} = 20 \quad \Bigg| = \frac{4-15}{20} = \frac{-11}{20}$$

$$4. \quad -\frac{7}{10} + \frac{3}{5} = -\frac{7}{10} + \frac{3}{5} \left(\frac{2}{2} \right) \\ \text{LCD} = 10 \quad \Bigg| = \frac{-7+6}{10} \\ = \frac{-1}{10}$$

$$5. \quad \frac{2}{4} \left(\frac{1}{3} \right) = \frac{2}{12} = \frac{1}{6} \\ \text{OR } \left(\frac{2 \cdot 1}{2 \cdot 4 \cdot 3} \right) = \frac{1}{6}$$

$$6. \quad \frac{1}{12} \left(-\frac{3}{10} \right) = \frac{-1}{8}$$

$$7. \quad -\frac{3}{5} \left(-\frac{10}{21} \right) = \frac{2}{7}$$

$$8. \quad \frac{7}{12} \left(\frac{3}{4} \right) = \frac{7}{16}$$

$$9. \quad \frac{3}{4} \div \frac{2}{3} = \frac{3}{4} \cdot \frac{3}{2} = \frac{9}{8} \quad \text{or} \quad \frac{1}{\frac{8}{9}}$$

$$\frac{\frac{c}{d}}{\frac{x}{y}} = \frac{c}{d} \div \frac{x}{y} \quad x, y, d \neq 0$$

$$= \frac{\frac{c}{d}}{\frac{x}{y} \cdot \frac{y}{x}} = \frac{\frac{c}{d} \cdot \frac{y}{x}}{1}$$

$$= \frac{c}{d} \cdot \frac{y}{x}$$

$$10. \quad \frac{\frac{15}{32}}{\frac{5}{8}} = \frac{15}{32} \div \frac{5}{8} = \frac{15}{32} \cdot \frac{8}{5} = \frac{3}{4}$$

$$11. \quad \frac{12}{\frac{1}{2}} = 12 \div \frac{1}{2} = 12 \cdot \frac{2}{1} = 24$$

$$(b) \quad \frac{12}{\frac{1}{2}} = \frac{12}{1} \div 2 = \frac{12}{1} \cdot \frac{1}{2} = 6$$

$$12. \quad \left(-\frac{9}{16}\right) \div \left(-\frac{3}{2}\right) = \frac{-9}{16} \cdot \frac{-2}{3} = \frac{3}{8}$$

$$13. \quad \frac{3}{\frac{1}{4} + \frac{2}{3}} \stackrel{\textcircled{1}}{=} 3 \div \left(\frac{1}{4} + \frac{2}{3} \right) \stackrel{LCD=12}{=} 3 \div \left(\frac{1}{4} \left(\frac{3}{3} \right) + \frac{2}{3} \left(\frac{4}{4} \right) \right)$$

$$= 3 \div \left(\frac{3+8}{12} \right) = 3 \div \frac{11}{12} = 3 \cdot \frac{12}{11}$$

$$\textcircled{2} \quad \frac{3 \left(\frac{12}{4} + \frac{12}{3} \right)}{12} = \frac{36}{\frac{1}{4}(12) + \frac{2}{3}(12)} = \frac{36}{3+8} = \frac{36}{11} = \boxed{\frac{36}{11} \text{ or } 3\frac{3}{11}}$$

$$14. \quad \frac{\frac{1}{4} + \frac{2}{3}}{3} \stackrel{\textcircled{1}}{=} \frac{\frac{1}{4} \left(\frac{3}{3} \right) + \frac{2}{3} \left(\frac{4}{4} \right)}{3} = \frac{\frac{3+8}{12}}{3} = \frac{11}{36}$$

$$\textcircled{2} \quad \frac{\left(\frac{1}{4} + \frac{2}{3} \right) (12)}{3(12)} = \frac{3+8}{36} = \frac{11}{36}$$

$$= \frac{11}{12} \div 3 = \frac{11}{12} \cdot \frac{1}{3} = \frac{11}{36}$$

$$15. \quad \frac{6}{6+9a}$$

$$= \frac{2 \cancel{3}}{\cancel{3}(2+3a)}$$

$$= \frac{2}{2+3a}$$

WARNING: ~~$\frac{6}{6+9a}$~~ ~~$\frac{1}{9a}$~~

6 does not divide out because the 6 in the denominator is being added to 9a.

(We can only divide out factors, NOT terms.)

$$16. \quad \frac{6+9a}{6}$$

$$\textcircled{1} \quad = \frac{\cancel{3}(2+3a)}{\cancel{3} \cdot 2} = \frac{2+3a}{2} = \frac{2}{2} + \frac{3a}{2} = 1 + \frac{3a}{2}$$

$$\textcircled{2} \quad \frac{6+9a}{6} = \frac{6}{6} + \frac{\cancel{3} \cdot 3a}{\cancel{3} \cdot 2} = 1 + \frac{3a}{2}$$