

Name: \_\_\_\_\_

Check-In Problem: Evaluate (simplify if needed):

$$\frac{5}{6} - \frac{3}{8}$$

**Solution** The least common denominator (LCD) is 24.

$$\begin{aligned}\frac{5}{6} - \frac{3}{8} &= \frac{5}{6} \cdot \frac{4}{4} - \frac{3}{8} \cdot \frac{3}{3} \\ &= \frac{20}{24} - \frac{9}{24} \\ &= \frac{20 - 9}{24} \\ &= \boxed{\frac{11}{24}}\end{aligned}$$

□

Challenge Problem: Express as a single fraction:

$$\frac{2}{x} + \frac{3}{y}$$

**Solution** Since  $x$  and  $y$  are variables, we can find the LCD by multiplying them together. The LCD is  $xy$ . (Note that  $xy$  and  $yx$  are the same thing because multiplication is commutative.)

$$\begin{aligned}\frac{2}{x} + \frac{3}{y} &= \frac{2}{x} \cdot \frac{y}{y} + \frac{3}{y} \cdot \frac{x}{x} \\ &= \frac{2y}{xy} + \frac{3x}{xy} \\ &= \boxed{\frac{2y + 3x}{xy}}\end{aligned}$$

□

Classwork Problems:

1. Evaluate each exponential expression.

(a)  $6^2 \cdot 2^4$

(c)  $(-5)^2$

(b)  $-3^3$

**Solution**

(a)

$$6^2 \cdot 2^4 = 36 \cdot 16 = \boxed{576}$$

(c)

$$(-5)^2 = \boxed{25}$$

(b)

$$-3^3 = \boxed{-27}$$

□

2. Evaluate each expression.

(a)  $\sqrt{25} - \sqrt{4}$

(c)  $\sqrt{(-6)^2}$

(b)  $\sqrt{25 - 16}$

(d)  $\sqrt{\frac{100}{64}}$

**Solution**

(a)

$$\begin{aligned}\sqrt{25} - \sqrt{4} &= 5 - 2 \\ &= \boxed{3}\end{aligned}$$

(d)

$$\begin{aligned}\sqrt{\frac{100}{64}} &= \frac{\sqrt{100}}{\sqrt{64}} \\ &= \frac{10}{8} \\ &= \frac{2 \cdot 5}{2 \cdot 4} \\ &= \boxed{\frac{5}{4}}\end{aligned}$$

(b)

$$\begin{aligned}\sqrt{25 - 16} &= \sqrt{9} \\ &= \boxed{3}\end{aligned}$$

(c)

$$\begin{aligned}\sqrt{(-6)^2} &= \sqrt{36} \\ &= \boxed{6}\end{aligned}$$

□

3. Use the order of operations to simplify each expression:

(a)  $8 - 3[-2(2 - 5) - 4(8 - 6)]$

(c)  $4^2 + (8 - 2)^2 - 4$

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

(d)  $2 \cdot 3^2 - (12 - 14)$

**Solution**

(a)

$$\begin{aligned} 8 - 3[-2(2 - 5) - 4(8 - 6)] &= 8 - 3[-2(-3) - 4(2)] \\ &= 8 - 3[6 - 8] \\ &= 8 - 3[-2] \\ &= 8 + 6 \\ &= \boxed{14} \end{aligned}$$

(b)

$$\begin{aligned} \frac{2(-2) - 4(-3)}{5 - 8} &= \frac{-4 + 12}{-3} \\ &= \frac{8}{-3} \\ &= \boxed{-\frac{8}{3}} \end{aligned}$$

(c)

$$\begin{aligned} 4^2 + (8 - 2)^2 - 4 &= 16 + (6)^2 - 4 \\ &= 16 + 36 - 4 \\ &= \boxed{48} \end{aligned}$$

(d)

$$\begin{aligned} 2 \cdot 3^2 - (12 - 14) &= 2 \cdot 9 - (-2) \\ &= 18 + 2 \\ &= \boxed{20} \end{aligned}$$

□

4. Evaluate the given algebraic expression using the given  $x$  value:

(a)  $9 + 2x; x = 5$

(c)  $7 + 8(x - 3)^2; x = 7$

(b)  $x^2 + 2x; x = 2$

(d)  $\frac{3(x + 2)}{15x - 30}; x = 3$

**Solution**

(a)

$$\begin{aligned} 9 + 2(5) &= 9 + 10 \\ &= \boxed{19} \end{aligned}$$

(d)

$$\frac{3(3 + 2)}{15(3) - 30} = \frac{3(5)}{45 - 30}$$

(b)

$$\begin{aligned} (2)^2 + 2(2) &= 4 + 4 \\ &= \boxed{8} \end{aligned}$$

$$\begin{aligned} &= \frac{15}{15} \\ &= \boxed{1} \end{aligned}$$

(c)

$$\begin{aligned} 7 + 8(7 - 3)^2 &= 7 + 8(4)^2 \\ &= 7 + 8(16) \\ &= 7 + 128 \\ &= \boxed{135} \end{aligned}$$

□

5. Evaluate the given algebraic expression using the given values of  $x$  and  $y$ :

(a)  $6x - y; x = 3$  and  $y = 8$

(c)  $\frac{2x + 3y}{x + 1}; x = -2$  and  $y = 4$

(b)  $x^2 - 3(x - y); x = 8$  and  $y = 2$

**Solution**

(a)

$$\begin{aligned} 6(3) - 8 &= 18 - 8 \\ &= \boxed{10} \end{aligned}$$

(c)

$$\frac{2(-2) + 3(4)}{-2 + 1} = \frac{-4 + 12}{-1}$$

(b)

$$\begin{aligned} (8)^2 - 3(8 - 2) &= 64 - 3(6) \\ &= 64 - 18 \\ &= \boxed{46} \end{aligned}$$

$$\begin{aligned} &= \frac{8}{-1} \\ &= \boxed{-8} \end{aligned}$$

□

6. Evaluate the algebraic expression for  $x = 2$  and  $y = -5$

(a)  $|x + y|$

(c)  $|x| - |y|$

(b)  $|x - y|$

(d)  $\frac{|x|}{x} + \frac{|y|}{y}$

**Solution**

(a)

$$\begin{aligned} |2 - 5| &= |-3| \\ &= \boxed{3} \end{aligned}$$

(c)

$$\begin{aligned} |2| - |-5| &= 2 - 5 \\ &= \boxed{-3} \end{aligned}$$

(b)

$$\begin{aligned} |2 - (-5)| &= |2 + 5| \\ &= |7| \\ &= \boxed{7} \end{aligned}$$

(d)

$$\begin{aligned} \frac{|2|}{2} + \frac{|-5|}{-5} &= \frac{2}{2} + \frac{5}{-5} \\ &= 1 - 1 \\ &= \boxed{0} \end{aligned}$$

□