

Name: _____

Work on the problem(s) assigned to your group first. Once you present your problem (to the LA or instructor) correctly, move on to the other problems.

1. Evaluate the given algebraic expression using the given x value:

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

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

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

(d) $\frac{3(x + 2)}{15x - 30}$; $x = 9$

Solution

(a)

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

(b)

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

(c)

$$\begin{aligned} 7 + 8(7 - 3)^2 &= 7 + 8(4)^2 \\ &= 7 + 8(16) \\ &= 7 + 108 \\ &= \boxed{115} \end{aligned}$$

(d)

$$\begin{aligned} \frac{3(9 + 2)}{15(9) - 30} &= \frac{3(11)}{135 - 30} \\ &= \frac{33}{105} \\ &= \boxed{\frac{11}{35}} \end{aligned}$$

□

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

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

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

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

Solution

(a)

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

(b)

$$\begin{aligned}(8)^2 - 3(8 - 2) &= 16 - 3(6) \\ &= 16 - 18 \\ &= \boxed{-2}\end{aligned}$$

(c)

$$\begin{aligned}\frac{2(-2) + 3(4)}{-2 + 1} &= \frac{-4 + 12}{-1} \\ &= \frac{8}{-1} \\ &= \boxed{-1}\end{aligned}$$

□

3. Find the intersection or union of the following sets:

(a) $\{6, 7, 8, 9\} \cap \{7, 8, 9\}$

(b) $\{6, 9, 13, 14\} \cup \{9, 14, 15\}$

(c) $\{6, 8, 10, 12\} \cap \{5, 7, 9, 11, 13\}$

Solution

(a) $\boxed{\{7, 8, 9\}}$

(b) $\boxed{\{6, 9, 13, 14, 15\}}$

(c) $\boxed{\emptyset}$

□

4. Find the intersection or union of the following sets:

(a) $\{1, 3, 5, 7\} \cap \{2, 3, 8\}$

(b) $\{s, e, t\} \cap \{t, e, s\}$

(c) $\{1, 3, 7, 8\} \cup \{2, 3, 8\}$

(d) $\{1, 2, 3, 4\} \cup \{2, 4, 5\}$

Solution

(a) $\boxed{\{3\}}$

(b) $\boxed{\{s, e, t\}}$

(c) $\boxed{\{1, 2, 3, 7, 8\}}$

(d) $\boxed{\{1, 2, 3, 4, 5\}}$

□

5. Rewrite each expression without absolute value bars:

(a) $|-203|$

(b) $\frac{-3}{|-3|}$

(c) $|-3| - |-7|$

Solution

(a) $\boxed{203}$

(b) $\frac{-3}{3} = \boxed{-1}$

(c) $|3 - 7| = |-4| = \boxed{4}$

□

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

(a) $|x + y|$

(b) $|x - y|$

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

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

Solution

(a)

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

(b)

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

(c)

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

(d)

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

□

7. For the following problems, write an expression for the distance between the two numbers, then evaluate the expression:

- (a) 16 and 19
- (b) -7 and 12
- (c) -6 and -3

Solution

(a)

$$|16 - 19| = |-3| = \boxed{3}$$

(b)

$$|-7 - 12| = |-19| = \boxed{19}$$

(c)

$$|-6 - (-3)| = |-6 + 3| = |-3| = \boxed{3}$$

□

8. For the following problems, write an expression for the distance between the two numbers, then evaluate the expression:

- (a) 2 and 17
- (b) -19 and -4
- (c) -6 and 8

Solution

(a)

$$|2 - 17| = |-15| = \boxed{15}$$

(b)

$$|-19 - (-4)| = |-19 + 4| = |-15| = \boxed{15}$$

(c)

$$|-6 - 8| = |-14| = \boxed{14}$$

□

9. Simplify the given algebraic expression:

(a) $5(5x + 4) - 12$

(b) $3(7x - 9) + 11x$

(c) $7(5y - 4) + 2(3y + 5)$

Solution

(a)

$$\begin{aligned} 5(5x + 4) - 12 &= 25x + 20 - 12 \\ &= \boxed{25x + 8} \end{aligned}$$

(b)

$$\begin{aligned} 3(7x - 9) + 11x &= 21x - 27 + 11x \\ &= \boxed{32x - 27} \end{aligned}$$

(c)

$$\begin{aligned} 7(5y - 4) + 2(3y + 5) &= 35y - 28 + 6y + 10 \\ &= \boxed{41y - 18} \end{aligned}$$

□

10. Simplify the given algebraic expression:

(a) $6(2y - 9) - (7y + 3)$

(b) $10x^2 + 2 - [3(x^2 - 8) + 9]$

Solution

(a)

$$\begin{aligned} 6(2y - 9) - (7y + 3) &= 12y - 54 - 7y - 3 \\ &= \boxed{5y - 57} \end{aligned}$$

(b)

$$\begin{aligned} 10x^2 + 2 - [3(x^2 - 8) + 9] &= 10x^2 + 2 - [3x^2 - 24 + 9] \\ &= 10x^2 + 2 - [3x^2 - 15] \\ &= 10x^2 + 2 - 3x^2 + 15 \\ &= \boxed{7x^2 + 17} \end{aligned}$$

□

11. Insert either $<$, $>$, or $=$ between the two numbers

(a) $|-6|$ $|-3|$

(b) $\frac{30}{40} - \frac{3}{4}$ $\frac{14}{15} \cdot \frac{15}{14}$

(c) $\frac{8}{13} \div \frac{8}{13}$ $|-1|$

Solution

(a) $|-6| = 6$ and $|-3| = 3$ so and $6 > 3$ so

$$|-6| \boxed{>} |-3|$$

(b)

$$\frac{30}{40} - \frac{3}{4} = \frac{3}{4} - \frac{3}{4} = 0$$

and

$$\frac{14}{15} \cdot \frac{15}{14} = 1$$

thus

$$\frac{30}{40} - \frac{3}{4} \boxed{<} \frac{14}{15} \cdot \frac{15}{14}$$

(c)

$$\frac{8}{13} \div \frac{8}{13} = \frac{8}{13} \cdot \frac{13}{8} = 1$$

and

$$|-1| = 1$$

thus

$$\frac{8}{13} \div \frac{8}{13} \boxed{=} |-1|$$

□

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

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

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

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)

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

□