

**Instructions.** (0 points) Show your work and clearly mark your answer. No calculators allowed.

1. Determine the value of each expression.

$$-(-15) = \boxed{15}$$

$$-|-35| = -(35) \\ = \boxed{-35}$$

2. Simplify the given expressions. If the answer does not exist or is undefined, write "undefined".

a)  $5 \cdot 0 = 0$

b)  $\frac{20}{0} = \text{undefined}$

c)  $0 \div 6 = 0$

d)  $\frac{0}{44} = 0$

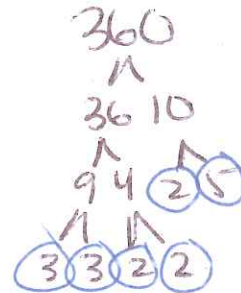
e)  $72 \div 0 = \text{undefined}$

3. Write the prime factorization of 360 in compact form. Show work using a prime factor tree.

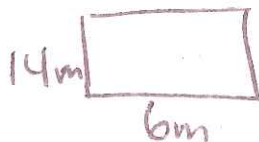
$$360 = 2 \cdot 2 \cdot 2 \cdot 3 \cdot 3 \cdot 5$$

$$= \boxed{2^3 \cdot 3^2 \cdot 5}$$

Smallest  $\rightarrow$  largest



4. Find the perimeter AND area of a rectangle with a length of 6 meters and a width of 14 meters. Be sure to answer in a complete sentence using proper units.



$$\begin{aligned} \text{Perimeter} &= 6 + 6 + 14 + 14 \\ &= 12 + 28 \\ &= 40 \text{ meters} \end{aligned}$$

The perimeter is 40 meters.

$$\begin{aligned} \text{Area} &= l \cdot w \\ &= 6 \cdot 14 \\ &= 84 \text{ m}^2 \end{aligned}$$

The area is  $84 \text{ m}^2$

$$\begin{array}{r} 2 \\ 14 \\ \times 6 \\ \hline 84 \end{array}$$

5. Use order of operations to simplify the expressions:

$$a) \underline{-40 - 9} + (+3) = -49 + 3$$

$$= \boxed{-46}$$

$$b) (\underline{-4 - 6}) - (2 + \underline{+5}) = (-10) - (7)$$

$$= -10 + (-7)$$

$$= \boxed{-17}$$

6. Use order of operations to compute the exact value of each expression:

$$a) \underline{30 \div 5} \cdot 6 = 6 \cdot 6$$

$$= \boxed{36}$$

$$b) 5 - \underline{36 \div 9} \cdot 3 - 6 = 5 - 4 \cdot 3 - 6$$

$$= 5 - 12 - 6$$

$$= -7 - 6$$

$$= \boxed{-13}$$

$$c) 3 + 2| -10 - \underline{(-5)^2} | = 3 + 2 \cdot | -10 - (25) |$$

$$= 3 + 2 \cdot | -10 + (-25) |$$

$$= 3 + 2 \cdot | -35 |$$

$$= 3 + 2(35)$$

$$\begin{array}{r} 35 \\ 35 \\ \hline 70 \end{array}$$

$$d) \frac{7 \cdot 8 - (-4)}{21 - 27}$$

$$= 3 + 70$$

$$= \boxed{73}$$

$$= \frac{56 + 4}{-6}$$

$$= \frac{60}{-6}$$

$$= \boxed{-10}$$

7. Combine like terms and simplify completely:

$$a) \quad 5 + (8 - 4x) = (5 + 8) - 4x \\ = \boxed{13 - 4x}$$

$$b) \quad -2(6a + 10b) - 4(a + 5b) = -12a - 20b - 4a - 20b \\ = \boxed{-16a - 40b}$$

$$c) \quad -10\left(\frac{1}{5}x - \frac{1}{2}y\right) + 12\left(\frac{3}{4}x - \frac{5}{6}y\right) = -\frac{10}{1}\frac{1}{5}x + \frac{10}{1}\left(\frac{1}{2}y\right) + \frac{12}{1}\left(\frac{3}{4}x\right) - \frac{12}{1}\left(\frac{5}{6}y\right) \\ = -2x + 5y + 9x - 10y \\ = \boxed{7x - 5y}$$

8. Evaluate the following expressions at the given value(s):

$$a) \quad 2x^2 + 5x - 3 \text{ at } x = -2 \quad \leftarrow \text{Plug in for } x$$

$$2(-2)^2 + 5(-2) - 3 = 2(4) + 5(-2) - 3 \\ = 8 + (-10) - 3 \\ = -2 - 3 \\ = \boxed{-5}$$

$$b) \quad 5x^2 - 2xy + 3y^2 \text{ at } x = 3 \text{ and } y = -1$$

$$5x^2 - 2xy + 3y^2 = 5(3)^2 - 2(3)(-1) + 3(-1)^2 \\ = 5(9) - 6(-1) + 3(1) \\ = 45 + 6 + 3 \\ = \boxed{54}$$

9. Use the following options to identify the property that justifies each statement and write one letter next to each identity

- a) Commutative property of addition
- b) Commutative property of multiplication
- c) Associative property of addition
- d) Associative property of multiplication
- e) Additive Identity
- f) Distributive property
- g) Multiplicative inverse

$$6(4x + 5) = 24x + 30$$

Letter: f

$$6 + 7 = 7 + 6$$

Letter: a

$$-6(4 \cdot 3) = (-6 \cdot 4) \cdot (3)$$

Letter: d

$$19 + 0 = 19$$

Letter: e

$$8 \cdot (-2) = -2 \cdot 8$$

Letter: b

$$3\left(\frac{1}{3}\right) = 1$$

Letter: g

10. Solve the following equations for  $x$  and CHECK your answers:

a)  $-6x + 20 = -64$

$$-6x = -64 - 20$$

$$-6x = -84$$

$$\frac{-6x}{-6} = \frac{-84}{-6}$$

$$x = 14$$

Check:  $x = 14$

$$-6x + 20 = -64$$

$$-6(14) + 20 = -64$$

$$-84 + 20 = -64$$

$$-64 = -64 \checkmark$$

$$\begin{array}{r} 14 \\ 6 \overline{) 84} \\ \underline{-64} \\ 20 \end{array}$$

b)  $x - 13.5 = -15.2$

$$x - 13.5 + 13.5 = -15.2 + 13.5$$

$$x = -1.7$$

Check:  $x = -1.7$

$$x - 13.5 = -15.2$$

$$(-1.7) - 13.5 = -15.2$$

$$-15.2 = -15.2 \checkmark$$

$$\begin{array}{r} 15.2 \\ -13.5 \\ \hline 1.7 \end{array}$$

c)  $4y + 15 = y$

$$4y + 15 - 4y = y - 4y$$

$$\frac{15}{-3} = \frac{-34}{-3}$$

$$-5 = y$$

$$y = -5$$

Check:  $y = -5$

$$4y + 15 = y$$

$$4(-5) + 15 = (-5)$$

$$-20 + 15 = -5$$

$$-5 = -5 \checkmark$$

$$\begin{array}{r} 13.5 \\ 1.7 \\ \hline 15.2 \end{array}$$

11. Solve the following equations for  $x$  CHECK IS NOT REQUIRED:

a)  $2(5x - 3) - 2x + 4 = 5 - (6x + 1)$

$$10x - 6 - 2x + 4 = 5 - 6x - 1$$

$$8x - 2 = 5 - 6x - 1$$

$$8x - 2 = 4 - 6x$$

$$\begin{array}{r} +2 \quad +2 \\ 8x = 6 - 6x \\ +6x \quad +6x \end{array}$$

$$14x = 6$$

$$x = \frac{6}{14}$$

$$\boxed{x = \frac{3}{7}}$$

LCD = 12 b)  $\frac{1}{4}x - \frac{1}{12} = \frac{1}{3}x + \frac{1}{6}$

$$3 \frac{12}{1} \frac{1}{4} x = \frac{12}{1} \frac{1}{12} = \frac{12^4}{1} \frac{1}{3} x + \frac{12^2}{1} \frac{1}{6}$$

$$\begin{array}{r} 3x - 1 = 4x + 2 \\ +1 \quad +1 \end{array}$$

$$3x = 4x + 3$$

$$3x - 4x = 4x + 3 - 4x$$

$$-x = 3$$

$$\frac{-x}{-1} = \frac{3}{-1}$$

$$\boxed{x = -3}$$