

Name: SOLUTIONS.

Knowledge/Understanding: #1-4

Application: #5,6

TIPS: #7

Communication: all

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1. Evaluate each of the following. [14 marks]

$$\begin{aligned} \text{a) } & -4 - (-8) + (-1) \\ & = -4 + 8 - 1 \quad \checkmark \\ & = 4 - 1 \quad \checkmark \\ & = 3 \end{aligned}$$

$$\begin{aligned} \text{b) } & -10 - 3 \\ & = -13 \quad \checkmark \end{aligned}$$

$$\begin{aligned} \text{c) } & (-1)(4)(-5) \\ & = 20 \quad \checkmark \end{aligned}$$

$$\begin{aligned} \text{d) } & -(5 - 3)^2 - (-1 - 2) \\ & = -(2)^2 - (-3) \quad \checkmark \\ & = -4 + 3 \\ & = -1 \end{aligned}$$

$$\begin{aligned} \text{e) } & 3(1 - 5)(6 - 7) \\ & = 3(-4)(-1) \\ & = 12 \quad \checkmark \end{aligned}$$

$$\begin{aligned} \text{h) } & 3(-4) - (3)(-5) \\ & = -12 + 15 \\ & = 3 \quad \checkmark \end{aligned}$$

$$\begin{aligned} \text{f) } & 3(-2)^2 + (-1)^5 \\ & = 3(4) + (-1) \quad \checkmark \\ & = 12 - 1 \\ & = 11 \end{aligned}$$

$$\begin{aligned} \text{g) } & \frac{3(-2) - 4}{5 - 10} \quad \checkmark \\ & = \frac{-6 - 4}{-5} \\ & = \frac{-10}{-5} = 2 \end{aligned}$$

2. Simplify the following expressions by collecting like terms. [10 marks]

$$\begin{aligned} \text{a) } & 4x - 9 + x - 3 \\ & = 5x - 12 \end{aligned}$$

$$\begin{aligned} \text{b) } & 3m - 4n - 9m + 2n \\ & = -6m - 2n \end{aligned}$$

$$\begin{aligned} \text{c) } & 5x^2 - 8x + x^2 - 3 - x + 8 - 2x \\ & = 6x^2 - 11x + 5 \end{aligned}$$

$$\begin{aligned} \text{d) } & 4xy - 5y^2 - 3x + xy - 9x + y^2 + 3x^2 \\ & = 3x^2 - 12x + 5xy - 4y^2 \end{aligned}$$

3. Evaluate each of the following expressions. [20 marks]

$$\begin{aligned} \text{a) } & \frac{4}{7} - \frac{2}{3} \\ & = \frac{12}{21} - \frac{14}{21} \\ & = -\frac{2}{21} \end{aligned}$$

$$\begin{aligned} \text{b) } & \left(\frac{4}{5}\right)\left(2\frac{1}{2}\right) \\ & = \frac{4}{5} \cdot \frac{5}{2} \\ & = \frac{4}{2} \\ & = 2 \end{aligned}$$

$$\begin{aligned} \text{c) } & 3\frac{3}{5} - \left(-\frac{4}{3}\right) \\ & = \frac{17}{5} + \frac{4}{3} \\ & = \frac{51}{15} + \frac{20}{15} \\ & = \frac{71}{15} \end{aligned}$$

$$\begin{aligned} \text{d) } & \left(\frac{1}{2} - \frac{2}{3}\right)^2 - 2\frac{1}{4} \\ & = \left(\frac{3}{6} - \frac{4}{6}\right)^2 - \frac{9}{4} \\ & = \left(-\frac{1}{6}\right)^2 - \frac{9}{4} \\ & = \frac{1}{36} - \frac{9}{4} \\ & = \frac{1}{36} - \frac{81}{36} \\ & = -\frac{80}{36} \\ & = -\frac{20}{9} \end{aligned}$$

$$\begin{aligned} \text{e) } & \frac{5}{8} \div 3 \\ & = \frac{5}{8} \times \frac{1}{3} \\ & = \frac{5}{24} \end{aligned}$$

$$\begin{aligned} \text{f) } & \frac{3}{4} - \frac{1}{2} - \left(\frac{1}{4}\right)(-3) \\ & = \frac{3}{4} - \frac{1}{2} + \frac{3}{4} \\ & = \frac{3}{4} - \frac{2}{4} + \frac{3}{4} \\ & = \frac{4}{4} \\ & = 1 \end{aligned}$$

$$\begin{aligned} \text{g) } & 4\left(\frac{3}{4}\right) - 10\left(\frac{1}{5}\right) - 8\left(\frac{-1}{4}\right) \\ & = 3 - 2 + 2 \\ & = 3 \end{aligned}$$

4. Use the distributive property to expand and simplify the following expressions. [12 marks]

a) $4(3x - 1)$

$= 12x - 4$ ✓

b) $3(n + 1) - 2(3n - 1)$

$= 3n + 3 - 6n + 2$
 $= -3n + 5$ ✓

c) $(3x^2 - 3x + 1) - (x^2 - x + 7)$

$= 3x^2 - 3x + 1 - x^2 + x - 7$
 $= 2x^2 - 2x - 6$ ✓

d) $5y - 2(3y - 4) + 8$

$= 5y - 6y + 8 + 8$ ✓
 $= -y + 16$

e) $\frac{2}{5}\left(\frac{1}{2}x + \frac{1}{4}\right) - \frac{1}{2}\left(\frac{2}{3}x - \frac{3}{2}\right)$

$= \frac{1}{5}x + \frac{1}{10} - \frac{1}{3}x + \frac{3}{4}$
 $= \frac{-2}{15}x + \frac{17}{20}$

$\frac{1}{5} - \frac{1}{3}$
 $= \frac{3}{15} - \frac{5}{15}$
 $= -\frac{2}{15}$

$\frac{1}{10} + \frac{3}{4}$
 $= \frac{2}{20} + \frac{15}{20}$
 $= \frac{17}{20}$

5. Let $m = -2$, $n = 3$ and $p = -1$. Evaluate both of the expressions below: [6 marks]

a) $m - 2n - 3p$

$= -2 - 2(3) - 3(-1)$
 $= -2 - 6 + 3$
 $= -5$

b) $2m^2 - m + 3n$

$= 2(-2)^2 - (-2) + 3(3)$
 $= 2(4) + 2 + 9$
 $= 8 + 2 + 9$
 $= 19$

$\frac{2}{5} \cdot \frac{1}{2}$
 $= \frac{1}{5}$
 $\frac{2}{5} \cdot \frac{1}{4}$
 $= \frac{2}{20}$
 $= \frac{1}{10}$

6. Evaluate the following for $a = \frac{2}{3}$, $b = \frac{1}{2}$ and $c = \frac{-2}{5}$.

[8 marks]

a) $2a - 4b - c$

$$\begin{aligned} &= 2\left(\frac{2}{3}\right) - 4\left(\frac{1}{2}\right) - \left(\frac{-2}{5}\right) \\ &= \frac{4}{3} - 2 + \frac{2}{5} \\ &= \frac{20}{15} - \frac{30}{15} + \frac{6}{15} \\ &= -\frac{4}{15} \end{aligned}$$

b) $\frac{a-b}{a-c}$

$$\begin{aligned} &= \frac{\frac{2}{3} - \frac{1}{2}}{\frac{2}{3} - \left(\frac{-2}{5}\right)} \\ &= \frac{\frac{4}{6} - \frac{3}{6}}{\frac{10}{15} + \frac{6}{15}} \\ &= \frac{1}{6} = \frac{16}{15} \\ &= \frac{1}{8} \times \frac{15}{16} \end{aligned}$$

$$\begin{aligned} &= \frac{1}{2} \times \frac{5}{16} \\ &= \frac{5}{32} \end{aligned}$$

7. Write an expression that has 7 terms **before it is simplified** and only 3 terms **after it has been simplified**. Show all work. [3 marks]

Many answers

$$\begin{aligned} &x^2 + 5x^2 + 2x + 3x + 8 + 3 + 1 \\ &= 6x^2 + 5x + 12 \end{aligned}$$