

# Solutions

Page 66 #s 3, 4, 5, 6, 8, 10ace, 11bf, 12a,  
14, 15bdf

Page 68 #s 16af, 20c, 24, 26c, 28

3. Identify each of the following pairs as like terms or unlike terms.

a)  $6x$  and  $14x$     b)  $10x$  and  $10y$     c)  $-5a$  and  $10a$     d)  $-9x$  and  $5$

|  
like

|  
unlike

|  
like

|  
unlike

to be a like term, the term must have the same variable(s) and the same exponents.

### 2.3 Adding and Subtracting Monomials (Collecting Like Terms).notebook February 26, 2024

4. State the coefficient for each of the following terms.

- a)  $8x$       b)  $15y$       c)  $-4x$       d)  $x$       e)  $-y$

Coefficient is the big number in front of the variable.

a) 8      b) 15      c) -4      d) 1      e) -1

5. Simplify each of the following expressions by collecting like terms.

- a)  $x+x+x+x$       b)  $2y+5y$       c)  $3x+4x+x$       d)  $9a-5a+4a$

$= 5x$        $= 7y$        $= 8x$        $= 8a$

- e)  $2x+6x-8x$       f)  $3k-7k$       g)  $w+5w-9w$       h)  $2z-10z+7z$

$= 0x$        $= -4k$        $= -3w$        $= -2z$

$= 0$

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6. Simplify each of the following expressions by collecting like terms.

a)  $x+x+y+y+y$

b)  $2a+5a+6b+10b$

c)  $3g+10h+4g+3h$

$$= 2x+3y = 7a+16b = 7g+13h$$

d)  $10c+8d-4c-3d$

e)  $5x+2y-8x-y$

f)  $6m-4m+6n-3m-2n$

$$= 6c+5d = -3x+y = -m+4n$$

8. Kalani and Marc were asked to simplify the expression  $9x+3-4x-10$  by collecting like terms. Kalani's answer was  $5x+(-7)$  and Marc's answer was  $5x-7$ . Was Kalani correct? Was Marc correct? Explain.

They were BOTH correct!

Adding a negative is the same as  
Subtracting a positive.

10. Simplify each of the following expressions by collecting like terms.

$$\text{a) } \underline{2x} + \underline{5x} + \underline{6} + \underline{8}$$

$$2x + 5x = 7x$$

$$6 + 8 = 14$$

$$\Rightarrow 7x + 14$$

$$\text{c) } \underline{16x} - \underline{4y} + \underline{x} + \underline{12y}$$

$$16x + x = 17x$$

$$-4y + 12y = 8y$$

$$\Rightarrow 17x + 8y$$

$$\text{e) } \underline{6t} + \underline{5} - \underline{t} - \underline{9}$$

$$6t - t = 5t$$

$$5 - 9 = -4$$

$$\Rightarrow 5t - 4$$

11. Simplify each of the following expressions by collecting like terms.

$$\text{b) } -8x - (-2x)$$

$$= -8x + 2x$$

$$= -6x$$

$$\text{f) } \underline{2} - \underline{4m} + \underline{9} + \underline{(-11m)}$$

$$-4m - 11m = -15m$$

$$2 + 9 = 11$$

$$\Rightarrow -15m + 11$$

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12. Simplify each of the following expressions by collecting like terms and then evaluate for  $x = 3$  and  $y = -4$ .

a)  $9x + 8y - 4x + 5y$

$$9x - 4x = 5x$$

$$8y + 5y = 13y$$

$$\Rightarrow 5x + 13y$$

Sub in  $x = 3, y = -4$

$$= 5(3) + 13(-4)$$

$$= 15 + (-52)$$

$$= -37$$

14. Identify each of the following pairs as like terms or unlike terms.

a)  $5x$  and  $3x^2$     b)  $-8x$  and  $\frac{2}{3}x$     c)  $-\frac{1}{2}t^2$  and  $\frac{1}{3}t^2$     d)  $3y^2$  and  $2y^3$

unlike

like

like

unlike

Same variable, but different exponents

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15. Simplify each of the following expressions by collecting like terms.

b)  $\underline{14x^2} + \underline{5x} + \underline{3x^2} - \underline{2x}$

$$14x^2 + 3x^2 = 17x^2$$

$$5x - 2x = 3x$$

$$\Rightarrow 17x^2 + 3x$$

d)  $\underline{-20x^2} + \underline{4x} + \underline{(-4x^2)} - \underline{5x}$

$$-20x^2 - 4x^2 = -24x^2$$

$$4x - 5x = -x$$

$$\Rightarrow -24x^2 - x$$

f)  $\underline{x^2} - \underline{4x} + \underline{x^2} + \underline{(-3x)}$

$$x^2 + x^2 = 2x^2$$

$$-4x - 3x = -7x$$

$$\Rightarrow 2x^2 - 7x$$

16. Simplify each of the following expressions by collecting like terms and then evaluate for  $x = -2$  and  $y = 3$ .

a)  $\underline{-2x^2} + \underline{4x} + \underline{6x^2} - \underline{7x}$

$$-2x^2 + 6x^2 = 4x^2$$

$$4x - 7x = -3x$$

$$\Rightarrow 4x^2 - 3x$$

Sub in  $x = -2, y = 3$

$$4(-2)^2 - 3(-2)$$

$$= 4(4) - (-6)$$

$$= 16 + 6$$

$$= 22$$

f)  $\underline{3x^2} - \underline{4y} + \underline{7x} - \underline{8y^2} + \underline{6y} - \underline{7x}$

$$-4y + 6y = 2y$$

$$7x - 7x = 0$$

$$\Rightarrow 3x^2 - 8y^2 + 2y$$

$$3(-2)^2 - 8(3)^2 + 2(3)$$

$$= 3(4) - 8(9) + 6$$

$$= 12 - 72 + 6$$

$$= -54$$

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20. Simplify each of the following expressions by collecting like terms.

$$c) \frac{2}{3}x + 5 - \frac{5}{6}x + \frac{4}{3}$$

$$\frac{2}{3}x - \frac{5}{6}x$$

$$5 + \frac{4}{3}$$

$$= \frac{4}{6}x - \frac{5}{6}x$$

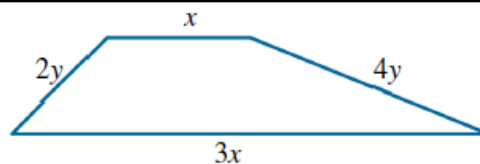
$$= 5 + 1\frac{1}{3}$$

$$= -\frac{1}{6}x$$

$$= 6\frac{1}{3}$$

$$\Rightarrow -\frac{1}{6}x + 6\frac{1}{3}$$

24. Determine a simplified expression for the perimeter of the trapezoid shown on the right.



$$P = \underline{2y} + \underline{x} + \underline{4y} + \underline{3x}$$

$$2y + 4y = 6y$$

$$x + 3x = 4x$$

$$\Rightarrow P = 6y + 4x$$

$$[ \text{OR } P = 4x + 6y ]$$

26. Simplify each of the following expressions by collecting like terms.

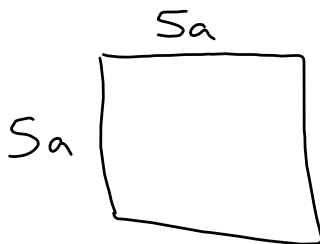
c)  $\underline{-7a^2b} - \underline{4a^2b^2} + 8ab^2 + \underline{3a^2b^2} - \underline{2a^2b}$

$$-7a^2b - 2a^2b = -9a^2b$$

$$-4a^2b^2 + 3a^2b^2 = -a^2b^2$$

$$\Rightarrow -9a^2b - a^2b^2 + 8ab^2$$

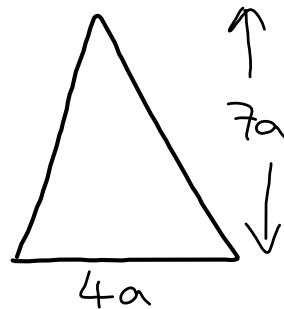
28. A square has a side length of  $5a$  cm. A triangle has a base of  $4a$  cm and a height of  $7a$  cm. Determine a simplified expression to represent the difference in the areas of these two shapes. Which shape has the greater area?



$$A = l \times w$$

$$A = 5a \times 5a$$

$$A = 25a^2$$



$$A = \frac{b \times h}{2}$$

$$A = \frac{4a \times 7a}{2}$$

$$A = \frac{28a^2}{2} = 14a^2$$

$$\begin{aligned} \text{Difference in areas} &= 25a^2 - 14a^2 \\ &= 11a^2 \end{aligned}$$