

3.2 Adding and Subtracting Linear Expressions

Learning Targets

- **Add Expressions**
- **Subtract Expressions**

What is a Linear Expression?

A Linear Expression is an algebraic expression in which the exponent of the variable is 1.

Linear Expressions

$$-3y - 17$$

$$4x$$

$$3x + 5$$

$$15 - \frac{3}{7}y$$

Non-Linear Expressions

$$x^2$$

$$3m^2 - 8$$

$$-2y^3 + 4$$

Adding Linear Expressions

linear solution

vertical solution

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

$$\textcircled{1x} \text{ } \boxed{-2} \text{ } \textcircled{+ 3x} \text{ } \boxed{+ 8}$$

$$4x + 6$$

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

$$\begin{array}{r} x - 2 \\ + 3x + 8 \\ \hline 4x + 6 \end{array}$$

Adding Linear Expressions

linear solution

vertical solution

$$(-4y - 3) + (11y - 5)$$

$$\begin{array}{r} (-4y - 3) + (11y - 5) \end{array}$$

$$7y - 8$$

$$(-4y - 3) + (11y - 5)$$

$$\begin{array}{r} -4y - 3 \\ + 11y - 5 \\ \hline 7y - 8 \end{array}$$

Adding Linear Expressions

$$(8x + 6) + 3(4x - 5)$$

$$(8x + 6) + 3(4x - 5)$$

$$\begin{array}{r} 8x + 6 \\ + 3(4x - 5) \\ \hline \end{array}$$

$$\begin{array}{r} 8x + 6 \\ 12x - 15 \\ \hline 20x - 9 \end{array}$$

Simplify

$$\textcircled{-3}(4x - 5)$$

$$-12x + 15$$

Subtracting Linear Expressions

linear solution

$$(8x + 6) - 3(4x - 5)$$
$$\boxed{8x+6} - \boxed{12x} + \boxed{15}$$

$$-4x + 21$$

vertical solution

$$\boxed{(8x + 6)} - \boxed{3(4x - 5)}$$

$$\begin{array}{r} 8x + 6 \\ - 3(4x - 5) \\ \hline \end{array}$$

$$\begin{array}{r} 8x + 6 \\ - 12x + 15 \\ \hline - 4x + 21 \end{array}$$

Rewriting Linear Expressions

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

$$-6 + 17x = 17x - 6$$

$$-19 - 12w = -12w - 19$$

$$16 - 7h = -7h + 16$$

Subtracting Linear Expressions

$$3(5m + 2) - \frac{1}{2}(8 - 12m)$$

$$3(5m + 2) \\ - \frac{1}{2}(8 - 12m)$$

$$15m + 6 \\ - 4 + 6m$$

$$\begin{array}{r} 15m + 6 \\ + 6m - 4 \\ \hline 21m + 2 \end{array}$$

$$-2(4x-5) - (2x-4)$$

$$\textcircled{-2}(4x-5) \quad \textcircled{-1}(2x-4)$$

$$-8x + 10$$

$$-2x + 4$$

$$-10x + 14$$

Real-Life Application

The original price of a cowboy hat is d dollars. You use a coupon and buy the hat for $(d - 2)$ dollars. You decorate the hat and sell it for $(2d - 4)$ dollars. Write an expression that represents your earnings from buying and selling the hat. Interpret the expression.



$$\text{Profit} = \text{Selling Price} - \text{Costs}$$
$$\$ = (2d - 4) - (d - 2)$$

$$\begin{array}{r} 2d - 4 \\ - (d - 2) \\ \hline 2d - 4 \\ - d + 2 \\ \hline d - 2 \end{array}$$

$$\$ = d - 2$$

3.2 Homework

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**#1-3 All, 9 - 23 All,
28 and 29**

