GRADE 7 · UNIT 9 · LESSON 3–4

Subtracting Linear Expressions; Adding and Subtracting With Rational Coefficients

MA.7.AR.1.1

I can subtract linear expressions with rational coefficients, and decide whether a situation adds or subtracts.

Warm-Up

1. Find the sum: $\left(\frac{1}{4}x + 5\right) + \left(\frac{1}{3}x - 2\right)$
2. A trapezoid: bases 6 cm and 10 cm, height 4 cm. Find the area.
3. Find the value: $4 - (-2.5)$
4. A spinner has 4 equal sections, numbered 1 to 4. Find P(not 1).

Warm-Up

1. Find the sum: $\left(\frac{1}{4}x + 5\right) + \left(\frac{1}{3}x - 2\right)$ $\frac{7}{12}x + 3$

2. A trapezoid: bases 6 cm and 10 cm, height 4 cm. Find the area.

   32 cm²

3. Find the value: $4 - (-2.5)$ **6.5**

4. A spinner has 4 equal sections, numbered 1 to 4. Find P(not 1).

   $\frac{3}{4}$

Vocabulary

opposite

the same expression with every sign flipped: the opposite of $2x - 5$ is $-2x + 5$

subtracted from

the order words: "A subtracted from B" means B − A

mixed number

a whole and a fraction, like the $2\frac{1}{2}$ in $2\frac{1}{2}x$

Notes

I. The –1 in front

$$(4x + 1) - (3x - 6) = (4x + 1) + (-1)(3x - 6)$$

$$= 4x + 1 - 3x + 6 = x + 7$$

A minus in front of a group is a –1 multiplying every term inside: 3x becomes –3x and –6 becomes +6.

Notes

II. A mixed number, and a minus before the group

$$7\frac{1}{2}x - 4 - (2 - x)$$

$$= 7\frac{1}{2}x - 4 - 2 + x = 8\frac{1}{2}x - 6$$

The –1 reaches the 2 and the –x: –2 and +x.

Notes

III. Add or subtract?

Subtract: how much more, how much longer, the difference, taken out, subtracted from.

Add: in all, together, the total, combined.

"A subtracted from B" is B – A: the order is reversed.

Example 1

$$(5x - 1) - (0.4x - 4)$$

Write the difference with the fewest terms.

Example 1

$$(5x - 1) + (-1)(0.4x - 4)$$

$$5x - 1 - 0.4x + 4$$

$$4.6x + 3$$

Answer: 4.6x + 3

Your Turn

$$(6n - 2.5) - (1.5n - 7)$$

Write the difference with the fewest terms.

Your Turn

$$(6n - 2.5) - (1.5n - 7)$$

Write the difference with the fewest terms.

$(6n - 2.5) - (1.5n - 7) = 6n - 2.5 - 1.5n + 7$

$6n - 1.5n = 4.5n, \quad -2.5 + 7 = 4.5$

$4.5n + 4.5$

Answer: $4.5n + 4.5$

Example 2

$$\left(\frac{2}{3}k - \frac{1}{5}\right) - \left(-\frac{1}{3}k + \frac{3}{5}\right)$$

Write the difference with the fewest terms.

Example 2

$$\frac{2}{3}k - \frac{1}{5} + \frac{1}{3}k - \frac{3}{5}$$

$$\frac{2}{3}k + \frac{1}{3}k = k \qquad -\frac{1}{5} - \frac{3}{5} = -\frac{4}{5}$$

$$k - \frac{4}{5}$$

Answer: k – ⅘

Your Turn

$$\left(\frac{3}{5}p - \frac{2}{7}\right) - \left(-\frac{2}{5}p + \frac{3}{7}\right)$$

Write the difference with the fewest terms.

Your Turn

$$\left(\frac{3}{5}p - \frac{2}{7}\right) - \left(-\frac{2}{5}p + \frac{3}{7}\right)$$

Write the difference with the fewest terms.

$$\frac{3}{5}p + \frac{2}{5}p = p$$

$$-\frac{2}{7} - \frac{3}{7} = -\frac{5}{7}$$

$$p - \frac{5}{7}$$

Answer: $p - \frac{5}{7}$

Whiteboards · Question 1 of 9

$$(5x + 4) - (2x + 1)$$

Answer it.

Whiteboards · Question 1 of 9

$$(5x + 4) - (2x + 1)$$

$$(5x + 4) - (2x + 1) = 5x + 4 - 2x - 1$$

$$3x + 3$$

Answer: $3x + 3$

Whiteboards · Question 2 of 9

$$(5x + 4) - (2x - 1)$$

Answer it.

Whiteboards · Question 2 of 9

$$(5x + 4) - (2x - 1)$$

$$(5x + 4) - (2x - 1) = 5x + 4 - 2x + 1$$

$$3x + 5$$

Answer: $3x + 5$

Whiteboards · Question 3 of 9

$$(5x + 4) - (-2x - 1)$$

Answer it.

Whiteboards · Question 3 of 9

$$(5x + 4) - (-2x - 1)$$

$$(5x + 4) - (-2x - 1) = 5x + 4 + 2x + 1$$

$$7x + 5$$

Answer: $7x + 5$

Whiteboards · Question 4 of 9

$$(5x - 1) - (0.5x - 4 + 2x)$$

Answer it.

Whiteboards · Question 4 of 9

$$(5x - 1) - (0.5x - 4 + 2x)$$

Inside first: $0.5x - 4 + 2x = 2.5x - 4$

$(5x - 1) - (2.5x - 4) = 5x - 1 - 2.5x + 4$

$2.5x + 3$

Answer: $2.5x + 3$

Whiteboards · Question 5 of 9

$$5 - (3x + 2)$$

A. $7 - 3x$

B. $3x + 3$

C. $-3x + 3$

D. $-3x - 7$

Answer it.

Whiteboards · Question 5 of 9

$$5 - (3x + 2)$$

$$5 - (3x + 2) = 5 - 3x - 2$$

$$-3x + 3$$

Answer: C — −3x + 3

Whiteboards · Question 6 of 9

Ana's ribbon is 2.5d + 3 inches long and cost $4. Ben's is 1.25d – 0.5 inches.

How much longer is Ana's ribbon?

Answer it.

Whiteboards · Question 6 of 9

Ana's ribbon is $2.5d + 3$ inches long and cost \$4. Ben's is $1.25d - 0.5$ inches.

How much longer is Ana's ribbon?

$$(2.5d + 3) - (1.25d - 0.5) = 2.5d + 3 - 1.25d + 0.5$$

$1.25d + 3.5$ inches

Answer: $1.25d + 3.5$

Whiteboards · Question 7 of 9

Kai's playlist is 4.5s + 2 minutes long and Mia's is 3s – 1.5 minutes.

How long are the two playlists together?

Answer it.

Whiteboards · Question 7 of 9

Kai's playlist is 4.5s + 2 minutes long and Mia's is 3s – 1.5 minutes.

How long are the two playlists together?

$$(4.5s + 2) + (3s - 1.5)$$

$$7.5s + 0.5 \text{ minutes}$$

Answer: $7.5s + 0.5$

Whiteboards · Question 8 of 9

What is the result when $1\frac{1}{4}x + 3$ is subtracted from $2\frac{1}{2}x - 1$?

A. $1\frac{1}{4}x + 2$

B. $3\frac{3}{4}x + 2$

C. $-1\frac{1}{4}x + 4$

D. $1\frac{1}{4}x - 4$

Answer it.

Whiteboards · Question 8 of 9

What is the result when $1\frac{1}{4}x + 3$ is subtracted from $2\frac{1}{2}x - 1$?

Subtracted from: second minus first

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

$\frac{5}{4}x - 4$, which is 1¼x – 4

Answer: D — 1¼x – 4

Whiteboards · Question 9 of 9

$(x + 6) - (5 - 3x)$: Noor gets $-2x + 1$, Lin gets $5x$, Jada gets $4x + 1$.

Who is right? Say what the others did wrong.

Write your answer in sentences.

Whiteboards · Question 9 of 9

$(x + 6) - (5 - 3x)$: Noor gets $-2x + 1$, Lin gets $5x$, Jada gets $4x + 1$.

Who is right? Say what the others did wrong.

$x + 6 - 5 + 3x = 4x + 1$: Jada

Noor's minus stopped at the 5; Lin combined unlike terms.

Answer: Jada. Noor's minus stopped at the 5; Lin combined unlike terms.

Independent Practice

1. Rewrite with the fewest terms: $(7x + 3) - (2x + 1)$
2. Rewrite with the fewest terms: $(7x + 3) - (2x - 1)$
3. Rewrite with the fewest terms: $\left(\frac{3}{5}n + 2\right) - \left(\frac{1}{5}n + 5\right)$
4. Rewrite with the fewest terms: $(4.2y - 1) - (1.2y - 2.5)$
5. Rewrite with the fewest terms: $\left(2 - \frac{1}{4}m\right) - \left(1 - \frac{3}{4}m\right)$
6. Rewrite with the fewest terms: $\left(\frac{1}{3}k + 2\right) - \left(\frac{1}{3}k - 5\right)$

Before You Go

Write the –1 in front. Every sign inside flips.

A subtracted from B is B – A.

Monday: are two expressions equivalent? Numbers first.

IXL

1. Open IXL and start today's skills.
2. Work on paper where the question needs work. The answer box does not show it.
3. Every skill listed is required, to a SmartScore of 60. Due by the Unit 9 test.

Today's skills — all required

Subtract linear expressions (KCX)

Add and subtract linear expressions (6BT)