GRADE 7 · UNIT 9 · LESSON 2

Adding Linear Expressions With Rational Coefficients

MA.7.AR.1.1

I can add linear expressions with fraction and decimal coefficients and write the sum with the fewest terms.

Warm-Up

1. Find the sum: $(2x - 7) + (5x + 3)$
2. A circle: radius 5 cm. Find the circumference. Use 3.14.
3. Find the value: $\frac{2}{5} + \frac{1}{3}$
4. Find the value: $2.4 + 0.35$

Warm-Up

1. Find the sum: $(2x - 7) + (5x + 3)$ $7x - 4$
2. A circle: radius 5 cm. Find the circumference. Use 3.14.

   31.4 cm
3. Find the value: $\frac{2}{5} + \frac{1}{3}$ $\frac{11}{15}$
4. Find the value: $2.4 + 0.35$ **2.75**

Vocabulary

rational coefficient

a coefficient that is a fraction or a decimal: $\frac{2}{3}$ in $\frac{2}{3}x$, 1.25 in 1.25x

common denominator

the denominator two fractions are rewritten over before they are added: $\frac{1}{4}x + \frac{5}{8}x = \frac{7}{8}x$

Notes

I. Fraction coefficients: a common denominator

$$\frac{1}{4}x + \frac{5}{8}x = \frac{2}{8}x + \frac{5}{8}x = \frac{7}{8}x$$

Quarters and eighths are different-sized pieces, so rewrite over a common denominator first. Then add the numerators and keep the x.

Notes

II. Decimal coefficients: line up the places

$$1.25x + 0.5x = 1.75x$$

Line the decimals up at the point and add. The x waits.

Notes

III. Three rules for the answer

A fraction stays a fraction: $\frac{1}{3}x$ is not $0.33x$.

A coefficient of 1 is written as the letter alone: $1m$ is m.

A coefficient of 0 drops the term: $0p + 4$ is 4.

Example 1

$$\left(4+\frac{2}{3}x\right)+\left(\frac{1}{6}x-3\right)$$

Write the sum with the fewest terms.

Example 1

$$\frac{2}{3}x + \frac{1}{6}x = \frac{4}{6}x + \frac{1}{6}x = \frac{5}{6}x$$

$$4 - 3 = 1$$

$$\frac{5}{6}x + 1$$

Answer: $\frac{5}{6}x + 1$

Your Turn

$$\left(5+\frac{3}{4}x\right)+\left(\frac{1}{8}x-2\right)$$

Write the sum with the fewest terms.

Your Turn

$$\left(5+\frac{3}{4}x\right)+\left(\frac{1}{8}x-2\right)$$

Write the sum with the fewest terms.

$$\frac{3}{4}x+\frac{1}{8}x=\frac{6}{8}x+\frac{1}{8}x=\frac{7}{8}x$$

$$5-2=3$$

$$\frac{7}{8}x+3$$

Answer: $\frac{7}{8}x+3$

Example 2

$$(2.4x - 1.5) + (-0.6x + 3.25)$$

Write the sum with the fewest terms.

Example 2

$2.4x - 0.6x = 1.8x$

$-1.5 + 3.25 = 1.75$

$1.8x + 1.75$

Answer: $1.8x + 1.75$

Your Turn

$$(1.2y + 4.5) + (-0.5y - 0.75)$$

Write the sum with the fewest terms.

Your Turn

$$(1.2y + 4.5) + (-0.5y - 0.75)$$

Write the sum with the fewest terms.

$1.2y - 0.5y = 0.7y$

$4.5 - 0.75 = 3.75$

$0.7y + 3.75$

Answer: $0.7y + 3.75$

Whiteboards · Question 1 of 9

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

Answer it.

Whiteboards · Question 1 of 9

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

$$\frac{1}{4}x + \frac{1}{4}x = \frac{2}{4}x = \frac{1}{2}x$$

$$3 - 1 = 2$$

$$\frac{1}{2}x + 2$$

Answer: $\frac{1}{2}x + 2$

Whiteboards · Question 2 of 9

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

Answer it.

Whiteboards · Question 2 of 9

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

$$\frac{1}{3}x + \frac{1}{4}x = \frac{4}{12}x + \frac{3}{12}x = \frac{7}{12}x$$

$$3 - 1 = 2$$

$$\frac{7}{12}x + 2$$

Answer: $\frac{7}{12}x + 2$

Whiteboards · Question 3 of 9

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

Answer it.

Whiteboards · Question 3 of 9

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

$$-\frac{3}{4}x+\frac{1}{2}x=-\frac{3}{4}x+\frac{2}{4}x=-\frac{1}{4}x$$

$$3-1=2$$

$$-\frac{1}{4}x+2$$

Answer: $-\frac{1}{4}x+2$

Whiteboards · Question 4 of 9

$$\left(\frac{5}{8}m + 2\right) + \left(\frac{3}{8}m - 7\right)$$

Answer it.

Whiteboards · Question 4 of 9

$$\left(\frac{5}{8}m + 2\right) + \left(\frac{3}{8}m - 7\right)$$

$$\frac{5}{8}m + \frac{3}{8}m = \frac{8}{8}m = m$$

$$2 - 7 = -5$$

$$m - 5$$

Answer: $m - 5$

Whiteboards · Question 5 of 9

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

A. $0.83x - 3$

B. $\frac{2}{5}x - 3$

C. $\frac{5}{6}x - 3$

D. $\frac{5}{6}x + 7$

Answer it.

Whiteboards · Question 5 of 9

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

$$\frac{1}{3}x + \frac{1}{2}x = \frac{2}{6}x + \frac{3}{6}x = \frac{5}{6}x$$

$$2 - 5 = -3$$

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

Answer: C — ⅚x − 3

Whiteboards · Question 6 of 9

Two trails start 4 miles from town. One is 1.5d + 2 miles long, the other 0.75d – 0.5 miles.

How long are the two trails together?

Answer it.

Whiteboards · Question 6 of 9

Two trails start 4 miles from town. One is 1.5d + 2 miles long, the other 0.75d – 0.5 miles.

How long are the two trails together?

$(1.5d + 2) + (0.75d - 0.5)$

$1.5d + 0.75d = 2.25d, \quad 2 - 0.5 = 1.5$

$2.25d + 1.5$ miles

Answer: $2.25d + 1.5$

Whiteboards · Question 7 of 9

$$(-0.4p + 1.2) + (0.4p + 3)$$

Answer it.

Whiteboards · Question 7 of 9

$$(-0.4p + 1.2) + (0.4p + 3)$$

$-0.4p + 0.4p = 0$ — a zero pair

$1.2 + 3 = 4.2$

4.2

Answer: 4.2

Whiteboards · Question 8 of 9

$$(2.6x - 1) + (-0.4x + 2)$$

A. $2.2x + 3$

B. $2.2x + 1$

C. $3x + 1$

D. $2.2x - 3$

Answer it.

Whiteboards · Question 8 of 9

$$(2.6x - 1) + (-0.4x + 2)$$

$$2.6x - 0.4x = 2.2x$$

$$-1 + 2 = 1$$

$$2.2x + 1$$

Answer: B — 2.2x + 1

Whiteboards · Question 9 of 9

A walk is $\frac{1}{3}d + 2$ km on Saturday and $\frac{2}{3}d + 3$ km on Sunday.

How far is the whole walk? Explain why the d-terms can be added but d and 2 cannot.

Write your answer in sentences.

Whiteboards · Question 9 of 9

A walk is $\frac{1}{3}d + 2$ km on Saturday and $\frac{2}{3}d + 3$ km on Sunday.

How far is the whole walk? Explain why the d-terms can be added but d and 2 cannot.

d-terms: $\frac{1}{3}d + \frac{2}{3}d = d$

Constants: $2 + 3 = 5$, so d + 5 km

Answer: d + 5 km. The d-terms are like terms; d and 2 are not.

Independent Practice

1. Rewrite with the fewest terms: $\left(\frac{1}{2}x + 4\right) + \left(\frac{1}{4}x + 1\right)$
2. Rewrite with the fewest terms: $\left(\frac{2}{3}x + 4\right) + \left(\frac{1}{6}x - 9\right)$
3. Rewrite with the fewest terms: $\left(-\frac{2}{5}n + 1\right) + \left(\frac{1}{5}n + 3\right)$
4. Rewrite with the fewest terms: $(3.4x + 2) + (1.6x - 5)$
5. Rewrite with the fewest terms: $(1.2y - 3.5) + (-0.2y + 1.5)$
6. Rewrite with the fewest terms: $\left(\frac{3}{4}m + 1\right) + \left(-\frac{3}{4}m + \frac{1}{2}\right)$

Before You Go

Rewrite over a common denominator, add the tops, keep the x.

A fraction stays a fraction.

Tomorrow: subtracting — the –1 in front, with fractions and decimals.

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

Add linear expressions (RPY)