GRADE 7 · UNIT 9 · SPIRAL DAY

Unit 9 Spiral Day

MA.7.AR.1.1, MA.7.AR.1.2

I can add, subtract and rewrite linear expressions, and say whether two are equivalent — and name the mistake when they are not.

Warm-Up

1. Rewrite with the fewest terms: $-\frac{1}{2}(8x - 6)$
2. Find the value of $-3x + 4$ when $x = -2$.
3. Find the difference: $(7x + 2) - (3x - 1)$
4. Find the value: $-\frac{3}{4} + \frac{1}{2}$

Warm-Up

1. Rewrite with the fewest terms: $-\frac{1}{2}(8x - 6)$ $-4x + 3$
2. Find the value of $-3x + 4$ when $x = -2$. **10**
3. Find the difference: $(7x + 2) - (3x - 1)$ $4x + 3$
4. Find the value: $-\frac{3}{4} + \frac{1}{2}$ $-\frac{1}{4}$

Vocabulary

like terms

terms with the same variable part: 4x and 2x, or 3 and 5

distribute

multiply the factor outside by every term inside: –3(2x – 4) is –6x + 12

evaluate

find the value of an expression at one value of x

equivalent

the same value for every x, even if written differently

Notes

I. Like terms, and the minus that reaches both

$$(4x - 1) - (x - 6) = 4x - 1 - x + 6 = 3x + 5$$

Combine like terms only. The minus reaches both terms: −(x − 6) is −x + 6. (9.01, 9.03)

Notes

II. Distribute to every term, then combine

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

The factor reaches every term; a negative factor changes every sign. Then combine. (9.08)

Notes

III. Testing proves 'not equivalent'; rewriting proves 'equivalent'

$2x + 1$ and $3x + 1$ at $x = 0$: 1 and 1. at $x = 1$: 3 and 4.

One difference proves not equivalent. One match proves nothing. Rewrite to prove equivalent. (9.06–07, 9.08)

Example 1

$3x + 2$ and $x - 4$

(a) their sum (b) their difference, first minus second

(c) Is their sum equivalent to $2(2x - 1)$? (d) their sum at $x = -1$

Answer all four.

Example 1

(a) $(3x + 2) + (x - 4) = 4x - 2$

(b) $(3x + 2) - (x - 4) = 2x + 6$

(c) $2(2x - 1) = 4x - 2$: yes, the sum

(d) $4(-1) - 2 = -6$

Answer: (a) $4x - 2$ (b) $2x + 6$ (c) Yes, $4x - 2$ (d) -6

Your Turn

$2x + 5$ and $x - 3$

(a) their sum (b) their difference, first minus second

(c) Is their sum equivalent to $3(x + 1)$? (d) their sum at $x = -1$

Your Turn

$2x + 5$ and $x - 3$

(a) their sum (b) their difference, first minus second

(c) Is their sum equivalent to $3(x + 1)$? (d) their sum at $x = -1$

(a) $3x + 2$ (b) $x + 8$

(c) No: $3(x + 1) = 3x + 3$ (d) $3(-1) + 2 = -1$

Answer: (a) 3x + 2 (b) x + 8 (c) No, 3x + 3 (d) –1

Example 2

$8 - 3x - 2$ $\qquad$ $\frac{1}{2}x + 6 - 3\frac{1}{2}x$

$-3x + 4.5 + 1.25$ $\qquad$ $-x - 2x + 6$

Three are equivalent. Which one doesn't belong, and why?

Example 2

$$8 - 3x - 2 = 6 - 3x$$

$$\frac{1}{2}x + 6 - \frac{7}{2}x = 6 - 3x$$

$$-3x + 4.5 + 1.25 = 5.75 - 3x$$

$$-x - 2x + 6 = 6 - 3x$$

Answer: The third: 5.75 – 3x. The others are 6 – 3x.

Your Turn

$10 - 2x - 4$

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

$-2x + 3.5 + 2.5$

$-x - x + 6$

Three are equivalent. Which one doesn't belong, and why?

Your Turn

$10 - 2x - 4$ $\qquad$ $\frac{1}{4}x + 8 - 2\frac{1}{4}x$

$-2x + 3.5 + 2.5$ $\qquad$ $-x - x + 6$

Three are equivalent. Which one doesn't belong, and why?

$6 - 2x,\ 8 - 2x,\ 6 - 2x,\ 6 - 2x$

The second: its constant is 8.

Answer: The second: 8 – 2x. The others are 6 – 2x.

Whiteboards · Question 1 of 9

$$(4x + 3) + (2x + 1)$$

A. $4x + 6$

B. $10x$

C. $6x$

D. $6x + 4$

Answer it.

Whiteboards · Question 1 of 9

$$(4x + 3) + (2x + 1)$$

$4x + 2x = 6x$ and $3 + 1 = 4$

$6x + 4$

Answer: D — 6x + 4

Whiteboards · Question 2 of 9

$$(5x + 1) - (2x - 3)$$

A. $3x + 4$

B. $3x - 4$

C. $3x - 2$

D. $7x - 2$

Answer it.

Whiteboards · Question 2 of 9

$$(5x + 1) - (2x - 3)$$

$5x + 1 - 2x + 3$: the minus reaches the -3

$3x + 4$

Answer: A — $3x + 4$

Whiteboards · Question 3 of 9

$$\frac{1}{3}x + \frac{1}{2}x$$

A. $\frac{5}{6}$

B. $\frac{5}{6}x$

C. $\frac{1}{6}x$

D. $\frac{2}{5}x$

Answer it.

Whiteboards · Question 3 of 9

$$\frac{1}{3}x + \frac{1}{2}x$$

$\frac{2}{6}x + \frac{3}{6}x$: like denominators first

$\frac{5}{6}x$

Answer: B — ⅚x

Whiteboards · Question 4 of 9

$$-3(2x - 4)$$

A. $-6x - 12$

B. $6x - 12$

C. $-6x + 12$

D. $-6x - 4$

Answer it.

Whiteboards · Question 4 of 9

$$-3(2x - 4)$$

$-3(2x) = -6x$ and $-3(-4) = 12$

$-6x + 12$

Answer: C — $-6x + 12$

Whiteboards · Question 5 of 9

Are $9 - x$ and $x - 9$ equivalent?

Yes or no, and show it.

Answer it.

Whiteboards · Question 5 of 9

Are $9 - x$ and $x - 9$ equivalent?

Yes or no, and show it.

$x = 1$: 8 and -8

No. Subtraction does not commute.

Answer: No — 8 and –8 at x = 1

Whiteboards · Question 6 of 9

Which is equivalent to $4(x + 3)$?

A. $4x + 3$

B. $7x$

C. $x + 12$

D. $4x + 12$

Answer it.

Whiteboards · Question 6 of 9

Which is equivalent to $4(x + 3)$?

$4(x) + 4(3)$: the factor reaches both

$4x + 12$

Answer: D — 4x + 12

Whiteboards · Question 7 of 9

$3x + 1$ and $5x - 3$ both give 7 at $x = 2$.

Are they equivalent? Show it.

Answer it.

Whiteboards · Question 7 of 9

$3x + 1$ and $5x - 3$ both give 7 at $x = 2$.

Are they equivalent? Show it.

$x = 0$: 1 and -3

No. One match proves nothing; one difference proves not equivalent.

Answer: No — 1 and –3 at x = 0

Whiteboards · Question 8 of 9

Mia, who is 12, has $4x + 3$ stickers and gives away $x + 5$ of them.

How many does she have left?

Answer it.

Whiteboards · Question 8 of 9

Mia, who is 12, has $4x + 3$ stickers and gives away $x + 5$ of them.

How many does she have left?

$$(4x + 3) - (x + 5) = 4x + 3 - x - 5$$
$$= 3x - 2$$

Answer: $3x - 2$ stickers

Whiteboards · Question 9 of 9

Priya rewrites $5(x - 2)$ as $5x - 2$.

Name her mistake, and write the correct expression.

Write your answer in sentences.

Whiteboards · Question 9 of 9

Priya rewrites $5(x - 2)$ as $5x - 2$.

Name her mistake, and write the correct expression.

$5(x - 2) = 5x - 10$

The factor reaches every term; Priya's 5 reached only the x.

Answer: The factor reached only the first term. $5(x - 2) = 5x - 10$.

Independent Practice

1. Find the sum: $(7x + 2) + (-3x + 5)$
2. Find the difference: $(6x - 1) - (2x - 7)$
3. Rewrite with the fewest terms: $-4(2x - 3)$
4. Is $3(x + 4)$ equivalent to $3x + 4$? Show it.
5. $x + 5$ and $2x + 5$ both give 5 at $x = 0$. Are they equivalent? Show it.
6. Find the value of $-2x + 9$ when $x = -3$.

Before You Go

Like terms only. The minus reaches both terms. The factor reaches every term.

One difference proves not equivalent; rewrite to prove equivalent.

The practice test's key is on the board. Monday is the test.

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. Every Unit 9 skill is due by the test: bring any still under 60 up to it.

Today's skills — all required

Write equivalent expressions using properties (6XR)
Identify equivalent linear expressions I (DRB)
Identify equivalent linear expressions II (KAR)
Identify equivalent linear expressions using algebra tiles (38V)
Multiply using the distributive property (NUY)