GRADE 7 · UNIT 10 · UNIT REVIEW

Unit 10 Review

MA.7.AR.2.1, MA.7.AR.2.2

I can solve and graph one-step inequalities, solve two-step equations in both forms, and write an inequality from words and an equation from a story.

Warm-Up

1. Solve: $0.8p - 3 = 29$
2. Solve: $2(x - 1.5) = 9$
3. Solve: $-2 \geq y + 1.5$
4. Find the value: $-\frac{3}{4} \times 12$

Warm-Up

1. Solve: $0.8p - 3 = 29$ $p = 40$
2. Solve: $2(x - 1.5) = 9$ $x = 6$
3. Solve: $-2 \geq y + 1.5$ $y \leq -3.5$
4. Find the value: $-\frac{3}{4} \times 12$ -9

Vocabulary

boundary

the number that separates an inequality's solutions from the numbers that are not; the circle sits on it

reverse

turn the symbol around — only when both sides are multiplied or divided by a negative

coefficient

the number that multiplies the variable: 4 in $4x + 3$, and -2 in $-2(x + 3)$

Notes

I. Inequalities: solve like an equation — and the reversal

Add, subtract, or multiply or divide by a positive: the symbol stays.

Multiply or divide by a negative: the symbol reverses, on that line.

$-2x \geq 9$: divide by -2 and reverse: $x \leq -4.5$

Its graph: a closed circle at -4.5, the arrow to the left.

Check a number on each side of the boundary.

Notes

II. Equations: the two forms

$px + q = r$: the constant, then the coefficient. $\frac{3}{4}x - 2 = 7$, so $x = 12$.

$p(x + q) = r$: divide first or distribute first. $-2(x + 3) = 10$, so $x = -8$.

In a story: name the variable, write the equation, solve it, say it with the unit.

Example 1

a. $-4x = 12$ b. $-4x < 12$

c. $-4 + x < 12$ d. $-4(x + 3) = 12$

Solve all four.

Example 1

$-4x = 12$: $x = -3$

$-4x < 12$: $x > -3$ (reversed)

$-4 + x < 12$: $x < 16$ (not reversed)

$-4(x + 3) = 12$: $x + 3 = -3$, $x = -6$

Answer: $x = -3$; $x > -3$; $x < 16$; $x = -6$

Your Turn

a. $-5x = 20$

b. $-5x \geq 20$

c. $-5 + x \geq 20$

d. $-5(x - 2) = 20$

Solve all four.

Your Turn

a. $-5x = 20$ b. $-5x \geq 20$

c. $-5 + x \geq 20$ d. $-5(x - 2) = 20$

Solve all four.

$x = -4$ and $x \leq -4$ (reversed)

$x \geq 25$ (not reversed) and $x - 2 = -4$, so $x = -2$

Answer: $x = -4$; $x \leq -4$; $x \geq 25$; $x = -2$

Example 2

Seven times a number n is at least 60, and n is a whole number.

What is the least n can be? Write and solve an inequality.

Example 2

Seven times n, at least 60: $7n \geq 60$.

Divide by 7, a positive: $n \geq 60 \div 7$, about 8.6.

n is whole: the least whole number that works is 9.

Check: $7 \times 8 = 56$, less than 60; $7 \times 9 = 63$.

Answer: $7n \geq 60$; $n = 9$

Your Turn

Six times a number n is at least 40, and n is a whole number.

What is the least n can be? Write and solve an inequality.

Your Turn

Six times a number n is at least 40, and n is a whole number.

What is the least n can be? Write and solve an inequality.

At least 40: $6n \geq 40$, and $40 \div 6 \approx 6.7$

The least whole number that works: $n = 7$ — $6 \times 6 = 36$ is less than 40

Answer: $6n \geq 40$; $n = 7$

Whiteboards · Question 1 of 9

$y - 3 \geq -5$

Which numbers are solutions? Select all.

A. -1.5

B. -2

C. -2.5

D. -3

E. 0

Answer it.

Whiteboards · Question 1 of 9

$y - 3 \geq -5$

Which numbers are solutions? Select all.

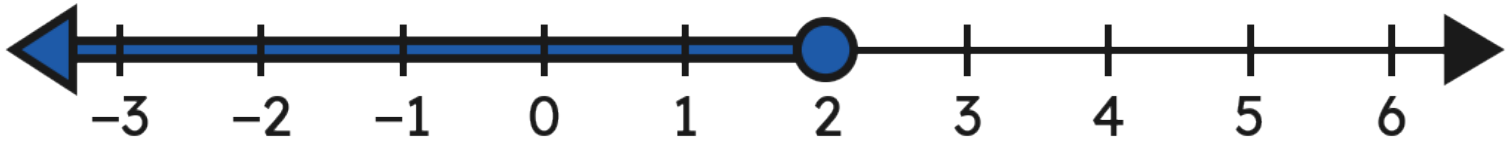
Solve first: $y \geq -2$

−2, 0 and −1.5 are at least −2; −3 and −2.5 are not

Answer: A, B and E

Whiteboards · Question 2 of 9

Which inequality does the graph show?



A. $x \leq -2$

B. $x \leq 2$

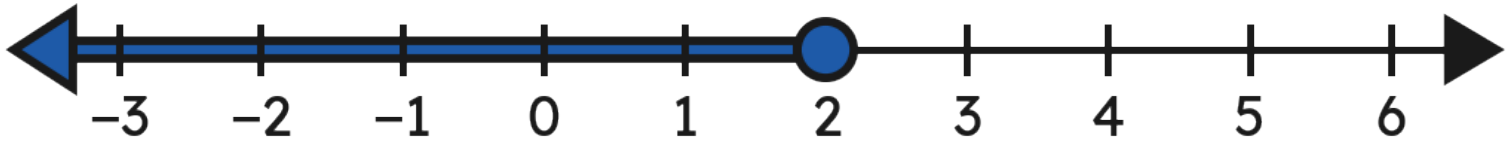
C. $x \geq 2$

D. $x < 2$

Answer it.

Whiteboards · Question 2 of 9

Which inequality does the graph show?



The circle at 2 is closed: 2 is a solution, so the symbol is ≤ or ≥

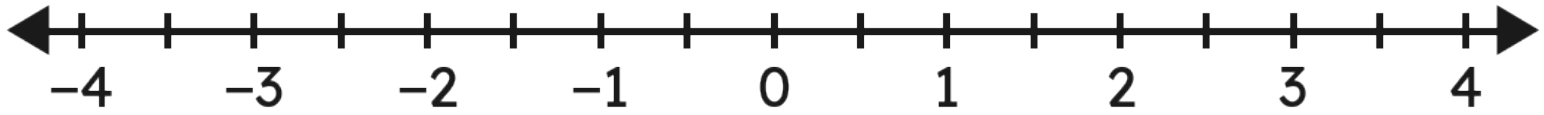
The arrow points left, to the numbers less than 2: so it is $x \leq 2$

Answer: B — $x \leq 2$

Whiteboards · Question 3 of 9

An inequality is shown. $-4x > 10$

Solve it. Then graph the solutions.

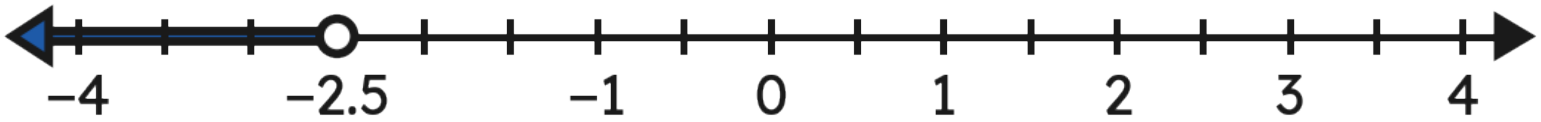


Answer it.

Whiteboards · Question 3 of 9

An inequality is shown. $-4x > 10$

Solve it. Then graph the solutions.



Divide both sides by −4, and reverse: $10 \div (-4) = -2.5$, so $x < -2.5$

Graph: an open circle at −2.5 (not a solution), arrow to the left

Answer: $x < -2.5$

Whiteboards · Question 4 of 9

$7 - x < 3$

Solve it.

Answer it.

Whiteboards · Question 4 of 9

$7 - x < 3$

Solve it.

Subtract 7 from both sides: $3 - 7 = -4$, so $-x < -4$

Divide by -1, and reverse: $x > 4$

Answer: $x > 4$

Whiteboards · Question 5 of 9

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

Solve it.

Answer it.

Whiteboards · Question 5 of 9

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

Solve it.

Subtract 4: $-2 - 4 = -6$, so $\frac{3}{5}x = -6$

Multiply by $\frac{5}{3}$: $-6 \times \frac{5}{3} = -10$, so $x = -10$

Answer: $x = -10$

Whiteboards · Question 6 of 9

$$-\frac{3}{4}(x+6)=9$$

Solve it.

Answer it.

Whiteboards · Question 6 of 9

$$-\frac{3}{4}(x+6)=9$$

Solve it.

Multiply both sides by $-\frac{4}{3}$, sign and all: $9\times\left(-\frac{4}{3}\right)=-12$, so $x+6=-12$

Subtract 6: $-12-6=-18$, so $x=-18$

Answer: x = –18

Whiteboards · Question 7 of 9

$2.5x - 4 = 6$

Which value of x makes the equation true?

A. 4

B. 10

C. 0.8

D. 25

Answer it.

Whiteboards · Question 7 of 9

$2.5x - 4 = 6$

Which value of x makes the equation true?

Test 4: $2.5(4) - 4 = 10 - 4 = 6$

Or solve: $6 + 4 = 10$, and $10 \div 2.5 = 4$

Answer: A — 4

Whiteboards · Question 8 of 9

A tour costs $12 a person plus a $30 bus fee, lasts 3 hours, and a group paid $186.

Which equation can be used to find n, the number of people?

A. $12n - 30 = 186$

B. $12(n + 30) = 186$

C. $12n + 30 = 186$

D. $30n + 12 = 186$

Answer it.

Whiteboards · Question 8 of 9

A tour costs $12 a person plus a $30 bus fee, lasts 3 hours, and a group paid $186.

Which equation can be used to find n, the number of people?

12 a person is the rate, 12n; the bus fee is paid once, + 30

$12n + 30 = 186$, so $12n = 156$ and $n = 13$

Answer: C — 12n + 30 = 186

Whiteboards · Question 9 of 9

A backpack is 40% off, and then $6 comes off; Leo pays $54.

Write an equation for the original price, solve it, and say what it means.

Write your answer in sentences.

Whiteboards · Question 9 of 9

A backpack is 40% off, and then $6 comes off; Leo pays $54.

Write an equation for the original price, solve it, and say what it means.

40% off leaves 60%: $0.60p - 6 = 54$

Add 6, then divide by 0.60: $60 \div 0.60 = 100$, so $p = 100$

Answer: $0.60p - 6 = 54$: the backpack was $100

Independent Practice

1. Solve: $\frac{2}{5}x \le -4$
2. Solve: $5 - y > 9$
3. Solve: $-\frac{2}{3}k + 1 = 9$
4. Solve: $4(m + 2.5) = 6$
5. Solve: $-1.6 = 0.4n - 2$
6. A plan costs \$15 plus \$7.50 a month; Kai has paid \$82.50. Write and solve an equation for the months.

Before You Go

Reverse only when a negative multiplies or divides.

Two moves: the constant first, then the coefficient — with parentheses, divide or distribute first.

Tomorrow and Friday: 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 10 skill is due by the test: bring any still under 60 up to it.

Today's skills — all required

Solve two-step equations: word problems (D2Y)