GRADE 7 · UNIT 7 · LESSON 9

Percent Increase and Decrease

MA.7.AR.3.1

I can find the percent of change from an initial value to a final value, and find a new or an original amount from a percent increase or decrease.

Warm-Up

1. I = Prt. Interest on $600 at 4% per year for 3 years?
2. A $32 game is 25% off. What is the sale price?
3. A 15 cm side is scaled by a factor of 1.2. How long is the copy?
4. Write the ratio 16 : 28 in simplest form.

Warm-Up

1. I = Prt. Interest on $600 at 4% per year for 3 years? **$72**
2. A $32 game is 25% off. What is the sale price? **$24**
3. A 15 cm side is scaled by a factor of 1.2. How long is the copy?

   18 cm
4. Write the ratio 16 : 28 in simplest form. **4 : 7**

Vocabulary

initial value

the amount at the start, before the change

final value

the amount at the end, after the change

percent of change

the change as a percent of the initial value: percent of change = (final − initial) ÷ initial · 100

percent increase

how much an amount went up, as a percent of the initial value. Its percent of change is positive: 20% is a 20% increase.

percent decrease

how much an amount went down, as a percent of the initial value. Its percent of change is negative: −20% is a 20% decrease.

Notes

I. The change over the initial value

Percent of change = (final – initial) ÷ initial · 100

Initial	Final	Change	Change ÷ initial · 100	Percent
40	50	50 – 40 = 10	10 ÷ 40 · 100 = 25	+25%
50	40	40 – 50 = –10	–10 ÷ 50 · 100 = –20	–20%

A change of 10 each way, but two percents: divide by the initial value.

+25% is a 25% increase. –20% is a 20% decrease.

Notes

II. The new amount from a percent

A town of 2,400 people grows 15%, or shrinks 15%.

Up: $1.15 \cdot 2{,}400 = 2{,}760$ Down: $0.85 \cdot 2{,}400 = 2{,}040$

Up 15%: you have 115% of it. Down 15%: you have 85% of it.

Or add 15% of it: $2{,}400 + 0.15 \cdot 2{,}400 = 2{,}760$

Notes

III. The original from the new

A town grew 20% to 3,600 people. How many lived there before?

Let n be the number before: it grew to 120% of n.

$$1.2n = 3{,}600, \quad \text{so} \quad n = 3{,}600 \div 1.2 = 3{,}000$$

Check: $1.2 \cdot 3{,}000 = 3{,}600$.

Not 3,600 minus 20% of 3,600: the 20% is of the original.

Example 1

percent of change = (final – initial) ÷ initial · 100

A town had 2,500 people in 2015 and 3,100 people in 2025.

Find the percent of change.

Example 1

$$3{,}100 - 2{,}500 = 600$$

$$600 \div 2{,}500 \cdot 100 = 24$$

Answer: 24%: a 24% increase.

Your Turn

$$\text{percent of change} = (\text{final} - \text{initial}) \div \text{initial} \cdot 100$$

A village had 1,200 people in 2015 and 1,560 people in 2025.

Find the percent of change.

Your Turn

percent of change = (final – initial) ÷ initial · 100

A village had 1,200 people in 2015 and 1,560 people in 2025.

Find the percent of change.

Change: $1{,}560 - 1{,}200 = 360$

Percent of change: $360 \div 1{,}200 \cdot 100 = 30$

Answer: 30%: a 30% increase

Example 2

percent of change = (final – initial) ÷ initial · 100

A used car's price fell from $12,500 to $10,000.

Find the percent of change.

Example 2

Which number do you divide by?

$$10{,}000 - 12{,}500 = -2{,}500$$

$$-2{,}500 \div 12{,}500 \cdot 100 = -20$$

Divide by the initial value, 12,500, not the final value, 10,000.

Answer: –20%: a 20% decrease.

Your Turn

$$\text{percent of change} = (\text{final} - \text{initial}) \div \text{initial} \cdot 100$$

A laptop's price fell from $640 to $480.

Find the percent of change.

Your Turn

percent of change = (final – initial) ÷ initial · 100

A laptop's price fell from $640 to $480.

Find the percent of change.

Change: $480 - 640 = -160$

Percent of change: $-160 \div 640 \cdot 100 = -25$

Answer: –25%: a 25% decrease

Whiteboards · Question 1 of 9

percent of change = (final – initial) ÷ initial · 100

A museum had 450 visitors on Saturday and 630 on Sunday.

What is the percent of change?

Answer it.

Whiteboards · Question 1 of 9

percent of change = (final – initial) ÷ initial · 100

A museum had 450 visitors on Saturday and 630 on Sunday.

What is the percent of change?

Change: $630 - 450 = 180$

Percent of change: $180 \div 450 \cdot 100 = 40$

Answer: 40%: a 40% increase

Whiteboards · Question 2 of 9

percent of change = (final – initial) ÷ initial · 100

Maya scored 320 points in round 1 and 248 in round 2.

Find the percent decrease.

Answer it.

Whiteboards · Question 2 of 9

percent of change = (final – initial) ÷ initial · 100

Maya scored 320 points in round 1 and 248 in round 2.

Find the percent decrease.

Change: $248 - 320 = -72$

Percent of change: $-72 \div 320 \cdot 100 = -22.5$

A 22.5% decrease

Answer: 22.5%

Whiteboards · Question 3 of 9

percent of change = (final – initial) ÷ initial · 100

A food drive collected 250 cans last year and 400 cans this year.

What is the percent of change?

A. 37.5%

B. 160%

C. 150%

D. 60%

Answer it.

Whiteboards · Question 3 of 9

percent of change = (final – initial) ÷ initial · 100

A food drive collected 250 cans last year and 400 cans this year.

What is the percent of change?

Change: $400 - 250 = 150$

Percent of change: $150 \div 250 \cdot 100 = 60$

Answer: D — 60%

Whiteboards · Question 4 of 9

A town of 850 people grew 6% in one year.

How many people live there now?

Answer it.

Whiteboards · Question 4 of 9

A town of 850 people grew 6% in one year.

How many people live there now?

Up 6%: the town now has 106% of its people

$1.06 \cdot 850 = 901$

Answer: 901 people

Whiteboards · Question 5 of 9

After a 15% rise, a concert ticket costs $46.

What did the ticket cost before the rise?

A. $40

B. $52.90

C. $39.10

D. $31

Answer it.

Whiteboards · Question 5 of 9

After a 15% rise, a concert ticket costs $46.

What did the ticket cost before the rise?

Let c be the cost before: $1.15c = 46$

$c = 46 \div 1.15 = 40$

Check: $1.15 \cdot 40 = 46$

Answer: A — $40

Whiteboards · Question 6 of 9

In the 18 months after it came out, a tablet's price fell 35% to $260.

What was its price when it came out?

Answer it.

Whiteboards · Question 6 of 9

In the 18 months after it came out, a tablet's price fell 35% to $260.

What was its price when it came out?

Down 35%: the price now is 65% of the first price: $0.65p = 260$

$p = 260 \div 0.65 = 400$

Answer: $400

Whiteboards · Question 7 of 9

A $250 bike's price rose 20%. Then the new price fell 20%.

What is the price now?

A. $250

B. $240

C. $300

D. $200

Answer it.

Whiteboards · Question 7 of 9

A $250 bike's price rose 20%. Then the new price fell 20%.

What is the price now?

Up 20%: $1.2 \cdot 250 = 300$

Down 20% of the new price: $0.8 \cdot 300 = 240$

Answer: B — $240

Whiteboards · Question 8 of 9

A club of 30 members is 70% girls. After 20 new members join, 60% of the club are girls.

How many of the new members are girls?

Answer it.

Whiteboards · Question 8 of 9

A club of 30 members is 70% girls. After 20 new members join, 60% of the club are girls.

How many of the new members are girls?

Girls at first: $0.7 \cdot 30 = 21$

Members now: $30 + 20 = 50$

Girls now: $0.6 \cdot 50 = 30$

New girls: $30 - 21 = 9$

Answer: 9 girls

Whiteboards · Question 9 of 9

percent of change = (final – initial) ÷ initial · 100

From 60 to 75 is a 25% increase. From 75 to 60 is a 20% decrease.

The change is 15 both times. Why are the percents different?

Write your answer in sentences.

Whiteboards · Question 9 of 9

percent of change = (final – initial) ÷ initial · 100

From 60 to 75 is a 25% increase. From 75 to 60 is a 20% decrease.

The change is 15 both times. Why are the percents different?

$$\text{Up: } 15 \div 60 \cdot 100 = 25$$

$$\text{Down: } -15 \div 75 \cdot 100 = -20$$

Answer: Different divisors: 60, then 75.

Independent Practice

1. Percent of change = (final − initial) ÷ initial · 100. A club grew from 160 to 216 members. Find the percent of change.

2. Percent of change = (final − initial) ÷ initial · 100. A truck's load fell from 1,500 kg to 1,140 kg. Find the percent decrease.

3. A park had 1,250 visitors on Monday and 8% fewer on Tuesday. How many on Tuesday?

4. After a 25% rise, a team's score was 85 points. What was its score before the rise?

5. After a 40% drop, a show had 330 viewers. How many viewers did it have before the drop?

6. Percent of change = (final − initial) ÷ initial · 100. For a change from 72 to 54, Leo divided by 54. What is the percent of change?

Before You Go

Percent of change: the change over the initial value, times 100.

Up by a percent: multiply by 1 plus it. Down: by 1 minus it. The original: solve for n.

Tomorrow: percent error — how far off, over the actual value.

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 7 test.

Today's skills — all required

Percent of change (BL7)

Percent of change: find the original amount word problems (RCM)