GRADE 7 · UNIT 7 · LESSON 7

Solving Multi-Step Problems Involving Discounts, Taxes, Tips, or Fees

MA.7.AR.3.1

I can solve a problem with two percent steps — a discount then tax, a meal with tax and tip — taking each percent of the right amount.

Warm-Up

1. Round $29.85 to the nearest dollar. Find a 20% tip on that.
2. A $40 jacket is 15% off. What is the sale price?
3. A map's scale is 1 cm : 5 km. How far is 7.5 cm on the map?
4. Multiply: $0.6 \cdot 0.95$

Warm-Up

1. Round $29.85 to the nearest dollar. Find a 20% tip on that.

   $30; a $6 tip

2. A $40 jacket is 15% off. What is the sale price? **$34**

3. A map's scale is 1 cm : 5 km. How far is 7.5 cm on the map?

   37.5 km

4. Multiply: $0.6 \cdot 0.95$ **0.57**

Notes

I. One step at a time

A $56 backpack is 25% off, and the sales tax is 7%.

Take the discount first. The tax is a percent of the sale price.

Step	Amount in	Percent	Amount out
Discount	$56.00	25% off: pay 75%	$42.00
Tax	$42.00	7% tax: pay 107%	$44.94

$$0.75 \cdot 56 = 42$$

$$1.07 \cdot 42 = 44.94$$

Notes

II. Percents in a row are not added

An $80 game is 25% off, then 10% off the sale price.

$$0.75 \cdot 80 = 60$$

$$0.90 \cdot 60 = 54$$

Not 35% off. That would be $52: the 10% is of $60, not of $80.

In one step: $0.75 \cdot 0.90 = 0.675$. You pay 67.5% of the price: 32.5% off.

Notes

III. Tax and tip on a meal

A meal's subtotal is $46, with 7% tax and a 20% tip, each on the subtotal.

$$\text{Tax: } 0.07 \cdot 46 = 3.22 \qquad \text{Tip: } 0.20 \cdot 46 = 9.20$$

$$\text{Total: } 46 + 3.22 + 9.20 = 58.42$$

Both are of the same $46, so in one step: $1.27 \cdot 46 = 58.42$

Percents of the same amount may be added. Percents one after another may not.

Example 1

A $90 pair of sneakers is 30% off, and the sales tax is 7%.

What is the total with tax?

Example 1

Sale price: pay 70% of the price.

$$0.70 \cdot 90 = 63$$

Total: pay 107% of the sale price.

$$1.07 \cdot 63 = 67.41$$

Or add the tax: $0.07 \cdot 63 = 4.41$, and $63 + 4.41 = 67.41$.

Answer: $67.41

Your Turn

A $70 jacket is 20% off, and the sales tax is 7%.

What is the total with tax?

Your Turn

A $70 jacket is 20% off, and the sales tax is 7%.

What is the total with tax?

Sale price: $0.80 \cdot 70 = 56$

Total: $1.07 \cdot 56 = 59.92$

Answer: $59.92

Example 2

A $72 coat is 40% off, then 25% off the sale price at the register.

What does it cost? What single percent off is that?

Example 2

$$0.60 \cdot 72 = 43.20$$

$$0.75 \cdot 43.20 = 32.40$$

$$0.60 \cdot 0.75 = 0.45$$

You pay 45%, so the coat is 55% off. Not 65% off: that would be $25.20.

Check: 32.40 ÷ 72 = 0.45.

Answer: $32.40, which is 55% off

Your Turn

A $60 coat is 30% off, then 15% off the sale price at the register.

What does it cost? What single percent off is that?

Your Turn

A $60 coat is 30% off, then 15% off the sale price at the register.

What does it cost? What single percent off is that?

First: $0.70 \cdot 60 = 42$

Then: $0.85 \cdot 42 = 35.70$

$0.70 \cdot 0.85 = 0.595$: you pay 59.5%, so it is 40.5% off

Answer: $35.70, which is 40.5% off

Whiteboards · Question 1 of 9

A $60 lamp is 15% off, with 7% sales tax on the sale price.

What is the sale price? What is the total with tax?

Answer it.

Whiteboards · Question 1 of 9

A $60 lamp is 15% off, with 7% sales tax on the sale price.

What is the sale price? What is the total with tax?

Sale price: $0.85 \cdot 60 = 51$

Total: $1.07 \cdot 51 = 54.57$

Answer: Sale price $51; total $54.57

Whiteboards · Question 2 of 9

A lunch's subtotal is $52, with 7% tax and a 15% tip, each on the subtotal.

What is the total bill?

A. $59.80

B. $74.00

C. $63.44

D. $11.44

Answer it.

Whiteboards · Question 2 of 9

A lunch's subtotal is $52, with 7% tax and a 15% tip, each on the subtotal.

What is the total bill?

Tax: $0.07 \cdot 52 = 3.64$ Tip: $0.15 \cdot 52 = 7.80$

Total: $52 + 3.64 + 7.80 = 63.44$

Answer: C — $63.44

Whiteboards · Question 3 of 9

An $85 jacket is 20% off, then 10% off the sale price.

What does the jacket cost now?

A. $61.20

B. $23.80

C. $68.00

D. $59.50

Answer it.

Whiteboards · Question 3 of 9

An $85 jacket is 20% off, then 10% off the sale price.

What does the jacket cost now?

$$\text{First: } 0.80 \cdot 85 = 68$$

$$\text{Then: } 0.90 \cdot 68 = 61.20$$

Answer: A — $61.20

Whiteboards · Question 4 of 9

Store A raises a $140 price 15%, then takes 10% off.

Store B takes 10% off $140, then raises it 15%.

What does each store charge?

Answer it.

Whiteboards · Question 4 of 9

Store A raises a $140 price 15%, then takes 10% off.

Store B takes 10% off $140, then raises it 15%.

What does each store charge?

Store A: $1.15 \cdot 140 = 161$, then $0.90 \cdot 161 = 144.90$

Store B: $0.90 \cdot 140 = 126$, then $1.15 \cdot 126 = 144.90$

The same two factors in either order: $1.15 \cdot 0.90 = 0.90 \cdot 1.15$

Answer: Both stores charge $144.90.

Whiteboards · Question 5 of 9

After 40% off, a tent costs $57.

What was the original price?

A. $79.80

B. $142.50

C. $22.80

D. $95.00

Answer it.

Whiteboards · Question 5 of 9

After 40% off, a tent costs $57.

What was the original price?

40% off, so you pay 60%: $0.60p = 57$

$p = 57 \div 0.60 = 95$

Answer: D — $95.00

Whiteboards · Question 6 of 9

A $280 scooter is 35% off at Store A, and 20% off, then 15% off the sale price, at Store B.

Which store's price is lower, and by how many dollars?

Answer it.

Whiteboards · Question 6 of 9

A $280 scooter is 35% off at Store A, and 20% off, then 15% off the sale price, at Store B.

Which store's price is lower, and by how many dollars?

Store A: $0.65 \cdot 280 = 182$

Store B: $0.80 \cdot 280 = 224$, then $0.85 \cdot 224 = 190.40$

$190.40 - 182 = 8.40$

Answer: Store A, by $8.40

Whiteboards · Question 7 of 9

A $145 concert ticket is 20% off with a student code, and a 15% service fee is added to the discounted price.

What does the ticket cost in all?

Answer it.

Whiteboards · Question 7 of 9

A $145 concert ticket is 20% off with a student code, and a 15% service fee is added to the discounted price.

What does the ticket cost in all?

Discounted: $0.80 \cdot 145 = 116$

With the fee: $1.15 \cdot 116 = 133.40$

Answer: $133.40

Whiteboards · Question 8 of 9

At a store 12 miles from home, Mia buys a $36 shirt at 25% off and pays 7% sales tax on the sale price.

How much does Mia pay?

Answer it.

Whiteboards · Question 8 of 9

At a store 12 miles from home, Mia buys a $36 shirt at 25% off and pays 7% sales tax on the sale price.

How much does Mia pay?

Sale price: $0.75 \cdot 36 = 27$

With tax: $1.07 \cdot 27 = 28.89$

Answer: $28.89

Whiteboards · Question 9 of 9

Jon says 25% off, then 25% off the sale price, is half price.

Is Jon right? Use a $64 game to explain.

Write your answer in sentences.

Whiteboards · Question 9 of 9

Jon says 25% off, then 25% off the sale price, is half price.

Is Jon right? Use a $64 game to explain.

First: $0.75 \cdot 64 = 48$ Then: $0.75 \cdot 48 = 36$

Half price would be $64 \div 2 = 32$

Answer: No: the game costs $36, not $32.

Independent Practice

1. A $75 game is 20% off, with 6% sales tax on the sale price. What is the total?
2. A $75 game is 20% off, then 20% off the sale price. What does it cost?
3. A dinner's subtotal is $38, with 6% tax and a 20% tip, each on the subtotal. What is the total?
4. After 25% off, a coat costs $66. What was the original price?
5. A $30 ticket is 10% off, and then an 8% fee is added to the discounted price. What is the total?
6. 30% off, then 10% off the sale price: what single percent off is that?

Before You Go

Take one percent at a time, of the amount in front of you.

Percents in a row multiply. Percents of the same amount may be added.

Tomorrow: simple interest, with $I = Prt$.

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

Multi-step problems with percents (ZHX)
Solve percent equations: word problems (JS6)
Estimate tips (Y5R)