

## The Price of Sunglasses

5 mins

10.1 One thing notice, one thing wondered

### Notice

- price is \$10
- total cost is more than the price
- Sales tax added to the cost

### Wonder

- Did cashier make a mistake?
- what ~~about~~ was the tax on the sunglasses?
- Why is the total cost more than the listed price?
- Was something else purchased?

Sales tax - a fee (amount of money) paid to the government - a percentage of a price.

Q1: How much <sup>tax</sup> takes is collected?

A1: \$0.45

Q2: 45 cents is what percentage of 10?

A2: 4.5%

Q3: What was the sales tax?

A3: 4.5%

**BARTLETT**

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15 mins

3 mins quiet work, then partner for 10, review for 2

**10.2: Shopping in Two Different Cities**

Different cities have different sales tax rates. Here are the sales tax charges on the same items in two different cities. Complete the tables.

$\frac{\text{Sales tax}}{\text{price}}$

City 1

item	price (dollars)	sales tax (dollars)	total cost (dollars)
paper towels	8.00	0.48	8.48
lamp	25.00	1.50	26.50
pack of gum	1.00	0.06	1.06
laundry soap	12.00	0.72	12.72
	x	0.06x	1.06x

$x + 0.06x$

\* share for each

City 2

item	price (dollars)	sales tax (dollars)	total cost (dollars)
paper towels	8.00	0.64	8.64
lamp	25.00	2.00	27.00
pack of gum	1.00	0.08	1.08
laundry soap	12.00	0.96	12.96
	x	0.08x	1.08x

$x + 0.08x$

tax rate - applied to a class of goods.

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**OPTIONAL:** 5 mins.  
**10.3: Shopping in a Third City**

Don't round!

Here is the sales tax on the same items in City 3.

1. What is the tax rate in this city?

item	price (dollars)	sales tax (dollars)
paper towels	8.00	0.58
lamp	25.00	1.83
pack of gum	1.00	0.07
laundry soap	12.00	0.84

tax rate is the same for all types of items

~ 7.3%  
 or 7.31%

2. For the sales tax on the laundry soap, Kiran says it should be \$0.84. Lin says it should be \$0.87. Do you agree with either of them? Explain your reasoning.

No, neither.

Sales tax on lamp was \$1.83, both answers are too small

**10.4: Dining at a Restaurant** 10 mins.

3 mins. work, 2 mins. share, 5 whole class discuss

1. Jada has a meal in a restaurant. She adds up the prices listed on the menu for everything they ordered and gets a subtotal of \$42.00.

Tips are usually 10-20%

Date: Sep. 12th	
Time: 6:55 PM	
Server: # 27	
Bread Stix	9.50
Chicken Parm	15.50
Chef Salad	12.00
Lemon Soda	2.00
Tea	3.00
Subtotal	42.00
Sales Tax	3.99
Total	45.99

a. When the check comes, it says they also need to pay \$3.99 in sales tax. What percentage of the subtotal is the sales tax?

9.5% because  $3.99 \div 42 = 0.095$

b. After tax, the total is \$45.99. What percentage of the subtotal is the total?

109.5% because  $45.99 \div 42 = 1.095$

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c. They actually pay \$52.99. The additional \$7 is a tip for the server. What percentage of the subtotal is the tip?

$\approx 16.67\%$  because  $7 \div 42 \approx 16.67$

2. The tax rate at this restaurant is 9.5%.

Date: Sep 12th	
Time: 6:04 PM	
Server: # 27	
Bread Stix	9.50
Ravioli Bites	10.50
Cheesecake	4.95
Subtotal	24.95
Sales Tax	_____
Total	_____

Date: Sep 12th	
Time: 7:12 PM	
Server: # 27	
Garden Salad	_____
Broccoli Bites	_____
Subtotal	_____
Sales Tax	1.61
Total	_____

a. Another person's subtotal is \$24.95. How much will their sales tax be?

\$2.37 because  $(24.95) \cdot (0.095) = 2.37025$

b. Some other person's sales tax is \$1.61. How much was their subtotal?

Between \$16.90 and \$16.99

$\approx 16.95$  because  $1.61 \div 0.095 \approx 16.95$

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# Unit 4, Lesson 11: Percentage Contexts

Let's learn about more situations that involve percentages.

*2 mins. think, pair, share*

## 11.1: Leaving a Tip

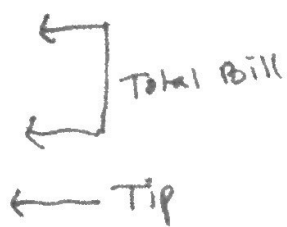
Which of these expressions represent a 15% tip on a \$20 meal? Which represent the total bill?

$15 \cdot 20$

$20 + 0.15 \cdot 20$

$1.15 \cdot 20$

$\frac{15}{100} \cdot 20$



## 11.2: A Car Dealership

*10 mins. 3 mins work 2, pair, 5 share*

A car dealership pays a wholesale price of \$12,000 to purchase a vehicle.

*(percent increase)*

*mark-up is a percentage businesses add to price, mark-down is taken off*

1. The car dealership wants to make a 32% profit.

a. By how much will they mark up the price of the vehicle?

*\$3,840 because*  
 $(0.32) \cdot 12,000 = 3,840$



*down is taken off (discount)*

b. After the markup, what is the retail price of the vehicle?

*\$15,840 because*  
 $12,000 + 3,840 = 15,840$   
 or  $(1.32) \cdot 12,000 = 15,840$

*(percent decrease)*

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2. During a special sales event, the dealership offers a 10% discount off of the retail price. After the discount, how much will a customer pay for this vehicle?

$$\$14,256 \text{ because } (0.1) \cdot 15,840 = 1,584$$

$$\text{and } 15,840 - 1,584 = 14,256$$

$$\text{or } (0.9) \cdot 15,840 = 14,256$$

Are you ready for more?

This car dealership pays the salesperson a bonus for selling the car equal to 6.5% of the sale price. How much commission did the salesperson lose when they decided to offer a 10% discount on the price of the car?

$$\$102.96$$

→ money a sales person → usually a %  
earns for selling

### 11.3: Commission at a Gym

10 mins. 2 mins quick  
3 mins

$$C = r \cdot p$$

1. For each gym membership sold, the gym keeps \$42 and the employee who sold it gets \$8. What is the commission the employee earned as a percentage of the total cost of the gym membership?

$$16\% \text{ because } 42 + 8 = 50$$

$$\$8 \div 50 = 0.16$$

2. If an employee sells a family pass for \$135, what is the amount of the commission they get to keep?

$$\$21.60 \text{ because } (0.16) \cdot 135 = 21.6$$

### 11.4: Card Sort: Percentage Situations

Your teacher will give you a set of cards. Take turns with your partner matching a situation with a descriptor. For each match, explain your reasoning to your partner. If you disagree, work to reach an agreement.

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**Are you ready for more?**

Elena's cousins went to a restaurant. The part of the entire cost of the meal that was tax and tip together was 25% of the cost of the food alone. What could the tax rate and tip rate be?

**Lesson 10 Summary**

Many places have *sales tax*. A sales tax is an amount of money that a government agency collects on the sale of certain items. For example, a state might charge a tax on all cars purchased in the state. Often the tax rate is given as a percentage of the cost. For example, a state's tax rate on car sales might be 2%, which means that for every car sold in that state, the buyer has to pay a tax that is 2% of the sales price of the car.

Fractional percentages often arise when a state or city charges a sales tax on a purchase. For example, the sales tax in Arizona is 7.5%. This means that when someone buys something, they have to add 0.075 times the amount on the price tag to determine the total cost of the item.

For example, if the price tag on a T-shirt in Arizona says \$11.50, then the sales tax is  $(0.075) \cdot 11.5 = 0.8625$ , which rounds to 86 cents. The customer pays  $11.50 + 0.86$ , or \$12.36 for the shirt.

The total cost to the customer is the item price plus the sales tax. We can think of this as a percent increase. For example, in Arizona, the total cost to a customer is 107.5% of the price listed on the tag.

A *tip* is an amount of money that a person gives someone who provides a service. It is customary in many restaurants to give a tip to the server that is between 10% and 20% of the cost of the meal. If a person plans to leave a 15% tip on a meal, then the total cost will be 115% of the cost of the meal.

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## Lesson 11 Summary

There are many everyday situations where a percentage of an amount of money is added to or subtracted from that amount, in order to be paid to some other person or organization:

	goes to	how it works
<b>sales tax</b>	the government	added to the price of the item
<b>gratuity (tip)</b>	the server	added to the cost of the meal
<b>interest</b>	the lender (or account holder)	added to the balance of the loan, credit card, or bank account
<b>markup</b>	the seller	added to the price of an item so the seller can make a profit
<b>markdown (discount)</b>	the customer	subtracted from the price of an item to encourage the customer to buy it
<b>commission</b>	the salesperson	subtracted from the payment that is collected

For example,

- If a restaurant bill is \$34 and the customer pays \$40, they left \$6 dollars as a tip for the server. That is 18% in \$34, so they left an 18% tip. From the customer's perspective, we can think of this as an 18% increase of the restaurant bill.
- If a realtor helps a family sell their home for \$200,000 and earns a 3% commission, then the realtor makes \$6,000, because  $(0.03) \cdot 200,000 = 6,000$ , and the family gets \$194,000, because  $200,000 - 6,000 = 194,000$ . From the family's perspective, we can think of this as a 3% decrease on the sale price of the home.