PERCENT
Lesson 4   Mixed Percent Word Problems

COMPARISON OF PERCENT WORD PROBLEM TYPES

We have covered two types of percent word problems. (There are other types, but we have focused on the two most common types.)

Type One: Percent of a Number Problems

The Marquez family had to make a 20% down payment to purchase their new house which cost $189,000. What was the amount of the down payment?
A. $37,800   B. $9,450   C. $151,200   D. $39,600   E. $3,780

The problem gives you a number ($189,000) and a percent (20%), and you have to calculate a number. Use multiplication to solve.

The amount of down payment was 20% of $189,000.
20% of $189,000 → 0.2 x $189,000 = $37,800   **Answer: A. $37,800**

Type Two: Percent One Number is of Another Number Problems

22 students showed up for the Tuesday night yoga class. If there are 28 students enrolled, what percentage of students attended class.
A. 6%   B. 22%   C. 28%   D. 79%   E. 27%

The problem gives you two numbers (22 and 28) and you have to calculate a percent. Form a fraction to solve.

You are looking for what percent 22 is of 28.
Make a fraction with the part, 22, on the top and the whole, 28, on the bottom.
$\frac{22}{28}$ → $22 \div 28$ → 0.7857 → 78.57%   round to 79%   **Answer: D. 79%**

What is the difference between these two types of percent problems?

Type One – you are given a number and a percent and have to calculate a number.

Type Two – you are given two numbers and have to calculate a percent.

Think about this difference as you do the following mixed word problems.
If the answer needed is a number, it is a Type One problem. Use multiplication to solve.
If the answer needed is a percent, it is a Type Two problem. Form a fraction to solve.

1. How much will a shopper save on a TV that is on sale for 25% off the regular price of $399.99?

A. $300   B. $10   C. $16   D. $100   E. $9

2. A restaurant bill is $28.00, and the customer wants to leave a 20% tip. How much in total will the customer pay?

A. $5.60   B. $33.60   C. $8.00   D. $48.00   E. $36.30

3. In a class of 15 students, 3 students arrived late. What percent of the students were on time?

A. 20%   B. 80 %   C. 8%   D. 2%   E. 12%

4. A store is having a 60% off clearance sale. What is the sale price of a sweater that is regularly priced at $49.99?

A. $29.99   B. $25.00   C. $20.00   D. $29.00   E. $20.99

5. Every Saturday Lana volunteers from 8 AM until 11 AM delivering meals to the elderly. What percentage of her Saturday does she spend delivering meals?

A. 12.5%   B. 8%   C. 16.7%   D. 1.25%   E. 3%

6. The average price of a house in Dover has increased by 32% over the past 10 years. If the average house price was $165,500 10 years ago, what is the average house price now?

A. $52,960   B. $217,800   C. $52,800   D. $197,500   E. $218,460

7. A salesperson earns a base salary of $500 per week plus a commission of 10% on her first $800 of merchandise sold, and a commission of 22% on all her additional sales beyond the first $800. If she sold $2,500 of merchandise last week, what was her total pay?

A. $2,154   B. $750   C. $954   D. $1,050   E. $1,300

8. At a used car lot, customers are charged a service fee of between 1% and 2.5% of the car's price, depending on their credit score. For a car that is priced at $11,999, the service fee will fall in which of the following ranges?
A. $119.99 to $299.98   B. $1,199.90 to $2,999.75   C. $119.99 to $239.98
D. $13,198.90 to $14,998.75   E. $12,118.99 to $12,298.98

9. If a salesperson earned a $1,440 commission on sales of $18,000, what is the sales commission percentage?
A. 80%   B. 12.5%   C. 18%   D. 10%   E. 8%

Refer to the chart below for questions 10 – 11.

ITEM	SALES
Cake	$400
Pie	$375
Brownies	$255
Cookies	$450
Bread	$650
Rolls	$150

10. A bakery's weekend sales are shown in the chart. What percentage of the bakery's sales were bread?
A. 2.9%   B. 26%   C. 2.6%   D. 29%   E. 19%

11. The bakery is open from 8:00 AM until 6:00 PM. If 35% of sales were made in the afternoon from 2:00 PM until closing, what was the dollar amount of sales made before 2:00 PM?
A. $798   B. $1,008   C. $1,872   D. $1,482   E. $1,842

<u>ANSWER KEY   Lesson 4 Mixed Percent Word Problems</u>

1. How much will a shopper save on a TV that is on sale for 25% off the regular price of $399.99?

A. $300   B. $10   C. $16   **D. $100**   E. $9

Type One – You are given a number and a percent and have to calculate a number.
            Use multiplication to solve.

The amount of savings is 25% of $399.99 → 0.25 x $399.99 = $99.9975 → $100
Answer: D. $100

2. A restaurant bill is $28.00, and the customer wants to leave a 20% tip. How much in total will the customer pay?

A. $5.60   **B. $33.60**   C. $8.00   D. $48.00   E. $36.30

Type One – You are given a number and a percent and have to calculate a number.
            Use multiplication to solve.

The tip is 20% of $28.00 → 0.2 x $28.00 = $5.60
Total paid to restaurant: $28.00 + $5.60 = $33.60
Answer: B. $33.60

OR – 100% of the bill plus another 20% for the tip is 120% of the bill.
        120% of $28.00 → 1.2 x $28.00 = **$33.60**

3. In a class of 15 students, 3 students arrived late. What percent of the students were on time?

A. 20%   **B. 80 %**   C. 8%   D. 2%   E. 12%

Type Two – You are given two numbers and have to calculate a percent.
            Form a fraction to solve.

You are given 3 late students, and asked for the percent of on time students, so subtract to get the number of on time students before calculating the percent.
15 – 3 = 12 on time students.

You are looking for what percent 12 is of 15.

$\frac{12}{15}$ → 12 ÷ 15 → 0.8 → 80%
Answer: B. 80%

OR – Calculate the percent of late students and subtract from 100% to get the percent of on time students.

$\frac{3}{15}$ → 3 ÷ 15 → 0.2 → 20% = late students

100% – 20% = **80%** = on time students

4. A store is having a 60% off clearance sale. What is the sale price of a sweater that is regularly priced at $49.99?

A. $29.99   B. $25.00   **C. $20.00**   D. $29.00   E. $20.99

Type One – You are given a number and a percent and have to calculate a number.
        Use multiplication to solve.

The discount is 60% of $49.99 → 0.6 x $49.99 = $29.994 → $29.99
Sale price = Regular price – Discount → $49.99 – $29.99 = $20
Answer: C. $20

OR – If the regular price is 100% of the cost, and 60% is being deducted as a
      discount, 100% – 60% = 40% is the amount left to pay.
      40% of $49.99 → 0.4 x $49.99 = $19.996 → **$20**

5. Every Saturday Lana volunteers from 8 AM until 11 AM delivering meals to the elderly. What percentage of her Saturday does she spend delivering meals?

A. 12.5%   B. 8%   C. 16.7%   D. 1.25%   E. 3%

Type Two – You are given numbers and have to calculate a percent.
        Form a fraction to solve.

It is 3 hours from 8 AM until 11 AM. You are looking for what percent 3 hours is out of a day. You have to supply the total of 24 hours in a day, so you want to find:
3 is what percent of 24.

$\frac{3}{24}$ → 3 ÷ 24 → 0.125 → 12.5%

Answer: A. 12.5%

6. The average price of a house in Dover has increased by 32% over the past 10 years. If the average house price was $165,500 10 years ago, what is the average house price now?

A. $52,960   B. $217,800   C. $52,800   D. $197,500   **E. $218,460**

Type One – You are given a number and a percent and have to calculate a number.
        Use multiplication to solve.

Amount of increase is 32% of $165,500 → 0.32 x $165,500 = $52,960
Average price 10 years ago plus increase is the average price now.
$165,500 + $52,960 = $218,460   **Answer: E. 218,460**

OR – 100% of the old price plus another 32% for the increase is
      100% + 32% = 132% of the old price.
      132% of $165,500 → 1.32 x $165,500 = **$218,460**

7. A salesperson earns a base salary of $500 per week plus a commission of 10% on her first $800 of merchandise sold, and a commission of 22% on all her additional sales beyond the first $800. If she sold $2,500 of merchandise last week, what was her total pay?

A. $2,154 B. $750 **C. $954** D. $1,050 E. $1,300

Type One – You are given numbers and percents and have to calculate a number.
Use multiplication to solve.

Total pay = Base salary + Comm. on first $800 of sales + Comm. on the rest of sales
Step 1 – Calculate the 10% commission on the first $800 of sales.
10% of $800 → 0.1 x $800 = $80
Step 2 – Calculate the amount of sales that get the 22% commission.
$2,500 – $800 = $1,700
Step 3 – Calculate the 22% commission on the additional $1,700 of sales.
22% of $1,700 → 0.22 x $1,700 = $374
Step 4 – Calculate total pay: base salary plus both commissions.
$500 + $80 + $374 = $954
Answer: C. $954

8. At a used car lot, customers are charged a service fee of between 1% and 2.5% of the car's price, depending on their credit score. For a car that is priced at $11,999, the service fee will fall in which of the following ranges?

A. $119.99 to $299.98 B. $1,199.90 to $2,999.75 C. $119.99 to $239.98
D. $13,198.90 to $14,998.75 E. $12,118.99 to $12,298.98

Type One – You are given a number and percents and have to calculate a number.
Use multiplication to solve.

Lowest service fee: 1% of $11,999 → 0.01 x $11,999 = $119.99
Highest service fee: 2.5% of $11,999 → 0.025 x $11,999 = $299.975 → $299.98
Answer: A. $119.99 to $299.98

9. If a salesperson earned a $1,440 commission on sales of $18,000, what is the sales commission percentage?

A. 80% B. 12.5% C. 18% D. 10% **E. 8%**

Type Two – You are given two numbers and have to calculate a percent.
Form a fraction to solve.

You are looking for what percent $1,440 is of $18,000.

$\frac{1,440}{18,000}$ → 1,440 ÷ 18,000 → 0.08 → 8%
Answer: E. 8%

Refer to the chart below for questions 10 – 11.

ITEM	SALES
Cake	$400
Pie	$375
Brownies	$255
Cookies	$450
Bread	$650
Rolls	$150

10. A bakery's weekend sales are shown in the chart. What percentage of the bakery's sales were bread?

A. 2.9%   B. 26%   C. 2.6%   **D. 29%**   E. 19%

Type Two – You are given numbers and have to calculate a percent.
        Form a fraction to solve.

You are looking for what percent $650 is of the total. Add up all the sales in the chart to get total sales of $2,280.

$\frac{650}{2,280}$ → 650 ÷ 2,280 → 0.285 → 28.5%   rounds to 29%   **Answer: D. 29%**

11. The bakery is open from 8:00 AM until 6:00 PM. If 35% of sales were made in the afternoon from 2:00 PM until closing, what was the dollar amount of sales made before 2:00 PM?

A. $798   B. $1,008   C. $1,872   **D. $1,482**   E. $1,842

Type One – You are given numbers and a percent and have to calculate a number.
        Use multiplication to solve.

Sales from 2:00 PM until closing are 35% of $2,280 → 0.35 x $2,280 = $798
The question asks for sales made before 2:00 PM, so subtract from total sales.

Total Sales – Sales from 2:00 PM until closing = Sales before 2:00 PM
$2,280 – $798 = $1,482
Answer: D. $1,482

OR – If 35% of sales are made from 2:00 PM until closing, then 100% – 35% = 65%
        of sales remain for the time period before 2:00 PM.
        65% of $2,280 → 0.65 x $2,280 = **$1,482**