

TOPIC: PERCENT PROBLEM SOLVING

Translating Percent Problems

◆ Recall: A **percent** is a part per 100 which can be written as a fraction (ratio) or decimal.

$$10\% = \frac{\quad}{100} =$$

► When solving problems with percents, *always* convert to _____ form.

New

Translate Percent Problems

"A number is 10% of 50"

Recall
 $is \rightarrow =$
 $of \rightarrow \cdot$

Partial = **Percent as decimal** • **Whole**

EXAMPLE

Translate & solve the percent problems below.

(A) 4 is 5% of what number?

(B) 35 is what percent of 28?



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EXAMPLE

Translate & solve the percent problem below.

(*A*) A number is 50% of 18

(*B*) A number is 18% of 50

(*C*) Why are part (*A*) and (*B*) related?

EXAMPLE

Caroline earns \$3452 a month. She pays \$1140 each month in rent. How much of her monthly paycheck goes towards rent?

PRACTICE

Translate and solve the percent problems below.

(*A*) Saphia's lunch bill was \$17.65. She wants to leave an 18% tip. How much should the tip be?

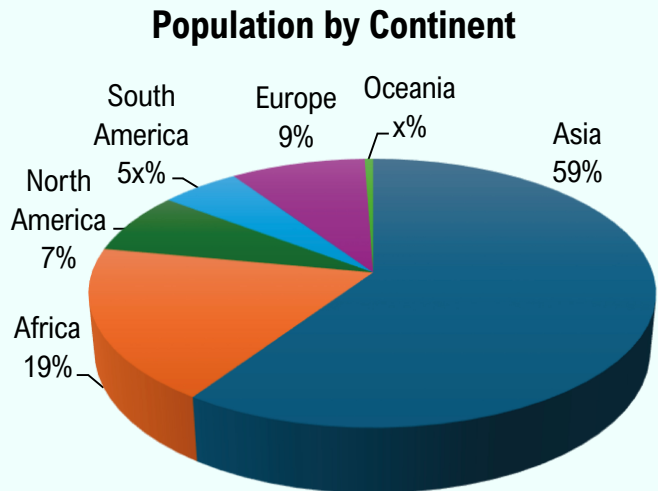
(*B*) Carson brought some new sneaker on sale for \$250. The sale price was 65% of the original price. What was the original price?

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EXAMPLE

The circle graph below shows the world population by continent. Use this graph to answer the questions below.

- (A) What percent of people do not live in Asia?
- (B) If the total world population is 8.142 billion people, how many people live in Africa?
- (C) What percent of the world population lives in Oceania?
- (D) What percent of the world population lives in South America?



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PRACTICE

Solve the word problems below.

(A) If sales tax on a \$36 pair of shoes is \$1.26, find the sales tax on a \$250 pair of shoes.

(B) Suppose the local sales tax rate is 6.5% and you buy a car for \$12,500. What is the car's total cost?

Hint: Find how much tax is due first.

EXAMPLE

Laundry detergent costs \$6.49 a pack. You have a coupon that gets you \$1 off each pack if you purchase 3 packs. If sales tax is 7.5% how much will you be charged for purchasing 3 packs of laundry detergent using the coupon?

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Percent Change

◆ **Percent Change** is the _____ between two values measured as a percent of the _____ value.

► If the change is [**POSITIVE** | **NEGATIVE**], then we call it a percent [**INCREASE** | **DECREASE**].

EXAMPLE

If the price of an item was \$50 and is now \$60, find the percent change in price.

New

Percent Change

New Price: _____ Original Price: _____

Change in Price: = _____ = _____ = _____

Recall

$$\text{percent} = \frac{\text{partial amount}}{\text{whole amount}}$$

Percent [**INCREASE** | **DECREASE**]: _____

$$\text{percent change} = \frac{\text{amount}}{\text{amount}}$$

EXAMPLE

Due to illness the rabbit population in New Zealand changed from 12,000 in 2022 to 8,000 in 2023. Find the percent change in population.

New Population: _____ Original Population: _____ Change in Population: _____

Percent [**INCREASE** | **DECREASE**]: _____

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PRACTICE

Find the percent increase/decrease.

(*A*) A city's population grew from 120,000 to 138,000 people in one year. What is the percent increase in population?

(*B*) A smartphone originally costs \$800 but is now sold for \$680. Determine the percent decrease in price.

PRACTICE

Find the amount increase/decrease.

(*A*) Last season, a farmer harvested 500 kg of rice. Due to improved techniques, the harvest is estimated to increase by 20% this season. How much rice is the farmer looking to harvest this season?

(*B*) A reservoir's water level decreased by 20% over the summer due to evaporation. If the water level is currently at 120 million liters, how much water was there initially?

PRACTICE

A square garden has sides of 8 ft. The gardener reduces each side by 1 ft to make space for a pathway. What is the percent decrease in the perimeter of the garden?

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Discount and Mark-up Problems

◆ A [**DISCOUNT | MARK UP**] is how much the price of an item [**DECREASES | INCREASES**].

► To solve, we apply the same strategy we use with percents.

EXAMPLE

(A) A used gaming system originally purchased for \$385 was sold at a garage sale at a discount of 85% the original price. What was the discount and new price?

Recall

partial amount = percent · whole amount

New

_____ = percent · _____

New price = original price _____

(B) An engagement ring was purchased at wholesale for \$1800. The retailer marked it up 70%. What was the mark up and new price?

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PRACTICE

(*A*) A pair of running shoes costs \$80. The store is offering a 25% discount. Calculate the amount of discount and the sale price of the shoes.

(*B*) A smartphone originally costs \$800. It is on sale for \$680. Calculate the percent discount.

PRACTICE

(*A*) A patient was prescribed a medication dose. It was increased by 15% after 3 days, and the new dosage is 23 cc. What was the original dosage?

(*B*) In a city, the water company increased the monthly water bill by 8%. The initial monthly cost is \$54. What is the cost after the increase?

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Simple Interest

◆ Recall: The formula $I = PRT$ means **Simple Interest** = **principal** · **rate** · **time**

► To solve simple interest problems, we apply our same strategy for solving problems with formulas.

EXAMPLE

Jenny borrowed \$1,275 from a local sponsor to fund a school science fair. The sponsor charges 6.8% simple interest per year. How much interest will Jenny owe after 4 years?

Recall

Solving Formulas

- 1) Identify known and unknown quantities
- 2) Plug in known quantities
- 3) Solve for unknown

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PRACTICE

(A) The student council borrowed \$1,275 from a local sponsor to organize a school event. The sponsor charges 6.5% simple interest per year. How much interest will the student council owe after a year?

(B) A community center paid \$432 in simple interest after 3 years on borrowed funds for new equipment. The interest rate was 4.5% per year. What was the original amount borrowed?

EXAMPLE

A bank loaned \$1,200 at 5% simple interest per year. What is the total amount to be repaid after 4 years?

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PRACTICE

(A) A 10-year government bond paid 5.8% simple interest per year. Over the 10 years, the bond earned \$4,640 in interest. What was the principal of the bond?

(B) Sofia plans to buy a car. Her loan statement indicates she will pay \$1,350 in interest for a 3-year loan at 9% simple interest per year. How much did Sofia borrow for the car?