

1. Micah has 294 songs stored in his phone, which is 70% of the songs that Jorge has stored in his phone. How many songs are stored on Jorge's phone?
2. Lisa sold 81 magazine subscriptions, which is 27% of her class's fundraising goal. How many magazine subscriptions does her class hope to sell?
3. Theresa and Isaiah are comparing the number of pages that they read for pleasure over the summer. Theresa read 2,210 pages, which was 85% of the number of pages that Isaiah read. How many pages did Isaiah read?
4. In a parking garage, the number of SUVs is 40% greater than the number of non-SUVs. Gina counted 98 SUVs in the parking garage. How many vehicles were parked in the garage?
5. The price of a tent was decreased by 15% and sold for \$76.49. What was the original price of the tent in dollars?
6. 40% of the students at Rockledge Middle School are musicians. 75% of those musicians have to read sheet music when they play their instruments. If 38 of the students can play their instruments without reading sheet music, how many students are there at Rockledge Middle School?
7. At Longbridge Middle School, 240 students said that they are an only child, which is 48% of the school's student enrollment. How many students attend Longbridge Middle School?
8. Grace and her father spent $4\frac{1}{2}$ hours over the weekend restoring their fishing boat. This time makes up 6% of the time needed to fully restore the boat. How much total time is needed to fully restore the boat?

9. Bethany's mother was upset with her because Bethany's text messages from the previous month were 218% of the amount allowed at no extra cost under her phone plan. Her mother had to pay for each text message over the allowance. Bethany had 5,450 text messages last month. How many text messages is she allowed under her phone plan at no extra cost?
10. Harry used 84% of the money in his savings account to buy a used dirt bike that cost him \$1,050. How much money is left in Harry's savings account?
11. 15% of the students in Mr. Riley's social studies classes watch the local news every night. Mr. Riley found that 136 of his students do not watch the local news. How many students are in Mr. Riley's social studies classes?
12. Grandma Bailey and her children represent about 9.1% of the Bailey family. If Grandma Bailey has 12 children, how many members are there in the Bailey family?
13. Shelley earned 20% more money in tips waitressing this week than last week. This week she earned \$72.00 in tips waitressing. How much money did she earn last week in tips?
14. Lucy's savings account has 35% more money than her sister Edy's. Together, the girls have saved a total of \$206.80. How much money has each girl saved?
15. Bella spent 15% of her paycheck at the mall, and 40% of that was spent at the movie theater. Bella spent a total of \$13.74 at the movie theater for her movie ticket, popcorn, and a soft drink. How much money was in Bella's paycheck?
16. On a road trip, Sara's brother drove 47.5% of the trip, and Sara drove 80% of the remainder. If Sara drove for 4 hours and 12 minutes, how long was the road trip?

1. Parker was able to pay for 44% of his college tuition with his scholarship. The remaining \$10,054.52 he paid for with a student loan. What was the cost of Parker's tuition?

Parker's tuition is the whole; 56% represents the amount paid by a student loan.

Quantity = Percent \times Whole. Let t represent the cost of Parker's tuition.

$$10,054.52 = 0.56(t)$$

$$\frac{10,054.52}{0.56} = t$$

$$17,954.50 = t$$

Parker's tuition was \$17,954.50.

2. Two bags contain marbles. Bag A contains 112 marbles, and Bag B contains 140 marbles. What percent fewer marbles does Bag A have than Bag B?

The number of marbles in Bag B is the whole.

There are 28 fewer marbles in Bag A.

Quantity = Percent \times Whole. Let p represent the unknown percent.

$$28 = p(140)$$

$$\frac{2}{10} = p$$

$$\frac{2}{10} = \frac{20}{100} = 20\%$$

Bag A contains 20% fewer marbles than Bag B.

3. There are 42 students on a large bus, and the rest are on a smaller bus. If 40% of the students are on the smaller bus, how many total students are on the two buses?

The 42 students on the larger bus represent 60% of the students. If I divide both 60% and 42 by 6, then I get 7 students, which represents 10% of the whole group. Multiplying both by 10, I get 70, which represents 100% of the group of students. There are 70 total students on the buses.

This problem set is a compilation of all types of percent problems from Lessons 2–6. For each problem, students should choose an appropriate strategy to find a solution. Students may also be asked to describe the mental math they used to solve the problem.

1. Micah has 294 songs stored in his phone, which is 70% of the songs that Jorge has stored in his phone. How many songs are stored on Jorge's phone?

Quantity = Percent \times Whole. Let s represent the number of songs on Jorge's phone.

$$294 = \frac{70}{100} \cdot s$$

$$294 = \frac{7}{10} \cdot s$$

$$294 \cdot \frac{10}{7} = \frac{7}{10} \cdot \frac{10}{7} \cdot s$$

$$42 \cdot 10 = 1 \cdot s$$

$$420 = s$$

There are 420 songs stored on Jorge's phone.

2. Lisa sold 81 magazine subscriptions, which is 27% of her class's fundraising goal. How many magazine subscriptions does her class hope to sell?

Quantity = Percent \times Whole. Let s represent the number of magazine subscriptions Lisa's class wants to sell.

$$\begin{aligned} 81 &= \frac{27}{100} \cdot s \\ 81 \cdot \frac{100}{27} &= \frac{27}{100} \cdot \frac{100}{27} \cdot s \\ 3 \cdot 100 &= 1 \cdot s \\ 300 &= s \end{aligned}$$

Lisa's class hopes to sell 300 magazine subscriptions.

3. Theresa and Isaiah are comparing the number of pages that they read for pleasure over the summer. Theresa read 2,210 pages, which was 85% of the number of pages that Isaiah read. How many pages did Isaiah read?

Quantity = Percent \times Whole. Let p represent the number of pages that Isaiah read.

$$\begin{aligned} 2,210 &= \frac{85}{100} \cdot p \\ 2,210 &= \frac{17}{20} \cdot p \\ 2,210 \cdot \frac{20}{17} &= \frac{17}{20} \cdot \frac{20}{17} \cdot p \\ 130 \cdot 20 &= 1 \cdot p \\ 2,600 &= p \end{aligned}$$

Isaiah read 2,600 pages over the summer.

4. In a parking garage, the number of SUVs is 40% greater than the number of non-SUVs. Gina counted 98 SUVs in the parking garage. How many vehicles were parked in the garage?

40% greater means 100% of the non-SUVs plus another 40% of that number, or 140%.

Quantity = Percent \times Whole. Let d represent the number of non-SUVs in the parking garage.

$$\begin{aligned} 98 &= \frac{140}{100} \cdot d \\ 98 &= \frac{7}{5} \cdot d \\ 98 \cdot \frac{5}{7} &= \frac{7}{5} \cdot \frac{5}{7} \cdot d \\ 14 \cdot 5 &= 1 \cdot d \\ 70 &= d \end{aligned}$$

There are 70 non-SUVs in the parking garage.

The total number of vehicles is the sum of the number of the SUVs and non-SUVs.

$70 + 98 = 168$. There is a total of 168 vehicles in the parking garage.

5. The price of a tent was decreased by 15% and sold for \$76.49. What was the original price of the tent in dollars?

If the price was decreased by 15%, then the sale price is 15% less than 100% of the original price, or 85%.

Quantity = Percent \times Whole. Let t represent the original price of the tent.

$$\begin{aligned} 76.49 &= \frac{85}{100} \cdot t \\ 76.49 &= \frac{17}{20} \cdot t \\ 76.49 \cdot \frac{20}{17} &= \frac{17}{20} \cdot \frac{20}{17} \cdot t \\ \frac{1,529.8}{17} &= 1 \cdot t \\ 89.988 &\approx t \end{aligned}$$

Because this quantity represents money, the original price was \$89.99 after rounding to the nearest hundredth.

6. 40% of the students at Rockledge Middle School are musicians. 75% of those musicians have to read sheet music when they play their instruments. If 38 of the students can play their instruments without reading sheet music, how many students are there at Rockledge Middle School?

Let m represent the number of musicians at the school, and let s represent the total number of students. There are two whole quantities in this problem. The first whole quantity is the number of musicians. The 38 students who can play an instrument without reading sheet music represent 25% of the musicians.

Quantity = Percent \times Whole

$$\begin{aligned} 38 &= \frac{25}{100} \cdot m \\ 38 &= \frac{1}{4} \cdot m \\ 38 \cdot \frac{4}{1} &= \frac{1}{4} \cdot \frac{4}{1} \cdot m \\ \frac{152}{1} &= 1 \cdot m \\ 152 &= m \end{aligned}$$

There are 152 musicians in the school.

Quantity = Percent \times Whole

$$\begin{aligned} 152 &= \frac{40}{100} \cdot s \\ 152 &= \frac{2}{5} \cdot s \\ 152 \cdot \frac{5}{2} &= \frac{2}{5} \cdot \frac{5}{2} \cdot s \\ \frac{760}{2} &= 1 \cdot s \\ 380 &= s \end{aligned}$$

There is a total of 380 students at Rockledge Middle School.

7. At Longbridge Middle School, 240 students said that they are an only child, which is 48% of the school's student enrollment. How many students attend Longbridge Middle School?

Quantity = Percent \times Whole. Let s represent the number of students who attend Longbridge Middle School.

$$\begin{aligned} 240 &= \frac{48}{100} \cdot s \\ 240 \cdot \frac{100}{48} &= \frac{48}{100} \cdot \frac{100}{48} \cdot s \\ 500 &= s \end{aligned}$$

There are 500 students attending Longbridge Middle School.

8. Grace and her father spent $4\frac{1}{2}$ hours over the weekend restoring their fishing boat. This time makes up 6% of the time needed to fully restore the boat. How much total time is needed to fully restore the boat?

Quantity = Percent \times Whole. Let t represent the total time that is needed to restore the boat.

$$\begin{aligned}4\frac{1}{2} &= \frac{6}{100} \cdot t \\ \frac{100}{6} \cdot \frac{9}{2} &= \frac{6}{100} \cdot \frac{100}{6} \cdot t \\ \frac{900}{12} &= t \\ 75 &= t\end{aligned}$$

The total amount of time to restore the boat is 75 hours.

9. Bethany's mother was upset with her because Bethany's text messages from the previous month were 218% of the amount allowed at no extra cost under her phone plan. Her mother had to pay for each text message over the allowance. Bethany had 5,450 text messages last month. How many text messages is she allowed under her phone plan at no extra cost?

Quantity = Percent \times Whole. Let m represent the number of text messages Bethany's phone plan allows with no extra cost.

$$\begin{aligned}5,450 &= \frac{218}{100} \cdot m \\ \frac{100}{218} \cdot 5,450 &= \frac{218}{100} \cdot \frac{100}{218} \cdot m \\ 2,500 &= m\end{aligned}$$

Bethany is allowed 2,500 text messages without extra cost.

10. Harry used 84% of the money in his savings account to buy a used dirt bike that cost him \$1,050. How much money is left in Harry's savings account?

Quantity = Percent \times Whole. Let a represent the amount of money, in dollars, in Harry's bank account before buying the bike.

$$\begin{aligned}1050 &= \frac{84}{100} \cdot a \\ \frac{100}{84} \cdot 1050 &= \frac{84}{100} \cdot \frac{100}{84} \cdot a \\ 1250 &= a\end{aligned}$$

Harry started with \$1,250 in his account but then spent \$1,050 of it on the dirt bike.

$$1,250 - 1,050 = 200$$

Harry has \$200 left in his savings account.

11. 15% of the students in Mr. Riley's social studies classes watch the local news every night. Mr. Riley found that 136 of his students do not watch the local news. How many students are in Mr. Riley's social studies classes?

If 15% of his students do watch their local news, then 85% do not.

Quantity = Percent \times Whole. Let c represent the number of students in Mr. Riley's class.

$$136 = \frac{85}{100} \cdot c$$

$$\frac{100}{85} \cdot 136 = \frac{85}{100} \cdot \frac{100}{85} \cdot c$$

$$160 = c$$

There are 160 total students in Mr. Riley's social studies classes.

12. Grandma Bailey and her children represent about 9.1% of the Bailey family. If Grandma Bailey has 12 children, how many members are there in the Bailey family?

Quantity = Percent \times Whole. Let f represent the number of members in the Bailey family.

$$13 = \frac{9.1}{100} \cdot f$$

$$\frac{100}{9.1} \times 13 = \frac{9.1}{100} \cdot \frac{100}{9.1} \cdot f$$

$$143 = f$$

The Bailey family has 143 members.

13. Shelley earned 20% more money in tips waitressing this week than last week. This week she earned \$72.00 in tips waitressing. How much money did Shelley earn last week in tips?

Quantity = Percent \times Whole. Let m represent the number of dollars Shelley earned waitressing last week.

$$72 = \frac{120}{100} m$$

$$72 \left(\frac{100}{120} \right) = \frac{120}{100} \left(\frac{100}{120} \right) m$$

$$60 = m$$

Shelley earned \$60 waitressing last week.

14. Lucy's savings account has 35% more money than her sister Edy's. Together, the girls have saved a total of \$206.80. How much money has each girl saved?

The money in Edy's account corresponds to 100%. Lucy has 35% more than Edy, so the money in Lucy's account corresponds to 135%. Together, the girls have a total of \$206.80, which is 235% of Edy's account balance.

Quantity = Percent \times Whole. Let b represent Edy's savings account balance in dollars.

$$206.8 = \frac{235}{100} \cdot b$$

$$206.8 = \frac{47}{20} \cdot b$$

$$206.8 \cdot \frac{20}{47} = \frac{47}{20} \cdot \frac{20}{47} \cdot b$$

$$\frac{4,136}{47} = 1 \cdot b$$

$$88 = b$$

Edy has saved \$88 in her account. Lucy has saved the remainder of the \$206.80, so $206.8 - 88 = 118.8$.

Therefore, Lucy has \$118.80 saved in her account.

15. Bella spent 15% of her paycheck at the mall, and 40% of that was spent at the movie theater. Bella spent a total of \$13.74 at the movie theater for her movie ticket, popcorn, and a soft drink. How much money was in Bella's paycheck?

If \$13.74 represents 40%, this amount can be divided by 4 to determine that \$3.435 represents 10%. Then, this amount can be multiplied by 10 to determine that \$34.35 represents 100% of the portion of the paycheck that was spent.

Bella spent \$34.35 at the mall.

Therefore, \$34.35 represents 15% of the entire paycheck. This can be divided by 3 to represent 5%. So, \$11.45 represents 5% of the paycheck. Now, to determine 100% of the paycheck, multiply by 20. $\$11.45 \times 20 = \229 .

Bella's paycheck was \$229.

16. On a road trip, Sara's brother drove 47.5% of the trip, and Sara drove 80% of the remainder. If Sara drove for 4 hours and 12 minutes, how long was the road trip?

There are two whole quantities in this problem. First, Sara drove 80% of the remainder of the trip; the remainder is the first whole quantity. 4 hr. 12 min. is equivalent to $4\frac{12}{60}$ hr. = 4.2 hr.

Quantity = Percent \times Whole. Let h represent the remainder of the trip that Sara's brother did not drive, in hours.

$$\begin{aligned}4.2 &= \frac{80}{100} \cdot h \\ \frac{100}{80} \cdot 4.2 &= \frac{80}{100} \cdot \frac{100}{80} \cdot h \\ 5.25 &= h\end{aligned}$$

The remainder of the trip that Sara's brother did not drive was 5.25 hours. He drove 47.5% of the trip, so the remainder of the trip was 52.5% of the trip, and the whole quantity is the time for the whole road trip.

Quantity = Percent \times Whole. Let t represent the total length of the trip, in hours.

$$\begin{aligned}5.25 &= \frac{52.5}{100} t \\ \frac{100}{52.5} \cdot 5.25 &= \frac{52.5}{100} \cdot \frac{100}{52.5} \cdot t \\ 10 &= t\end{aligned}$$

The road trip was a total of 10 hours.