

Reasoning and Problem Solving

Step 5: Percentages – Missing Values

National Curriculum Objectives:

Mathematics Year 6: (6R2) [Solve problems involving the calculation of percentages \[for example, of measures, and such as 15% of 360\] and the use of percentages for comparison](#)

Mathematics Year 6: (6F11) [Recall and use equivalences between simple fractions, decimals and percentages, including in different contexts](#)

Differentiation:

Questions 1, 4 and 7 (Reasoning)

Developing Compare two statements finding percentages and explain why one is correct. Percentages are multiples of 10 and solutions are whole numbers.

Expected Compare two statements finding percentages and explain why one is correct. Percentages are multiples of 2 and 5, and solutions may have one decimal place.

Greater Depth Compare two statements finding any percentage and explain why one is correct. Solutions may have one decimal place.

Questions 2, 5 and 8 (Problem Solving)

Developing Complete a cross puzzle by finding the missing values. Percentages are multiples of 10.

Expected Complete a cross puzzle by finding two possible solutions for the missing values. Percentages are multiples of 2 and 5.

Greater Depth Complete a cross puzzle by finding two possible solutions for the missing values.

Questions 3, 6 and 9 (Problem Solving)

Developing Solve a one-step word problem by finding the missing value. Percentages are multiples of 10 and a bar model is provided.

Expected Solve a two-step word problem by finding the missing value. Percentages are multiples of 2 and 5, and a bar model is provided.

Greater Depth Solve a multi-step word problem by finding the missing values.

More [Year 6 Percentages](#) resources.

Did you like this resource? Don't forget to [review](#) it on our website.

Percentages – Missing Values

Percentages – Missing Values

1a. The children disagree about how to find 20% of 60.



Olivia

20 is a third of sixty, so 20% of sixty must be 3.



Lucas

Divide 60 by 10 to find 10% and double that to find 20%. The answer is 12.

★ Who do you agree with and why?

R

1b. The children disagree about how to find 30% of 400.



Fionn

$400 - 30 = 370$ so 30% of 400 must be 370.



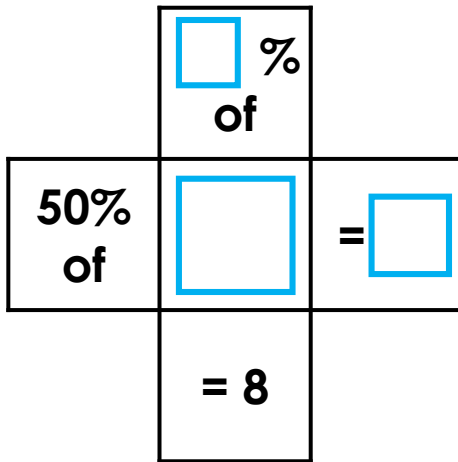
Amelie

Divide 400 by 10 to find 10% and then multiply by 3. The answer is 120.

★ Who do you agree with and why?

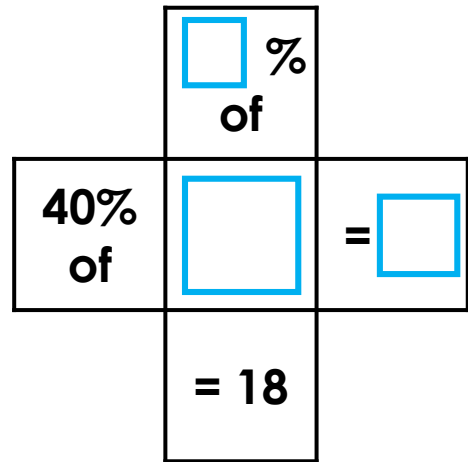
R

2a. What could the missing values be?



PS

2b. What could the missing values be?



PS

3a. 20% of the sweets in a jar are orange, the rest are yellow.

There are 240 sweets in the jar.

How many of the sweets are yellow?

| | |
|------|-----|
| 100% | |
| ? | 20% |



PS

3b. 30% of the cupcakes baked for a charity sale are red, the rest are lilac.

There are 300 cupcakes altogether.

How many of the cakes are covered with lilac icing?

| | |
|------|-----|
| 100% | |
| ? | 30% |



PS

Percentages – Missing Values

4a. The children disagree about how to find 22% of 500.



Lucie

22% is 110 because 22% of 100 is 22 and 22% of 500 is five times this.



Marcus

10% of 500 is 50, so 22% must be 72.

★ Who do you agree with and why?

R

Percentages – Missing Values

4b. The children disagree about how to find 48% of 300.



Annie

50% of 300 is 150, so 48% must be 148.



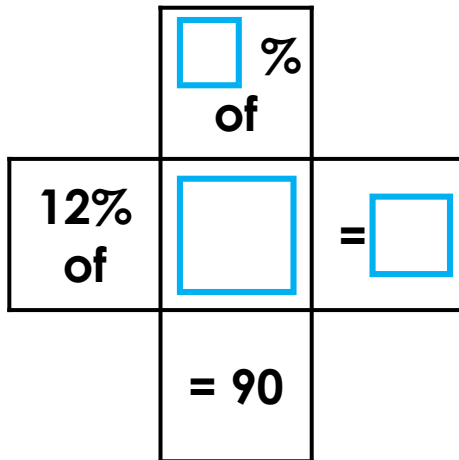
Stephan

10% is 30, so 40% must be 30×4 . 1% is 3, so 8% must be 8×3 . The answer is 144.

★ Who do you agree with and why?

R

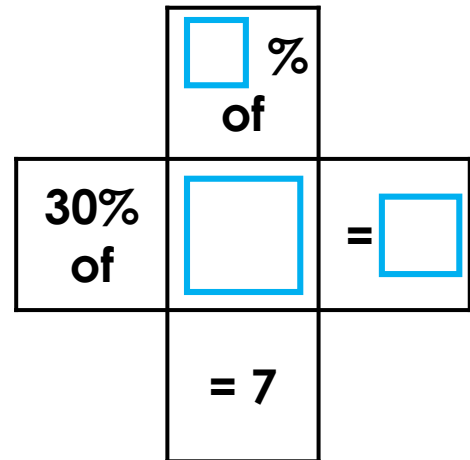
5a. What could the missing values be?



★ Find 2 possible solutions.

PS

5b. What could the missing values be?



★ Find 2 possible solutions.

PS

6a. A garden centre has 200 plants.

85% of the plants are roses. 60% of the roses are red, and the rest are yellow.

How many yellow roses are there?

| | |
|------------|---|
| 85% of 200 | |
| 60% | ? |



PS

6b. A pizza shop sells 160 pizzas.

75% of the pizzas are topped with pepperoni. 35% of the pepperoni pizzas are stuffed crust, and the rest are not.

How many pizzas do not have stuffed crust?

| | |
|------------|-----|
| 75% of 160 | |
| ? | 35% |



R

Percentages – Missing Values

Percentages – Missing Values

7a. The children disagree about how to find 33% of 140.



Tia

10% of 140 is 14 and 1% of 140 is 1.4. If I multiply both by 3, I can find the answer.



Joe

I can find 77% of 140 and subtract that from 140 to find the answer.



Who do you agree with and why?

R

7b. The children disagree about how to find 91% of 180.



Leida

1% of 180 is 1.8. I can multiply 1.8 by 9 and take the answer away from 180.



Donnie

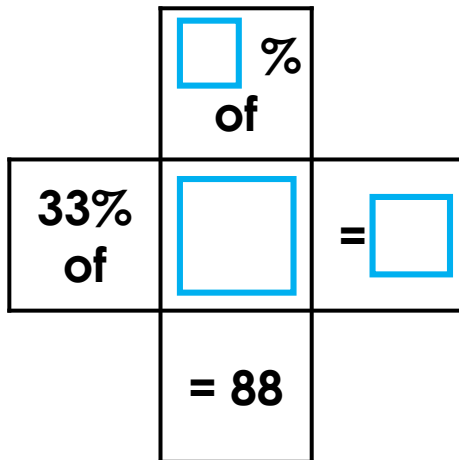
10% of 180 is 18 and 1% of 180 is 1.8. If I multiply 18 by 9 and add 1.8, I can find the answer.



Who do you agree with and why?

R

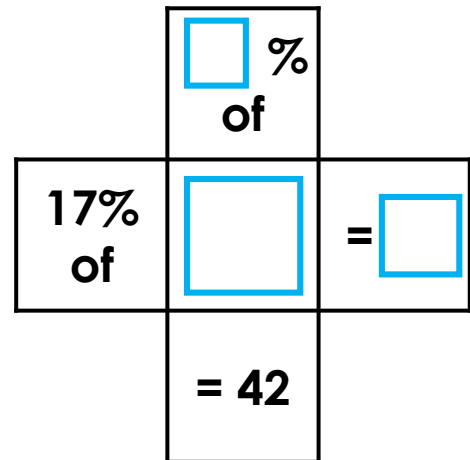
8a. What could the missing values be?



Find 2 possible solutions.

PS

8b. What could the missing values be?



Find 2 possible solutions.

PS

9a. There are 200 children in year seven.

90% are going on the school adventure camp.

While on camp 75% of the children take part in the high wire obstacle course, and 80% of those who take part complete the full course.

How many children went on the high wire and how many completed the course?



PS

9b. 250 plants are grown in an allotment.

80% of the plants are edible.

Of the 80%, 37% are fruits and the rest are vegetables.

How many plants are fruits and how many are vegetables?



R

Reasoning and Problem Solving Percentages – Missing Values

Developing

- 1a. Lucas is correct; Olivia's method does not find 20%.
2a. Various possible answers, for example:
 50% of $40 = 20$ and 20% of $40 = 8$
3a. 192 sweets

Expected

- 4a. Lucie is correct; Marcus has added 22 to 10%.
5a. Various possible answers, for example:
 12% of $180 = 21.6$ and 50% of $180 = 90$;
 12% of $360 = 43.2$ and 25% of $360 = 90$
6a. 68 roses

Greater Depth

- 7a. Either method could be used.
Children's answers may vary dependent on their chosen method.
8a. Various possible answers, for example:
 33% of $100 = 33$ and 88% of $100 = 88$;
 33% of $160 = 52.8$ and 55% of $160 = 88$
9a. 135 children went on the high wire and 108 completed the course.

Reasoning and Problem Solving Percentages – Missing Values

Developing

- 1b. Amelie is correct; Lucas' method does not find 30%.
2b. Various possible answers, for example:
 40% of $90 = 36$ and 20% of $90 = 18$
3b. 210 cakes

Expected

- 4b. Stephan is correct; Annie has taken 2 (instead of 2%) away from 50%.
5b. Various possible answers, for example:
 30% of $70 = 21$ and 10% of $70 = 7$;
 30% of $35 = 10.5$ and 20% of $35 = 7$
6b. 78 pizzas

Greater Depth

- 7b. Either method could be used.
Children's answers may vary dependent on their chosen method.
8b. Various possible answers, for example:
 17% of $100 = 17$ and 42% of $100 = 42$;
 17% of $150 = 25.5$ and 28% of $150 = 42$
9b. 74 of the plants are fruit and 126 are vegetables.