



## Questions

### Calculating a percentage of another number

1. What is 25% of 67?
2. What is 13% of 13?
3. What is 99.5% of 55?

### Increasing and decreasing by a percentage

#### Decreasing

1. What is 50 decreased by 30%?
2. The price of a t-shirt is £20. The price is decreased by 41%. What is the new price of the t-shirt?
3. What is 112 decreased by 88.5%?

#### Increasing

1. What is 50 increased by 30%?
2. The volume of water in a bucket that is catching drips from the ceiling increases by 42% in one hour. If there is 3.5L in the bucket at the start of the hour, how much water will be in the bucket at the end of 1 hour?
3. What is 1.5 increased by 15%?

#### Reversing a decrease

1. The cost of a pair of shoes was put on sale at 35% off. The price is now £19.50. What was the original price?
2. A server is filling glasses from a jug that holds 1.5L of juice. She has to fill 10 glasses, but can only fill 6 with the jug. How much more juice does she need to fill all of the glasses?
3. A team of workers are filling up a lorry with boxes. They have filled 45% of the lorry so far, and now they can fit 110 more boxes in the remaining space. How many boxes can the lorry hold?

### Reversing an increase

1. The price of a loaf of bread was increased by 4%. It now costs 78p. What was the original price of the bread?
2. The number of books in a library was increased by 28%. There are now 9216 books. What was the original number of books?
3. A bath is filled halfway. The person running the bath then increases the volume of water in the bath by 12%. The bath now contains 168L of water. What is the total volume of water that can fit in the bath?

### Percentage change

1. The price of a car has increased from £7,000 to £11,000. What is the percentage change in the price?
2. A scarf is being knitted. In one hour, the length of the scarf increases from 1.5m to 1.55m. What is the percentage change in the length?
3. A plate of brownies is left on the kitchen table. Originally there were 25 brownies. After half a day, there are 5 left. What is the percentage change in the number of brownies?

### One value as a percentage of another

1. Express 12 as a percentage of 240.
2. What is 52 as a percentage of 40?
3. What is 5 as a percentage of 7.5?

## Answers

### Calculating a percentage of another number

1.  $25 \div 100 = 0.25$

$0.25 \times 67 = 16.75.$

2.  $13 \div 100 = 0.13$

$0.13 \times 13 = 1.69.$

3.  $99.5 \div 100 = 0.995$

$0.995 \times 55 = 54.725.$

## Increasing and decreasing by a percentage

### Decreasing

1.  $30 \div 100 = 0.3$

$$0.3 \times 50 = 15$$

$$50 - 15 = 35.$$

2.  $41 \div 100 = 0.41$

$$0.41 \times \text{£}20 = \text{£}8.20$$

$$\text{£}20 - \text{£}8.20 = \text{£}11.80.$$

3.  $88.5 \div 100 = 0.885$

$$0.885 \times 112 = 99.12$$

$$112 - 99.12 = 12.88.$$

### Increasing

1.  $30 \div 100 = 0.3$

$$0.3 \times 50 = 15$$

$$50 + 15 = 65.$$

2.  $42 \div 100 = 0.42$

$$0.42 \times 3.5 = 1.47$$

$$3.5 + 1.47 = 4.97L.$$

3.  $15 \div 100 = 0.15$

$$0.15 \times 1.5 = 0.225$$

$$1.5 + 0.225 = 1.725.$$

**Reversing a decrease**

1.  $100 - 35 = 65.$

$$£19.50 \div 65 = £0.30$$

$$£0.30 \times 100 = £30.$$

2. The server has filled  $\frac{6}{10} \times 100 = 60\%$  of the glasses. Therefore, we calculate:

$$1.5\text{L} \div 60 = 0.025\text{L}$$

$$0.025\text{L} \times 100 = 2.5\text{L}.$$

The total amount of juice needed to fill 10 glasses is 2.5L, so the server needs  $2.5\text{L} - 1.5\text{L} = 1\text{L}$  more juice.

3.  $100 - 45 = 55.$

$$110 \div 55 = 2$$

$$2 \times 100 = 200 \text{ boxes.}$$

**Reversing an increase**

1.  $100 + 4 = 104.$

$$78 \div 104 = 0.75\text{p}$$

$$0.75\text{p} \times 100 = 75\text{p}.$$

2.  $100 + 28 = 128.$

$$9216 \div 128 = 72$$

$$72 \times 100 = 7200 \text{ books.}$$

3.  $100 + 12 = 112.$

$$168\text{L} \div 112 = 1.5\text{L}$$

$$1.5\text{L} \times 100 = 150\text{L}.$$

So, when the bath is half full it contains 150L of water. Therefore, the total volume of water that the bath can hold is 300L.

**Percentage change**

1.  $£11,000 - £7,000 = £4,000$ .  
 $£4,000 \div £7,000 = 0.57143$   
 $0.57143 \times 100 = 54.143\%$ .
2.  $1.55\text{m} - 1.5\text{m} = 0.05\text{m}$ .  
 $0.05\text{m} \div 1.5\text{m} = 0.0\dot{3}$   
 $0.0\dot{3} \times 100 = 3.\dot{3}$ .
3.  $5 - 25 = -20$ .  
 $-20 \div 25 = -0.8$   
 $-0.8 \times 100 = -80\%$ .

**One value as a percentage of another**

1.  $12 \div 240 = 0.05$   
 $0.05 \times 100 = 5\%$ .
2.  $52 \div 40 = 1.13$   
 $1.13 \times 100 = 113\%$ .
3.  $5 \div 7.5 = 0.\dot{6}$
4.  $0.\dot{6} \times 100 = 66.\dot{6}$ .

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