

Percentage increases and decreases

Year 8 About 70 minutes Calculator allowed 47 marks



Hints online, answers free with an account:
mathswariz.uk/worksheets/ks3-year-8-percentage-increases-and-decreases/

Date _____

A Do Now

Quick questions to start.

- A1** Needed today [1 mark] Write down the multiplier for an increase of 6%.
- A2** Needed today [1 mark] Write 0.925 as a percentage.

Answer _____

Answer _____

- A3** Last lesson [1 mark] A loan of £300 has simple interest of 2% each month. Work out the interest for 5 months.
- A4** Year 7 [1 mark] Write $\frac{3}{8}$ as a decimal.

Answer _____

Answer _____

B Example, then your turn

Year 8

To increase by 15% multiply by 1.15; to decrease by 15% multiply by 0.85. Your teacher works through each example with you. Then try the one beside it.

EXAMPLE 1

A bike costs £360. The price goes up by 15%. Work out the new price.

Hint $100\% + 15\% = 115\%$, so the multiplier is 1.15.

- B1** The rent on a flat is £860 a month. It goes up by 4%. Work out the new rent. [2 marks]

Answer _____

EXAMPLE 2

A television costs £1250. In a sale the price is reduced by 17.5%. Work out the sale price.

Hint $100\% - 17.5\% = 82.5\%$, so the multiplier is 0.825.

- B2** A gas bill is £218.40. It goes down by 12.5%. Work out the new bill. [2 marks]

Answer _____

EXAMPLE 3

The price of a car falls from £13 480 to £12 750. Work out the percentage decrease, to 1 decimal place.

Hint $\text{original} \times \text{multiplier} = \text{new}$, so the multiplier is $\text{new} \div \text{original}$.

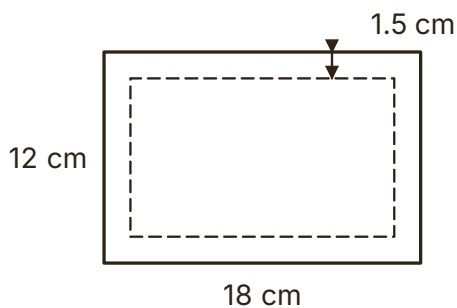
EXAMPLE 4

The population of a town grew from 38 000 to 107 000 in 60 years. Work out the percentage increase, to the nearest whole number.

Hint The multiplier is more than 2, so the increase is more than 100%.

EXAMPLE 5

A card is 18 cm by 12 cm. A border 1.5 cm wide is cut off all the way round. Work out the percentage decrease in (i) the perimeter, (ii) the area.



Not drawn accurately

Hint Work out the new length and width first. Each side loses the border at BOTH ends.

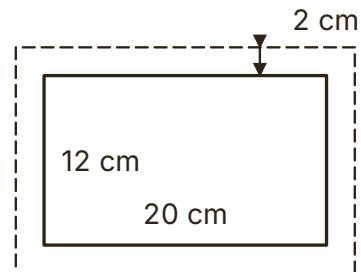
- B3** A dog's mass goes up from 64.5 kg to 71.2 kg. Work out the percentage increase, to 1 decimal place. [2 marks]

Answer

- B4** The value of a painting rose from £14 500 to £52 200. Work out the percentage increase. [2 marks]

Answer

- B5** A photo is 20 cm by 12 cm. A frame 2 cm wide is put all the way round it. Work out the percentage increase in (i) the perimeter, (ii) the area. [3 marks]



Not drawn accurately

Answer (i)% (ii)%

C1 The multiplier for a price increase is 1.085. (i) What is the percentage increase? (ii) What is the multiplier for a decrease of the same percentage? [2 marks]

Answer (i)% (ii)

C3 A dealer buys a watch for £480 and sells it for £612. Work out her percentage profit. [2 marks]

Answer

C2 A rare coin is worth £450. Its value increases by 235%. Work out its new value. [2 marks]

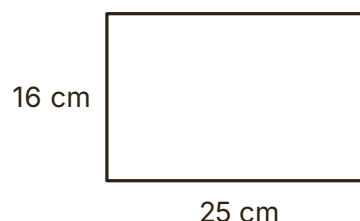
Answer

C4 Ola makes candles. Each one costs her £6.40 to make. She wants a profit of at least 35%. What is the least price she can sell a candle for? [2 marks]

Answer

C5 A sign in a shop says, "All prices reduced by 120%." Explain why this cannot be true. [1 mark]

C6 A rectangle is 25 cm by 16 cm. Its length is increased by 20% and its width is decreased by 25%. Work out the percentage change in its area. Say whether it is an increase or a decrease. [3 marks]



Not drawn accurately

Answer

- D1** Beth says, "A change from 640 to 800 is an increase of 25%. So a change from 800 to 640 is a decrease of 25%." [3 marks]

Beth is wrong about the decrease. Explain why, and work out the correct percentage decrease.

Answer Percentage decrease%

- D2** The table shows the price of a house in three years.

- (a) Work out the percentage increase in the price from 2005 to 2012. [2 marks]

Year	2005	2012	2020
Price of the house	£180 000	£234 000	£210 600

Answer

- (b) Work out the percentage decrease in the price from 2012 to 2020. [2 marks]

Answer

- (c) Kim says, "From 2005 to 2020 the price went up by $30\% - 10\% = 20\%$." Is Kim correct? You must show your working. [2 marks]

Total for D2: 6 marks

- D3** The table shows the sales of three shops last year and this year. Which shop had the greatest percentage increase in sales? You must show your working. [4 marks]

Shop	Sales last year	Sales this year
A	£2500	£3150
B	£820	£1066
C	£4400	£5236

Answer

- D4** A gym membership costs £36.50 a month. The price goes up by 8%. Ali pays the new price for 12 months. Work out how much Ali pays altogether. [3 marks]

Answer

E Extension

Stretch

No route is given. The hints are at the end of the sheet. Use one at a time.

- E1** A price is increased by $x\%$. Then the new price is decreased by $x\%$. The final price is 4% less than the price at the start. Find the value of x . [4 marks]

Answer

Extension hints

Cover these with paper. Uncover one at a time.

- E1** **Hint 1** Try a starting price of £100 and a value of x , say 10. What is the final price?
- Hint 2** With $x = 10$: $100 \times 1.1 \times 0.9 = 99$, only 1% less. You need a bigger x .
- Hint 3** With $x = 20$: $100 \times 1.2 \times 0.8 = 96$, which is 4% less. So $x = 20$.

How did it go?

Colour one circle on each line: not yet, nearly, yes.

- I can increase or decrease an amount by a percentage with a multiplier. ☐ ☐ ☐
- I can work out a percentage change, including changes over 100%. ☐ ☐ ☐
- I can work out percentage profit and the price for a given profit. ☐ ☐ ☐
- I can explain why a change back is not the same percentage. ☐ ☐ ☐