

Percentages: Increase, Decrease and Reverse

GCSE Mathematics • **Foundation Tier** • Grades 4–5 • Non-calculator

WORKED SOLUTIONS

Name: _____ *worked example* _____

Class: _____

Total: _____ *57* _____ / 57

Show all your working. Marks are given for correct method as well as the final answer.

1. Increase \$200 by 10%. [2 marks]

$$\begin{aligned}10\% \text{ of } 200 &= 20 \\ 200 + 20 &= 220\end{aligned}$$

Answer: _____ *£220* _____

2. Decrease 80 kg by 25%. [2 marks]

$$\begin{aligned}25\% \text{ of } 80 &= 20 \\ 80 - 20 &= 60\end{aligned}$$

Answer: _____ *60* _____ kg

3. Increase \$450 by 12% using a multiplier. [2 marks]

$$\begin{aligned}\text{multiplier} &= 1.12 \\ 450 \times 1.12 &= 504 \\ \text{one step, not two}\end{aligned}$$

Answer: _____ *£504* _____

4. Decrease 640 by 35% using a multiplier. [2 marks]

$$\begin{aligned}100 - 35 &= 65\% \\ \text{multiplier} &= 0.65 \\ 640 \times 0.65 &= 416\end{aligned}$$

Answer: _____ *416* _____

5. Write down the multiplier for a 7% increase. [1 mark]

$$100 + 7 = 107\% = 1.07$$

Answer: _____ *1.07* _____

6. Write down the multiplier for a 3% decrease. [1 mark]

$$100 - 3 = 97\% = 0.97$$

Answer: _____ *0.97* _____

7. A coat costs \$85. VAT of 20% is added. Work out the total price. [2 marks]

$$85 \times 1.2 = 102$$

Answer: _____ *£102* _____

8. A price rises from \$40 to \$50. Work out the percentage increase. [3 marks]

$$\begin{aligned}\text{change} &= 10 \\ \frac{10}{40} \times 100 \\ &= 25\% \quad \text{divide by the ORIGINAL}\end{aligned}$$

Answer: _____ *25%* _____

9. A population falls from 1 200 to 1 050. Work out the percentage decrease. [3 marks]

$$\text{change} = 150$$

$$\frac{150}{1200} \times 100 = 12.5$$

Answer: _____ 12.5% _____

10. A shop buys a bike for \$120 and sells it for \$150. Work out the percentage profit. [3 marks]

$$\text{profit} = 30$$

$$\frac{30}{120} \times 100 = 25$$

Answer: _____ 25% _____

11. A car bought for \$9 000 is sold for \$6 300. Work out the percentage loss. [3 marks]

$$\text{loss} = 2700$$

$$\frac{2700}{9000} \times 100 = 30$$

Answer: _____ 30% _____

12. \$500 is invested at 4% simple interest per year. Work out the interest after 3 years. [3 marks]

$$4\% \text{ of } 500 = 20 \text{ per year}$$

$$20 \times 3 = 60$$

simple = same each year

Answer: _____ £60 _____

13. A price of \$200 rises by 10%, then the new price falls by 10%. Work out the final price. [3 marks]

$$200 \times 1.1 = 220$$

$$220 \times 0.9 = 198$$

NOT back to 200 -- the 10% is of a bigger number

Answer: _____ £198 _____

14. A \$300 laptop is reduced by 20%, then by a further 15%. Work out the final price. [3 marks]

$$300 \times 0.8 = 240$$

$$240 \times 0.85 = 204$$

Answer: _____ £204 _____

15. After a 20% increase, a price is \$60. Work out the original price. [3 marks]

$$60 \text{ is } 120\% \text{ of the original}$$

$$60 \div 1.2 = 50$$

DIVIDE by the multiplier

Answer: _____ £50 _____

16. A jacket costs \$68 in a 15%-off sale. Ana says the original price was \$78.20 because $68 \times 1.15 = 78.20$. Explain her mistake and find the correct original price. [4 marks]

$$68 \text{ is } 85\% \text{ of the original, not } 100\%$$

you cannot add the % back on

$$68 \div 0.85 = 80$$

Answer: _____ £80 _____

17. After 5% VAT is added, a bill is \$126. Work out the bill before VAT. [3 marks]

$$126 \div 1.05 = 120$$

Answer: _____ £120 _____

18. A car is worth \$8 400 after losing 30% of its value. Work out its original value. [3 marks]

$$8400 \text{ is } 70\% \text{ of the original}$$
$$8400 \div 0.7 = 12000$$

Answer: _____ £12000 _____

19. In a sale all prices are cut by 40%. A dress now costs \$33.

- (a) Work out the original price. [3 marks]

$$33 \text{ is } 60\% \text{ of the original}$$
$$33 \div 0.6 = 55$$

- (b) Work out how much is saved. [2 marks]

$$55 - 33 = £22$$

Answer: _____ £55 ; saves £22 _____

20. Tom earns \$24 000. He gets a 3% rise, then a further 2% rise the next year.

- (a) Work out his salary after both rises. [3 marks]

$$24000 \times 1.03 = 24720$$
$$24720 \times 1.02 = 25214.40$$

- (b) Work out the overall percentage increase. [3 marks]

$$1.03 \times 1.02 = 1.0506$$
$$= 5.06\% \quad \text{not } 5\%$$

Answer: _____ £25214.40 ; 5.06% _____