

Percentages Toolkit

Basic Percentages / Percentage Increases & Decreases / Reverse Percentages

Easy (12 questions)	/22
Medium (12 questions)	/37
Hard (24 questions)	/77
Total Marks	/136

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Easy Questions

- 1 The Earth has a surface area of approximately 510 100 000 km². Water covers 70.8% of the Earth's surface.

Work out the area of the Earth's surface covered by water.

..... km²

(2 marks)

- 2 Write \$1.92 as a percentage of \$1.60.

..... %

(1 mark)

- 3 In a box of 80 glasses, 3 are broken.

Work out the percentage of broken glasses in the box.

..... %

(1 mark)

- 4 Work out 5% of \$25.

\$

(1 mark)

- 5 Work out \$1.20 as a percentage of \$16.

.....%

(1 mark)

- 6 67 of 645 parcels are damaged on a journey.

Calculate the percentage of parcels that are damaged.

..... %

(1 mark)

- 7 The Muller family are on holiday in New Zealand. They have \$1962 New Zealand dollars.
The family spend 15% of their New Zealand dollars on a tour.

Calculate the number of dollars they have left.

\$

(2 marks)

- 8 Work out \$1.45 as a percentage of \$72.50.

..... %

(1 mark)

- 9 Bill's weight decreases from 64.8 kg to 59.3 kg.

Calculate the percentage decrease in Bill's weight.

Give your answer correct to 3 significant figures.

(3 marks)

10 Tom is a ski jumper.

The maximum length of skis he can use is 145% of his height. Tom's height is 1.80 m.

Work out the maximum length of skis Tom can use.

(3 marks)

11 George wants to watch all 23 games that a football team will play at home next season.

He can buy

a season ticket costing £425
or 23 separate tickets costing £24 each ticket.

What percentage of the total cost of 23 separate tickets does George save by buying a season ticket?

(3 marks)

12 Emily buys a pack of 12 bottles of water. The pack costs £5.64

Emily sells all 12 bottles for 50p each.

Work out Emily's percentage profit. Give your answer correct to 1 decimal place.

(3 marks)

Medium Questions

- 1 Increase 42 by 16%.

(2 marks)

- 2 (a) The table shows the surface area of some countries and their estimated population in 2017.

Country	Surface area (km ²)	Estimated population in 2017
Brunei	5.77×10^3	433 100
China	9.60×10^6	1 388 000 000
France	6.41×10^5	67 000 000
Maldives	3.00×10^2	374 600

Find the surface area of France as a percentage of the surface area of China.

..... %

(2 marks)

- (b) The population of the Earth in 2017 was estimated to be 7.53×10^9 .
The population of the Earth in 2000 was estimated to be 6.02×10^9 .
Work out the percentage increase in the Earth's estimated population from 2000 to 2017.

..... %

(2 marks)

3 One month, Greta spent a total of \$360 on presents.

She spent $\frac{1}{5}$ of this total on presents for her parents.

She spent $\frac{2}{3}$ of the remaining money on presents for her friends. She spent the rest of the money on presents for her sisters.

Calculate the percentage of the \$360 that she spent on presents for her sisters.

..... %

(4 marks)

4 Dhanu has a model railway.

He has a train that consists of a locomotive and 4 coaches. The mass of the locomotive is 87 g and the mass of each coach is 52 g.

i) Work out the total mass of the train.

..... g [2]

ii) Work out the mass of the locomotive as a percentage of the total mass of the train.

..... % [1]

(3 marks)

- 5** Manjeet uses 220 litres of water each day.
She reduces the amount of water she uses by 15%.

Calculate the number of litres of water she now uses each day.

..... litres

(2 marks)

- 6** Marianne sells photos.
The selling price of each photo is \$6.
Marianne makes a profit of \$2.25 on each photo.
Calculate her profit as a percentage of the selling price.

.....%

(1 mark)

- 7** Increase \$22 by 15%.

\$

(2 marks)

- 8** A company sells boxes to factories.

Fred buys boxes.
The boxes are sold in packs of 1000
Each pack costs £193.86

Fred orders 3 packs of boxes.
He gets a discount on his total order.

The table shows the discount he will get.

Total Order	Discount
£100 - £300	5%
£301 - £400	10%
£401 and above	15%

Work out the total cost of the order after the discount.
You must show your working.

(5 marks)

- 9** Mr Watkins needs to buy some oil for his central heating.

Mr Watkins can put up to 1500 litres of oil in his oil tank.
There are already 850 litres of oil in the tank.
Mr Watkins is going to fill the tank with oil.

The price of oil is 67.2p per litre.
Mr Watkins gets 5% off the price of the oil.

How much does Mr Watkins pay for the oil he needs to buy?

(5 marks)

10 The table gives some information about student attendance at a school on Friday.

	Number of students		
Year	Present	Absent	Total
Year 7	192	16	208
Year 8	219	22	241
Year 9	234	28	262
Year 10	233	28	261
Year 11	214	24	238

The school has a target of 94% of students being present each day.

Did the school meet its target on Friday?

(3 marks)

11 Claire is making a loaf of bread.

A loaf of bread loses 12% of its weight when it is baked.

Claire wants the baked loaf of bread to weigh 1.1 kg.

Work out the weight of the loaf of bread before it is baked.

(3 marks)

12 A force of 70 newtons acts on an area of 20 cm²

$$\text{pressure} = \frac{\text{force}}{\text{area}}$$

The force is increased by 10 newtons.

The area is increased by 10 cm²

Helen says,

"The pressure decreases by less than 20%"

Is Helen correct?

You must show how you get your answer.

(3 marks)

Hard Questions

- 1 The selling price of a shirt is \$26.50.
This includes a tax of 6%.

Calculate the price of the shirt before the tax was added.

\$

(2 marks)

- 2 Adil and Brian are paid the same wage.

Adil is given a 7% pay decrease and his new wage is \$427.80. Brian is given a 7% pay increase.

Work out Brian's new wage.

\$

(3 marks)

- 3 Shona buys a chair in a sale for \$435.60.
This is a reduction of 12% on the original price.
Calculate the original price of the chair.

\$

(3 marks)

4 In 2003, Jerry bought a house.

In 2007, Jerry sold the house to Mia.
He made a profit of 20%

In 2012, Mia sold the house for £162 000
She made a loss of 10%

Work out how much Jerry paid for the house in 2003

(3 marks)

5 Marie invests £8000 in an account for one year.
At the end of the year, interest is added to her account.

Marie pays tax on this interest at a rate of 20%
She pays £28.80 tax.

Work out the percentage interest rate for the account.

(3 marks)

6 The cost of a Premium ticket is reduced from \$114 to \$96.90. Calculate the percentage reduction in the cost of a ticket.

..... %

(2 marks)

- 7** Arjun earned \$36 515 in 2019.
This was an increase of 9% on his earnings in 2018.

Work out his earnings in 2018.

\$

(2 marks)

- 8** In a sale the original prices are reduced by 15%.

Calculate the original price of a jacket that has a sale price of \$38.25.

\$

(2 marks)

- 9** In September the total income at a campsite was \$37 054. This was a decrease of 4.5% on the total income in August.

Calculate the total income in August.

\$

(2 marks)

- 10** The cost of a railway magazine increases by 12.5% to \$2.70. Calculate the cost of the magazine before this increase.

\$

(2 marks)

- 11** In a sale, Ali buys a television for \$195.80.
The original price was \$220.

Calculate the percentage reduction on the original price.

..... %

(3 marks)

- 12** In the sale, Mo buys a jacket for \$63.
The original price was reduced by 25%.

Calculate the original price of the jacket.

\$

(3 marks)

- 13** Mani exports some of his pears to a shop in Belgium.
The shop buys the pears at \$1.50 per kilogram.
The shop sells the pears for 2.30 euros per kilogram.
The exchange rate is \$1 = 0.92 euros.

Calculate the percentage profit per kilogram made by the shop.

..... %

(5 marks)

- 14** In 2019, the membership fee of a cycling club is \$79.50.
This is 6% more than last year.

Find the **increase** in the cost of the membership.

\$

(3 marks)

- 15** The price of a newspaper increased from \$0.97 to \$1.13.

Calculate the percentage increase.

..... %

(3 marks)

- 16** There were 3.08×10^5 passengers that made a journey in 2018. This was a 12% decrease in the number of passengers that made this journey in 2017.
Find the number of passengers that made this journey in 2017. Give your answer in standard form.

(3 marks)

- 17** In a sale, Marianne buys a new camera for \$483.
This is a reduction of 8% on the original price.

Calculate the original price of the camera.

\$

(3 marks)

- 18** i) Water flows over the Browne Falls at a rate of 3680 litres per second.
After rain, this rate increases to 9752 litres per second.

Calculate the percentage increase in this rate.

..... % [3]

- ii) After rain, water flows over the Sutherland Falls at a rate of 74240 litres per second.
This is an increase of 45% on the rate before the rain.

Calculate the rate before the rain.

..... litres/second [3]

(6 marks)

- 19** The price of a house decreased from \$82 500 to \$77 500. Calculate the percentage decrease.

..... %

(3 marks)

- 20** In 2017, the membership fee for a sports club was \$79.50.
This was an increase of 6% on the fee in 2016.

Calculate the fee in 2016.

\$

(3 marks)

- 21** A company makes biscuits at a cost of \$1.35 per packet.

These biscuits are sold for \$1.89 per packet.

- i) Calculate the percentage profit the company makes on each packet.

..... % [3]

- ii) The selling price of \$1.89 has increased by 8% from last year. Calculate the selling price last year.

\$ [3]

(6 marks)

22 Rowena buys and sells clothes.

i) She buys a jacket for \$40 and sells it for \$45.40 .

Calculate the percentage profit.

..... % [3]

ii) She sells a dress for \$42.60 after making a profit of 20% on the cost price.

Calculate the cost price.

\$ [3]

(6 marks)

23 The selling price of dress fabric is \$2.97 per metre, which is an increase of 8% on the cost price.

Calculate the cost price.

\$ per metre

(3 marks)

24 Tom is tiling a wall.

He needs to buy at least 100 tiles.

The tiles are sold in large packs and small packs.

Large pack 40 tiles	£18
Small pack 28 tiles	£14
Special offer	
25% reduction when you buy 3 or more large packs	

Work out the cheapest cost for Tom to buy the packs of tiles he needs.

£.....

(3 marks)