PERCENTAGES (FOUNDATION)

DATE OF SOLUTIONS: 15/05/2018
MAXIMUM MARK: 80

SOLUTIONS

GCSE (+ IGCSE) EXAM QUESTION PRACTICE

1. [New Question, by Maths4Everyone.com] Percentages (Standard) **[7 Marks]**

Students in Year 11 took a maths test.
The maximum mark in the test was 75.

(a) Melissa scored 48 marks.
Express 48 as a percentage of 75

$\frac{48}{75} \times 100$ (M1)

64% (A1)

(2)

(b) Ciaran scored 76%.
Work out 76% of 75 marks.

75×0.76 (M1)

57 (A1)

(2)

(c) 56% of the students who took the test were girls.
There were 126 girls that took the test.
Work out the total number of students that took the test.

$0.56 \times S = 126$

$\Rightarrow S = \frac{126}{0.56}$ (M1) (FOR DIVIDE)

(M1) (USING 0.56)

225 (A1)

(3)

2. [Edexcel, 2004] Percentages (Standard) **[4 Marks]**

Paul got 68 out of 80 in a science test.

(a) Work out 68 out of 80 as a percentage.

$\frac{68}{80} \times 100$ M1

85 % A1

(2)

Paul got 72 marks in a maths test.
72 is 60% of the total number of marks.

60% → 0.6

(b) Work out the total number of marks.

$0.6x = 72$

$\Rightarrow x = \frac{72}{0.6}$ M1

120 A1

(2)

3. [Edexcel, 2010] Percentages (Inc Reverse) **[3 Marks]**

Jade has tax deducted from her income at the rate of 24%. → 0.76
Last month, after tax had been deducted, \$1786 of her income remained.
Calculate her income last month before the tax was deducted.

(REVERSE PERCENTAGE
SO DIVIDE)

M1 DIVIDE $\frac{1786}{0.76}$ = \$2350 A1

B1

4. [Edexcel, 2008] Percentages (Inc Reverse) **[9 Marks]**

In a sale, normal prices were reduced by 35%.

0.65

(a) The normal price of a camera was £180
Work out the sale price of the camera.

180 x 0.65

M1 B1

£ 117 A1

(3)

(b) The normal price of a clock was reduced by £84
Work out the normal price of the clock.

M1 84 / 0.35

B1

£ 240 A1

(3)

(c) The sale price of a computer was £442
Work out the normal price of the computer.

M1 442 / 0.65

B1

£ 680 A1

(3)

5. [Edexcel, 2011] Percentages (Compound) **[3 Marks]**

Ella invested \$8000 for 3 years at 5% per annum **compound interest**.

Calculate the value of her investment at the end of 3 years.

$8000 \times \underbrace{1.05}_{B1}{}^{\overbrace{3}^{M1}}$

A1

\$ 9261

6. [Edexcel, 2016] Percentages (Inc Reverse) **[6 Marks]**

In a sale, normal prices are reduced by 8% → 0.92

(a) The normal price of a jacket is £28

Work out the price of the jacket in the sale.

28×0.92 ← B1

M1 [MULTIPLY]

£ 25.76 A1

(3)

(b) In the sale, the price of a shirt decreases by £3 — £3 IS THE 8% DECREASE!

Work out the normal price of the shirt.

WORKING BACKWARDS SO DIVIDE.

$3 \div 0.08$ M1 [DIVIDE]

B1

£ 37.50 A1

(3)

7. [Edexcel, 2004] Percentages (Increases and Decreases) **[3 Marks]**

In July 2002, the population of Egypt was 69 million.
By July 2003, the population of Egypt had increased by 2%. → 1.02 (102%)

Work out the population of Egypt in July 2003.

69×1.02 ← (B1) '1.02'

(M1)

[MULTIPLY]

70.38 (A1) million

8. [Edexcel, 2015] Percentages (Increases and Decreases) **[6 Marks]**

Lisa sees a dress in a sale.
The normal price of the dress is $45
The price of the dress is reduced by 12% in the sale.

0·88, 0·12

(a) Work out the price of the dress in the sale.

45×0.88 (B1)

(M1)

REMEMBER THE ZERO!

$ 39.60

(3) (A1)

Lisa's weekly pay increases from $525 to $546

(b) Calculate her percentage pay increase.

$546 - 525 = 21$ (M1)

(M1) $\frac{21}{525} \times 100 = 4$ (A1)

Eloy's height was 125 cm when his age was 7 years.
His height was 153 cm when his age was 12 years.

(a) Work out the percentage increase in Eloy's height between the ages of 7 and 12 years.

INCREASE = 153 − 125

= 28 → $\frac{28}{125} \times 100$

22.4 %

(3)

Eloy's height at the age of 12 years was 85% of his height at the age of 20 years.

(b) Work out Eloy's height when his age was 20 years.

$0.85 \times \text{FINAL} = 153$

$\text{FINAL} = \frac{153}{0.85}$

$= 180 \text{ cm}$

10. [New Question, by Maths4Everyone.com] Percentages (Inc Reverse) **[9 Marks]**

An electronics store had a sale in which it reduced all its prices by 24%. (0.24, 0.76)

(a) Tom bought a television which had been reduced by $85
Work out how much Tom paid for the television.

$\frac{85}{0.24}$ M1

B1

A1

$354.17

(3)

(b) Michael paid $140 for a DAB radio.
Work out the original price of the radio, before the sale.

$\frac{140}{0.76}$ M1

B1

A1

$184.21

(3)

(c) Alec bought a laptop, which was originally priced at $380
Work out the sale price for the laptop.

380×0.76 M1 B1

A1

$288.80

(3)

11. [New Question, by Maths4Everyone.com] Percentages (Inc Reverse) **[8 Marks]**

Maddie invested $3000 for 4 years at 2.5% per annum compound interest.

(a) Calculate the amount of the investment at the end of 4 years.

$3000 \times 1.025^4 = 3311.4386...$ B1 B1

A1

$ 3311.44

(3)

(b) Work out the amount of interest that Maddie earned in these 4 years.

$3311.44 - 3000$ M1

A1

$ 311.44

(2)

Pardeep invests a sum of money at an interest rate of 3% per year.
At the end of one year, the interest he receives is $372

(c) Work out the value of Pardeep's investment at the end of one year.

$0.03 \times \text{START} = 372$

$\therefore \text{START} = \frac{372}{0.03}$ M1

$= 12400$ M1

FINAL AMOUNT $= 12400 + 372$

A1

$ 12 772

(3)

12. [Edexcel, 2008] Percentages (Increases and Decreases) **[6 Marks]**

Cara's salary was increased from \$28 250 to \$29 832

(a) Work out the percentage increase in Cara's salary.

INCREASE = 29832 − 28250 (M1)

= 1582

% AGE INCREASE = $\frac{1582}{28250} \times 100$ (M1)

STARTING AMOUNT

5.6 (A1) ..... %

(3)

Pedro's salary was increased by 5.2%.
After the increase, his salary was \$28 141

(b) Work out his salary before the increase.

INCREASE OF 5.2% → × 1.052 OR ÷ 1.052

(M1) $\frac{28141}{1.052} = 26750$

(B1)

(A1)

\$ 26750 .....

(3)

13. [Edexcel, 2013] Percentages (Compound) **[4 Marks]**

Jomo invested an amount of money at 4% per annum **compound interest**.
At the end of 2 years, the value of his investment was £3380

How much of the £3380 was interest?

1.04

INITIAL INVESTMENT $= \frac{3380}{1.04^2}$ M1

$= 3125$ A1

INTEREST EARNT $= 3380 - 3125$ M1

$= 255$

£ 255 A1

14. [Edexcel, 2014] Percentages (Compound) **[3 Marks]**

Serena bought a car that had a value of $16 000
At the end of each year, the value of her car had depreciated by 15%.

Calculate the value of her car at the end of 3 years.

→ 0.85

$16\,000 \times 0.85^3$ ← M1

B1

$= \$9826$ A1

15. [Edexcel, 2012] Percentages (Compound) **[3 Marks]**

The population of India increased by 20% between 1989 and 1999. → $\times 1.20$
The population of India increased by a further 17% between 1999 and 2009. → $\times 1.17$

Calculate the percentage by which the population of India increased between 1989 and 2009.

1.20×1.17 (M1)

(B1) EITHER

$= 1.404$

$= 40.4\%$ (A1)

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Sometimes a method used in these solutions might be unfamiliar to You. If You are able to use a different method to obtain the correct answer then You should consider to keep using your existing method and not change to the method that is used here. However, the choice of method is always up to You and it is often useful if You know more than one method to solve a particular type of problem.

Within these solutions there is an indication of where marks **might** be awarded for each question. B marks, M marks and A marks have been used in a similar, but **not identical**, way that an exam board uses these marks within their mark schemes. This slight difference in the use of these marking symbols has been done for simplicity and convenience. Sometimes B marks, M marks and A marks have been interchanged, when compared to an examiners' mark scheme and sometimes the marks have been awarded for different aspects of a solution when compared to an examiners' mark scheme.

B1 – This is an unconditional accuracy mark (the specific number, word or phrase must be seen. This type of mark cannot be given as a result of 'follow through').

M1 – This is a method mark. Method marks have been shown in places where they might be awarded for the method that is shown. If You use a different method to get a correct answer, then the same number of method marks would be awarded but it is not practical to show all possible methods, and the way in which marks might be awarded for their use, within these particular solutions. When appropriate, You should seek clarity and download the relevant examiner mark scheme from the exam board's web site.

A1 – These are accuracy marks. Accuracy marks are typically awarded after method marks. If the correct answer is obtained, then You should normally (but not always) expect to be awarded all of the method marks (provided that You have shown a method) and all of the accuracy marks.

Note that some questions contain the words 'show that', 'show your working out', or similar. These questions require working out to be shown. Failure to show sufficient working out is likely to result in no marks being awarded, even if the final answer is correct.

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