

Daily Practice 14.9.2015

Q1. State the equation of the line joining (0, -4) and (2, -3)

$$m = \frac{-3 - (-4)}{2 - 0} = \frac{1}{2} = 0.5$$

$$y = mx + c$$

$$-4 = 0.5(0) + c$$

$$c = -4$$

$$y = \frac{1}{2}x - 4$$

Q2. Multiply out and simplify $2(3x - 4) + 4(x - 8) - 3$

$$6x - 8 + 4x - 32 - 3$$

$$10x - 43$$

Q3. How much is a TV priced at £360 + 20% VAT?

$$10\% = \pounds 36$$

$$20\% = \pounds 72$$

$$360 + 72 = \pounds 432$$

Q4. Rearrange $y = at^2 - b$ so that t is the subject

$$y + b = at^2$$

$$\frac{y + b}{a} = t^2$$

$$t = \sqrt{\frac{y + b}{a}}$$

Q5. Solve the equation $\frac{3}{4}x + 2 = 26$

$$\frac{3}{4}x + 2 = 26$$

$$\frac{3}{4}x = 24$$

$$x = 32$$

Today we will be learning about percentage multipliers.

Homework Online due 22.9.15

Writing percentages as decimals 14.9.15

A percentage is a fraction over 100.

So to write a percentage as a decimal, just divide the numerator by the denominator (In this case the denominator is 100)

For example:

$$35\% = 0.35$$

$$\frac{35}{100}$$

Writing percentages as decimals

Write the following percentages as decimals:

- | | | |
|----------|-----------|-------------|
| (a) 29% | (e) 4.5% | (i) 103.2% |
| 0.29 | 0.045 | 1.032 |
| (b) 100% | (f) 0.23% | (j) 4.05% |
| 1 | 0.0023 | 0.0405 |
| (c) 5% | (g) 88.1% | (k) 99.086% |
| 0.05 | 0.881 | 0.99086 |
| (d) 2.3% | (h) 103% | (l) 25.5% |
| 0.023 | 1.03 | 0.255 |

Percentage Multipliers

Percentages are converted to decimals to allow calculations using a calculator.

Of means to multiply

So find 64% of 700 means $64\% \times 700$

or in other words 0.64×700

Convert the percentages to decimals and use your calculator to work out the answers (Give answers to 1 d.p. where rounding is needed):

- | | | |
|----------------------|---------------------------|-----------------------------|
| (a) 51% of 84 = 42.8 | (c) 2.5% of 47 = 1.175 | (e) 10.5% of 184 = 19.32 |
| (b) 92% of 638 = 587 | (d) 3.08% of 112 = 3.4496 | (f) 2.99% of 3021 = 90.3279 |

3886% APR

Loans up to £5000

£5000 = Loan

194300

3.3%

Daily Practice

15.9.2015

Q1. Find 19% of 3000

$$1\% = 3000 \div 100 = 30$$

$$19\% = 30 \times 19 = \underline{570}$$

Q2. $458 \div 0.004$

$$114.5 \times 1000 = 114500$$

$$4 \overline{) 458.0} = 114.5$$

$$\frac{458}{1} \div \frac{4}{1000}$$

$$\frac{458}{1} \times \frac{1000}{4}$$

Q3. 4.25×0.6

$$0.425$$

$$\begin{array}{r} 0.425 \\ \times 0.6 \\ \hline 2.550 \end{array}$$

$$\frac{6}{10} \text{ of } 4.25$$

Q4. Factorise $45gh - 18h^2$

$$9h(5g - 2h)$$

Q5. $2 - 2 \times 46$

$$2 - 92 = \underline{-90}$$

$$\frac{458}{0.004} \times 1000 =$$

$$\frac{17}{4} \times \frac{6}{10} = \frac{102}{40} = 2 \frac{22}{40} = 2 \frac{11}{20}$$

Today we will be continuing to learn about percentage multipliers.

Percentage Multipliers

Other % calculations can be made easier using decimals too.

Adding on or taking off a percentage.

Examples:

1. Find the value of a TV that costs £620 + 17.5% VAT

$$100\% + 17.5\% = 117.5\% = 1.175$$

$$620 \times 1.175 = \underline{\underline{\pounds 728.50}}$$

2. Find the value of a car that was worth £12 000 and depreciated in value by 4%

$$100\% - 4\% = 96\% = 0.96$$

$$12000 \times 0.96 = \underline{\underline{\pounds 11520}}$$

$$280 + 20\% \text{ VAT}$$

$$\frac{120\%}{1.2} \text{ of } 280$$

$$1.2 \times 280$$

Percentage Multipliers

Work out the following:

1. A house that increased in value from £135 000 by 7.5%
2. A dress that cost £60 and was reduced in the sale by 15%
3. A loan for £5000 that has an APR of 4.25% at the beginning of the next year
4. A person's salary that was £28 920 p.a. and they got a payrise of 2%

Percentage Multipliers

Work out the following:

1. A house that increased in value from £135 000 by 7.5% $\pounds 145125$
2. A dress that cost £60 and was reduced in the sale by 15% $\pounds 51$
3. A loan for £5000 that has an APR of 4.25% at the beginning of the next year $\pounds 5212.50$
4. A person's salary that was £28 920 p.a. and they got a payrise of 2% $\pounds 29498.40$
5. A carton of milk cost £1.21 and increased in line with inflation by 1.3%. How much does it cost now? $\pounds 1.23$
6. £845 900 - 2.44% $\pounds 825260.04$

DAILY PRACTICE

16.9.2015

$$Q1. 1\frac{3}{5} - \frac{2}{7} = \frac{8}{5} - \frac{2}{7} = \frac{56}{35} - \frac{10}{35} = \frac{46}{35} = 1\frac{11}{35}$$

LCM=35

$$Q2. \text{Evaluate } 3a^2b - 2b \text{ when } a = 4 \text{ and } b = -3$$

$$3(4^2)(-3) - 2(-3) \quad 48(-3) + 6$$

$$3 \times 16 \times -3 + 6 \quad -144 + 6 = -138$$

Q3. Two bottles are similar in size, the diameter of the smaller bottle is 6cm and its volume is 250ml. If the diameter of the larger bottle is 8cm, what is its volume?

$$\text{ESf} = 8 \div 6 = 1.3$$

$$\text{V.s.f} = (1.3)^3 \quad \text{Volume} = 250 \times (1.3)^3 = 592.6 \text{ ml}$$

Q4. Find 54.5% of 281 (Give answer to 2 s.f.)

$$0.545 \times 281 = \underline{\underline{\pounds 153.15}}$$

$$\rightarrow \underline{\underline{\pounds 150}} \text{ (2 s.f.)}$$

$$500 \times 1.02 = 510 \times 1.02$$

$$510 \times 1.02^5$$

Today we will be learning to use percentage multipliers to work out long term effects.

Percentage Multipliers / Compound Interest 16.9.15

Percentage multipliers can then be used to work out long term values provided that the percentage increase/decrease stays the same.

Examples:

1. John has £10 500 in his ISA, it has an interest rate of 2.5% p.a. provided he does not withdraw any money for 3 years. How much is there in John's ISA at the end of 3 years?

$$100\% + 2.5\% = 102.5\% = 1.025$$

$$10500 \times 1.025^3 = \underline{\underline{\pounds 11307.35}}$$

$$\text{Interest earned} = \underline{\underline{\pounds 807.35}}$$

Percentage Multipliers

2. There are 300 lice on Dan's head, when he rinses his hair out with Bye Bye Lice, the lice die at a rate of 15% per minute, how many lice are left after 4 minutes?

$$100\% - 15\% = 85\% = 0.85$$

$$300 \times 0.85^4 = \underline{\underline{156 \text{ lice}}}$$

Compounding

Source: Investopedia.com

DEFINITION OF 'COMPOUNDING'

The ability of an asset to generate earnings, which are then reinvested in order to generate their own earnings. In other words, compounding refers to generating earnings from previous earnings.

Also known as "compound interest".

Percentage Multipliers

http://www.knightswoodsecondary.org.uk/personal/Resources/Hillhead/Credit_Worksheets/AppreciationAndDepreciation.pdf

Daily Practice

18.9.2015

Q1. Calculate the current value of a car that was worth £4000 and depreciated by 3% p.a. for 3 years

$$100\% - 3\% = 97\% = 0.97 \quad 4000 \times 0.97 = \underline{\underline{£3680}}$$

Q2. $48.8 \div 4000$

$$48.8 \div 4000 = 0.0122$$

Q3. Factorise fully $3x^2a + 15xb + 12x$

$$3x(xa + 5b + 4)$$

Q4. $1\frac{1}{9} \times \frac{3}{4}$

$$1\frac{1}{9} \times \frac{3}{4} = \frac{10}{9} \times \frac{3}{4} = \frac{30}{36} = \frac{5}{6}$$

Q5. Solve $7x - 3 = 4x + 27$

$$\begin{array}{r} -4x \quad -4x \\ 3x - 3 = 27 \\ +3 \quad +3 \\ 3x = 30 \\ \div 3 \quad \div 3 \\ \underline{\underline{x = 10}} \end{array}$$

Today we will be learning about percentages working backwards.

Homework due 22.9.15

DVD in the sale £12.98

Marked 20% off
Original Price??

$$\begin{array}{l} 12.98 = 80\% \\ 0.16225 = 1\% \\ \underline{\underline{£16.23}} = 100\% \end{array}$$

$$\begin{array}{l} £12.98 = 80\% \\ £1.62 = 10\% \\ 3.25 = 20\% \\ 3.25 + 12.98 \\ = \underline{\underline{£16.23}} \end{array}$$

Percentages working backwards

18.9.15

Given the new amount with a percentage increase/decrease, this means finding the original amount.

Always let the original amount = 100% (or 1 in decimal form)

Percentages working backwards

Examples:

1. Find the original size of a box of cereal that is marked 20% extra free and now contains 600grams

$$\begin{array}{l} 120\% = 600g \\ 1\% = 600 \div 120 = 5g \\ 100\% = 5 \times 100 = \underline{\underline{500g}} \end{array}$$



2. Calculate the original cost of a painting that is priced £76.50 in the sale with 15% marked off

$$\begin{array}{l} 85\% = £76.50 \\ 1\% = £76.50 \div 85 = 0.9 \\ 100\% = 0.9 \times 100 = \underline{\underline{£90}} \end{array}$$



Percentages

Percentages working backwards

Task: Make up a question on percentages working backwards.

Write down the solution.

Every time someone sits beside you, show them the question and work out theirs. Then check solutions and move on.

- Between the years 2001 and 2002 a stereo system increased in value by 20%. If the stereo cost £660 in 2002 what was its value in 2001?
- The price of a car has increased in value by 30%. If the car is now valued at £7800 what was its previous value?
- John is 136 cm tall. If John is 85% of the height of David, find David's height.
- A student pays an aeroplane fare of £240. If this represents 60% of the adult fare, find the adult fare.
- The cost of a season ticket for Hillside Town is £273 for a child. If this represents 65% of the cost of an adult ticket, find the cost of an adult season ticket.
- Amanda and Roomila decide to see who can cycle further over an hour. Amanda covers 6 kilometres which is 80% of the distance covered by Roomila. How far did Roomila cycle?
- In a maths examination Michael scored 75% of what Brian scored. If Michael scored 66% what did Brian score?

- The average cost of a computer has fallen in price by 45% since 1999. If the average cost is now £660, find the average cost in 1999.
- The roll of a school has fallen by 15% since the year 2001. If the school roll is now 1190, what was the roll in 2001?
- The population of a Scottish village has dropped by 35%. If the population is now 420, what was the population originally?
- The cost of a holiday increased by 8% from the years 2001 to 2002. If it cost £540 for the holiday in 2002, what was the cost in 2001?
- Laura's wages have increased by 6%. She now earns £19080, find her wage before the increase.

Daily Practice 22.9.2015

Q1. Calculate the area of a quarter circle with a radius of 7cm

$$A = \frac{\pi r^2}{4} = \frac{\pi \times 7^2}{4} = \frac{153.94}{4} = 38.48 \text{ cm}^2$$

Q2. Multiply out and simplify $7(2x - 1) - 3x + 4$

$$14x - 7 - 3x + 4$$

$$11x - 3$$

Q3. Factorise $3x^2 - 15x$

$$3x(x - 5)$$

Q4. Calculate the value of a car that was worth £6000 and depreciated by 6% per annum for 3 years

$$6000 \times 0.94^3 = \underline{\underline{4983.50}}$$

Q5. $\frac{2\frac{2}{3}}{3} \div \frac{4}{5} = \frac{8}{3} \div \frac{4}{5}$
 $= \frac{8}{3} \times \frac{5}{4} = \frac{40}{12} = \frac{10}{3} = 3\frac{1}{3}$

Q1. Without the use of a calculator, work out the following:

- (a) 15% of 32 (b) 4.5% of 20 (c) 17.5% of 340

Handwritten calculations for Q1:

- (a) 15% of 32: $10\% \text{ of } 32 = 3.2$, $5\% \Rightarrow 3.2 \div 2 = 1.6$, $15\% \Rightarrow 3.2 + 1.6 = 4.8$
- (b) 4.5% of 20: $10\% \Rightarrow 20 \div 10 = 2$, $5\% \Rightarrow 1$, $1\% \Rightarrow 0.2$, $0.5\% \Rightarrow 0.1$, $4\% = 0.8$, $0.5\% = 0.1$, 0.9
- (c) 17.5% of 340: $10\% \Rightarrow 340 \div 10 = 34$, $5\% \Rightarrow 34 \div 2 = 17$, $1\% \Rightarrow 17 \div 5 = 3.4$, $0.5\% \Rightarrow 3.4 \div 2 = 1.7$, $59.5 \Rightarrow 17.5\%$

Today we will be completing a check-up on percentages and marking the homework.

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Q2. Gary bought a car for £4000, it depreciated in value by 8% within a year. How much is it worth at the end of the year?

$$4000 \times 0.92 = \underline{\underline{£3680}}$$

②

Q3. Andy put £8000 in the bank at 3.7% interest compounded annually for 4 years. How much was in his account at the end of the 4 years?

$$8000 \times 1.037^4 = \underline{\underline{£9251.35}}$$

③

Q4. Karen was earning £31 400 in 2009 and her wages are adjusted for inflation every year. How much is she earning in 2011 if the inflation rate in 2009 was 3.1% and in 2010 was 4%?

$$\begin{array}{l} \underline{2010} \quad 31400 \times 1.031 = \underline{\underline{£32373.40}} \\ \underline{2011} \quad 32373.4 \times 1.04 = \underline{\underline{£33668.34}} \end{array}$$

④

Q5. If the population of the world is approximately 7 300 000 000 (7.3 billion) and the world population growth rate is around 1.13% p.a., what will the world population be in 2018?



$$\begin{array}{l} 7\,300\,000\,000 \times 1.0113^3 \\ \underline{\underline{7\,550\,276\,944}} \end{array}$$

③

Q6. During a flu epidemic 6400 cases were recorded on Monday. The number of cases was expected to rise by 28.5% each day. How many cases are expected by Thursday in the same week? (Give your answer to 3 sig. figs.)

$$\begin{array}{l} 6400 \times 1.285^3 = 13579.67 \\ \rightarrow \underline{\underline{13600}} \end{array}$$

④

Q7. A jar of coffee contains 600grams. It is marked 33 $\frac{1}{3}$ % extra free. What weight was the coffee originally?

$$\begin{array}{l} 133\frac{1}{3}\% = 600g \checkmark \\ 1\% = 4.5g \checkmark \\ 100\% = \underline{\underline{450grams}} \checkmark \\ \div 133\frac{1}{3} \times 100 \end{array}$$

③

Q8. A new book "Maths is Fun" was published in 2006. There were 3000 sales of the book during that year. Sales rose by 11% in 2007 then fell by 10% in 2008. Were the sales in 2008 more or less than the sales in 2006? You must give a reason for your answer.

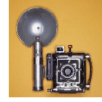


$$\begin{array}{l} \text{2007} \quad 3000 \times 1.11 = 3330 \\ \text{2008} \quad 3330 \times 0.9 = 2997 \end{array}$$

$100\% + 11\% = 111\% = 1.11$
 $100\% - 10\% = 90\% = 0.9$

Less sales in 2008 than 2006 by 3.

⑤



Q9. A camera in the sale is 20% off and now costs £109. How much did it cost originally?

$$\begin{array}{l} 80\% = £109 \\ 1\% = £109 \div 80 = 1.3625 \\ 100\% = 1.36 \times 100 = £136.25 \end{array}$$

③ Total 33