

Maths

End of Year Assessments

Revision Notes

Important Websites:

- Mathswatch: <https://vle.mathswatch.co.uk/vle/>

You have tasks to complete and videos will help you answer the questions.

- Corbett Maths: <https://corbettmaths.com/>

Lots of questions to answer and video clips to help you learn and revise.

- BBC Bitesize:

<https://www.bbc.co.uk/bitesize/subjects/z38pycw>

Year 8 Delta:

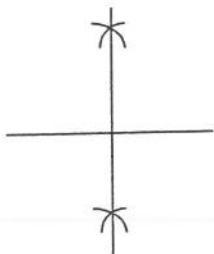
1	You can identify multiples.
2	You can use and apply the laws of indices.
3	You can identify a percentage multiplier.
4	You can add fractions and decimals.
5	You can simplify algebraic expressions using BIDMAS
6	You can order numbers in standard form.
7	You can calculate a percentage increase.
8	You can bisect an angle.
9	You can simplify algebraic expressions involving brackets.
10	You can express a number as the product of prime factors. You can find the highest common factor and lowest common multiple.
11	You can solve linear equations with unknowns on each side.
12	You can convert between standard form and ordinary numbers.
13	You can use and apply Pythagoras' Theorem.
14	You can solve problems involving the area of a circle.
15	You can find the volume of a cylinder.
16	You can interpret real-life graphs.
17	You can identify a vector translation.
18	You can convert a recurring decimal into a fraction.
19	You can solve percentage problems.

8/1 Change recurring decimal to fraction

$$\begin{aligned}\text{If } x &= 0.4444444 \\ 10x &= 4.4444444 \\ 9x &= 4 \\ x &= \frac{4}{9}\end{aligned}$$

$$\begin{aligned}\text{If } x &= 0.54545 \\ 100x &= 54.545454 \\ 99x &= 54 \\ x &= \frac{54}{99}\end{aligned}$$

- Equal distance from two points
perpendicular bisector



- Equal distance from two intersecting lines -
angle bisector



8/3 Standard Form

$$\sim a \times 10^n$$

a is between 1 & 10; n is an integer

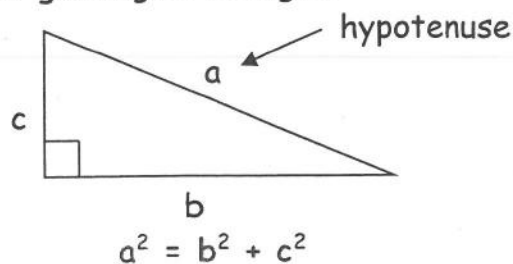
~ When mult/div in standard form,
work out number part separate from the
power of 10 part

$$\text{e.g. } 3 \times 10^5 \times 4 \times 10^3 = 12 \times 10^8 = 1.2 \times 10^9$$

~ With a calculator use **EXP** or **$\times 10^x$**

7/12 Pythagoras Theorem

For this right angled triangle:



- If finding the hypotenuse
ADD the squares of the other 2 sides
Then square root
- If finding a shorter side
SUBT the squares of the other 2 sides
Then square root

6/2 Increase/Decrease by a percentage

- To increase £12 by 5%
 $= 1.05 \times \text{£}12$ (100% + 5% = 105%)
OR

$$= \text{£}12 + 5\% \text{ of } \text{£}12$$

- To decrease £50 by 15%
 $= 0.85 \times \text{£}50$ (100% - 15% = 85%)
OR

$$= \text{£}50 - 15\% \text{ of } \text{£}50$$

Maths – Year 8 Delta – Unit 1

Index Laws

$$a^m \times a^n = a^{m+n}$$

$$\frac{a^m}{a^n} = a^{m-n}$$

$$(a^m)^n = a^{m \times n}$$

Examples

$$7^7 \times 7^8 = 7^7 + 8 = 7^{15}$$

$$\frac{9^5}{9^3} = 9^5 - 3 = 9^2$$

$$(15^2)^3 = 15^2 \times 3 = 15^6$$

prime factors

To find the prime factors of a composite number, first divide the number by 2 and then keep working down using 2 or the next lowest prime number that will divide any remaining composite factors exactly, until there are no composite factors left.

● prime factors ● composite factors

$$20 \begin{array}{l} \swarrow \searrow \\ 2 \times 10 \\ \swarrow \searrow \\ 2 \times 5 \\ \hline 20 = 2 \times 2 \times 5 \end{array}$$

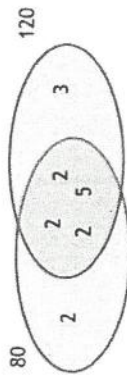
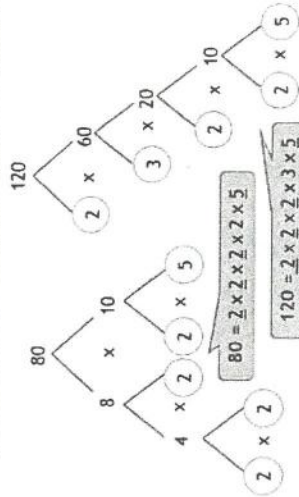
$$24 \begin{array}{l} \swarrow \searrow \\ 2 \times 12 \\ \swarrow \searrow \\ 2 \times 6 \\ \swarrow \searrow \\ 2 \times 3 \\ \hline 24 = 2 \times 2 \times 2 \times 3 \end{array}$$

$$48 \begin{array}{l} \swarrow \searrow \\ 2 \times 24 \\ \swarrow \searrow \\ 2 \times 12 \\ \swarrow \searrow \\ 2 \times 6 \\ \swarrow \searrow \\ 2 \times 3 \\ \hline 48 = 2 \times 2 \times 2 \times 2 \times 3 \end{array}$$

$$75 \begin{array}{l} \swarrow \searrow \\ 3 \times 25 \\ \swarrow \searrow \\ 5 \times 5 \\ \hline 75 = 3 \times 5 \times 5 \end{array}$$

Finding LCM and HCF using product of primes

- Write each number as a product of primes
- Write each product on a Venn Diagram
- HCF is the product of the intersection
- LCM is the product of all the numbers



HCF = $2 \times 2 \times 5 = 40$ (product of the intersection)
LCM = $2 \times 120 = 240$ (product of all the numbers)

Convert to Standard Form

Move the decimal point until there is one digit to the left of the decimal point.

Exponent goes up ← Decimal point moves left

Decimal point moves right → Exponent goes down

Examples:

$$156000. = 1.56 \times 10^5$$

Move decimal point 5 places left, exponent goes up by 5

$$0.0000053 = 5.3 \times 10^{-6}$$

Move decimal point 6 places right, exponent goes down by 6

Estimation

- 1) Round each number to 1sf
- 2) Complete the calculation

Example: Estimate 562×233

$$562 \rightarrow 600$$

$$233 \rightarrow 200$$

$$600 \times 200 = 120,000$$

Maths – Year 8 Delta – Unit 2

Index Laws

$$a^m \times a^n = a^{m+n}$$

$$\frac{a^m}{a^n} = a^{m-n}$$

$$(a^m)^n = a^m \times n$$

Examples

$$7^7 \times 7^8 = 7^7 + 8 = 7^{15}$$

$$\frac{9^5}{9^3} = 9^5 - 3 = 9^2$$

$$(15^2)^3 = 15^2 \times 3 = 15^6$$

Expand & Simplify.

$$5(x+3) + 6(x-4)$$

$$5x + 15 + 6x - 24$$

$$11x - 9$$

Factorise

$$7x + 14$$

$$7(x + 2)$$

$$45 - 27k$$

$$9(5 - 3k)$$

$$12ab + 7b$$

$$b(12a + 7)$$

Answer

Solving Equations

Variable Terms

Constant Terms

$$5x - 2 = 3x + 4$$

$$-3x \quad -3x$$

$$2x - 2 = 4$$

$$+2 \quad +2$$

$$2x = 6$$

$$x = 3$$

Forming Expressions

An expression is a group of numbers, letters and operation symbols.

Add 14 to a

$$a + 14$$

Subtract 20 from b

$$b - 20$$

Multiply c by 4

$$4c$$

12 more than d

$$d + 12$$

Multiply e by 3 and subtract 5

$$3e - 5$$

Add 12 to f and then multiply by 2

$$2(f + 12)$$

Sarah is x years old.
Thomas is 3 years older than Sarah.
David is twice as old as Sarah.
The total of their ages is 51.

(a) Write an expression for Thomas's age in terms of x.

$$x + 3$$

(b) Write an expression for David's age in terms of x.

$$2x$$

(c) Form an equation in x and solve it to work out Sarah's age.

$$x + x + 3 + 2x = 51$$

$$4x + 3 = 51$$

$$-3 \quad -3$$

$$4x = 48$$

$$\div 4 \quad \div 4$$

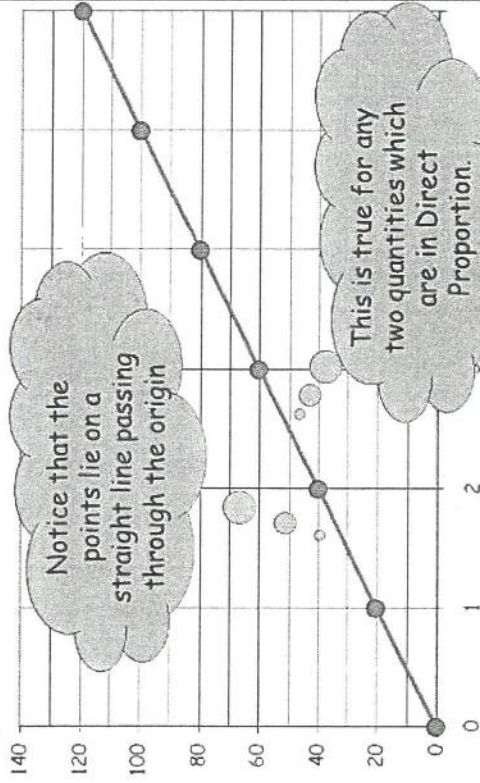
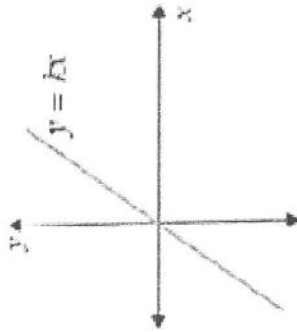
$$x = 12$$

Maths – Year 8 Delta – Unit 4

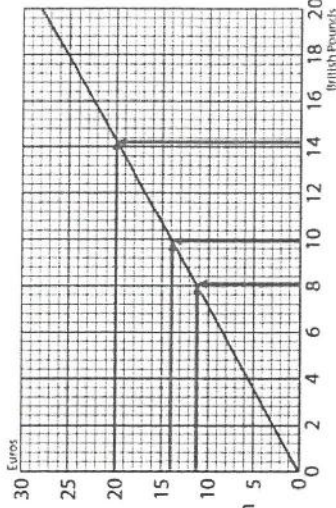
Directly Proportional

$$y \propto x$$

$$y = kx \text{ for a constant } k$$

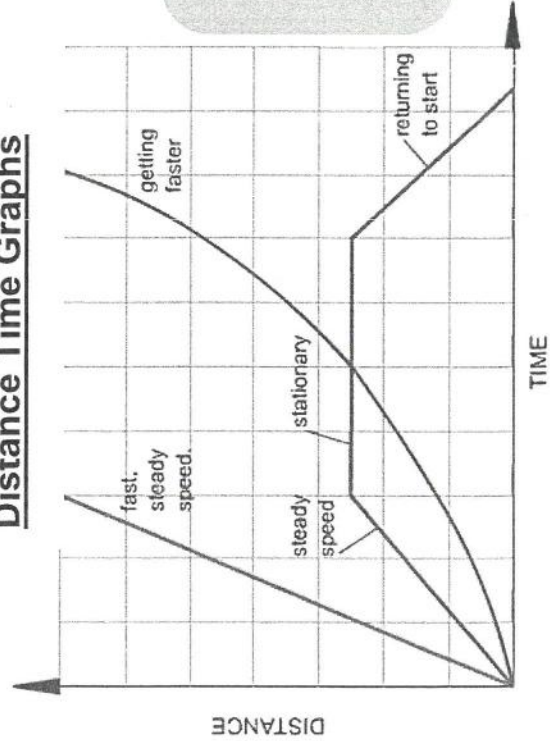


Plot and interpret real life conversion graphs.



- a) convert £8 to Euros
11€
- b) convert 14 Euros to £s
£10
- c) find the difference in £s between £12 and 14 Euros.
£12 - £10 = £2
- d) calculate the change from £50 when you spend 20€. Give your answer in £s
£50 - £14 = £36

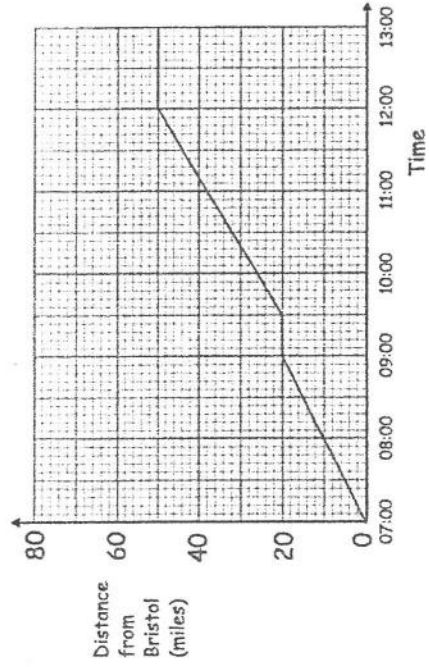
Distance Time Graphs



Speed Distance Time

$\text{Speed} = \frac{\text{Distance}}{\text{Time}}$
$\text{Distance} = \text{Speed} \times \text{Time}$
$\text{Time} = \frac{\text{Distance}}{\text{Speed}}$

Anne cycles from Bristol to Salisbury.
The diagram shows the distance-time graph of her journey.



Work out Anne's speed for the first two hours of her journey

$$s = \frac{d}{t} = \frac{20}{2}$$

5 Percentage change

Key point



You can calculate the percentage change using the formula
 percentage change =

$$\frac{\text{actual change}}{\text{original amount}} \times 100$$

Calculate the percentage decrease from £400 to £280

Work out the difference £400 - £280 = £120
 Write the difference over the original as a fraction and change to a percentage

$$\frac{120}{400} = \frac{30}{100} = 30\%$$

÷ 4

6 Repeated percentage change

Repeated Percentage Change

Formula: $\text{Quantity} \times \text{Multiplier}^{\text{Years}}$

Abi deposited £160 in a bank.
 She earned 20% compound interest every year.

How much was in the account after 3 years?

Multiplier:
 = 100% + 20%
 = 1.0 + 0.2
 = 1.2

$$160 \times 1.2^3 = \text{£}276.48$$

7 Recurring decimals

Worked example



Write $0.\dot{7}$ as a fraction.

$$0.\dot{7} = 0.777777... = n$$

Call the recurring decimal n .

$$10n = 7.777777...$$

Multiply the recurring decimal by 10.

$$10n - n = 7.777777... - 0.777777... \\ = 7.000000...$$

Subtract the value of n from the value of $10n$ so you get all the decimal places to zero.

$$9n = 7$$

$$n = \frac{7}{9}$$

Solve the equation.

