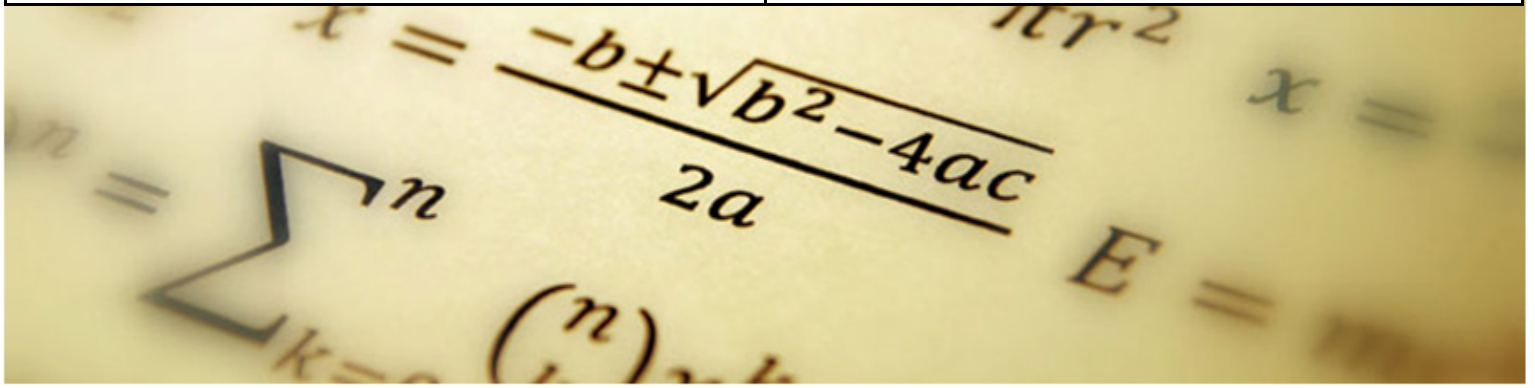
THE DUSTON SCHOOL 4-19

Knowledge Organiser

Maths

Year 11 Term 4 High

Name:	
Homework	Due date



Year 11 High Term 4 Overview

Data and Statistics

Stem and leaf & Scatter graphs	Cumulative frequency and box plots	Pie charts & Sampling	Probability & relative frequency	Sample space diagrams
Averages from tables & Frequency polygons	Histograms	Time Series	Probability trees	Set theory (with Venn diagrams)

Ratio, proportion, fractions, decimals and percentages

Simplify/scale up/divide ratio	Recipes and best value	Exchange rates	Calculating with fractions	Percentages of amounts, Increasing and decreasing
Tricky ratio problems	Tricky ratio problems	Direct & inverse proportion	Exponential & other non-linear graphs	Compound interest & Reverse percentages

Useful Websites—Resources, Past Papers, Video Tutorials and Solutions

- https://corbettmaths.com/contents/

- https://vle.mathswatch.co.uk/vle/

  USERNAME: namesurname@dustonschool

  PASSWORD: berrywood

- https://www.methodmaths.com/

  CENTRE ID: duston

  USERNAME: firstnamesurname PASSWORD: berrywood

Term 4—Homework 1—Higher Questions Due……..

1. G is inversely proportional to H.

When G = 45, H = 5.

Find the value of G when H = 14.

2. The functions f and g are such that:

$f(x) = -3x + 12$ and $g(x) = ax + b$ where a and b are constants.

$g(5) = 38$ and $f^{-1}(-174) = g(8)$.

Find the value of a and b.

3. The line L is a tangent to the circle $x^2 + y^2 = 45$ at the point (6, -3).

Line L crosses the x-axis at the point P.

Work out the coordinates of P.

4. The table belows shows some values of x and y that satisfy the equation $y = a\cos x° + b$.

x	0	30	60	90	120	150	180
y	0	$-4 + 2\sqrt{3}$	-2	-4	-6	$-4 - 2\sqrt{3}$	-8

Find the value of a and b.

5. Prove the square of any odd number must be an odd number.

6. X is directly proportional to the square of Y.

When X = 50000, Y = 10.

Find the value of X when Y = 19.

7. The functions f and g are such that $f(x)=7x-9$ and $g(x)=-x+5$.

a) Find f(10).

b) Find g(-11.5).

c) Solve f(x) = g(x).

8. Robinder buys a computer for £180.

He wants to put a tag with a price on the computer so that in the sale he can give a discount of 25% off the price on the tag and still make a profit of 30% on the price he paid for the computer.

Work out the price that Robinder should put on the tag.

Term 4—Homework 2—Higher Questions Due…….

1. The number of bees in a garden decreases by x% each year.

Given that the number of bees halves in 12 years, work out the value of x.

Give your answer correct to 2 decimal places.

2. Ferial buys a computer for £220.

She wants to put a tag with a price on the computer so that in the sale she can give a discount of 20% off the price on the tag and still make a profit of 40% on the price she paid for the computer.

Work out the price that Ferial should put on the tag.

3. The function f is such that $f(x)=4x+9$.

a) Find $f^{-1}(x)$.

b) Solve $f(x) = f^{-1}(x)$.

4. The points T, U, V and W lie in order on a straight line.

$TU : UW = 5 : 4$

$TV : VW = 16 : 2$

Work out $TU : UV : VW$.

5. David has 26 cards.

Each card has a different symbol on it.

David gives one card to Amanda and one card to Nicola.

In how many ways can David do this?

6. A fisherman wants to estimate the number of fish in his pond.

One day he catches 180 fish. He puts a tag on each fish then releases them.

Then next day the fisherman catches 115 fish.

30 of these fish have a tag on them.

Work out an estimate for the total number of fish in his pond.

Write down any assumptions you have made.

7. The number of bees in a garden t days from now is b_t where:

$b_0 = 80$ and $b_{t+1} = 1.06b_t$.

Work out the number of bees in the garden 5 days from now.

8. Donatella buys a mobile phone for £160.

She wants to put a tag with a price on the mobile phone so that in the sale she can give a discount of 35% off the price on the tag and still make a profit of 30% on the price she paid for the mobile phone.

Work out the price that Donatella should put on the tag.

Term 4—Homework 3—Higher Questions Due……..

1. Work out the largest integer value of c that satisfies the inequality:

$10c-5 < 4c-2$

2. The product of two consecutive positive integers is added to the larger of the two integers.

Prove the result is always a square number.

3. x and y are two positive integers greater than 2.

The highest common factor (HCF) of x and y is 2.

The lowest common multiple (LCM) of x and y is 40.

Find the value of x and y.

4. The first 5 terms of a quadratic sequence are: -15,-16,-13,-6,5.

Find an expression, in terms of n, for the nth term of this quadratic sequence.

5. The number of butterflies in a garden t days from now is b_t where:

$b_0 = 70$ and $b_{t+1} = 1.12b_t$.

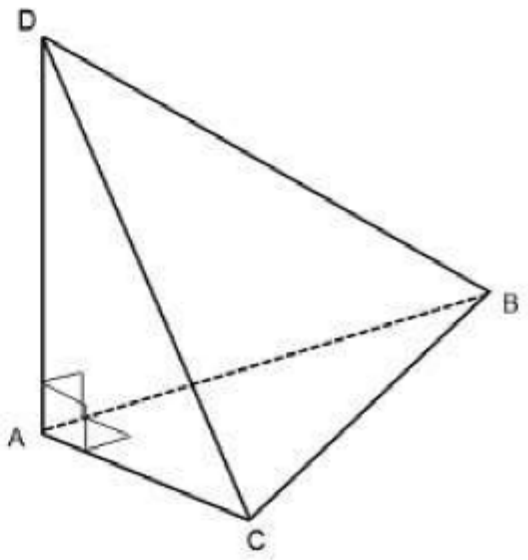
Work out the number of butterflies in the garden 5 days from now.

6. Wisal buys a television for £195.

She wants to put a tag with a price on the television so that in the sale she can give a discount of 25% off the price on the tag and still make a profit of 5% on the price she paid for the television.

Work out the price that Wisal should put on the tag.

7. The diagram shows a tetrahedron.



AD is perpendicular to both AB and AC.

AB = 3 mm, AC = 6 mm and AD = 5 mm.

Angle BAC = 90°.

Calculate the size of angle BDC.

Give your answer correct to 1 decimal place.

8. Solve the inequality $h^2 + 4h \leq 60$.