**GCSE Edexcel Foundation Key notes**

**1) Converting from a fraction to a decimals to a percentage (and vice versa)**

Example: If the decimal was 0.345. The denominator would be 1000 because you have to multiply 0.345 by 1000 to give you a whole number.

*Remember, % means ‘out of 100’.*

Numerator ÷ Denominator

÷ 100

X 100

Percentage

Decimal

Fraction

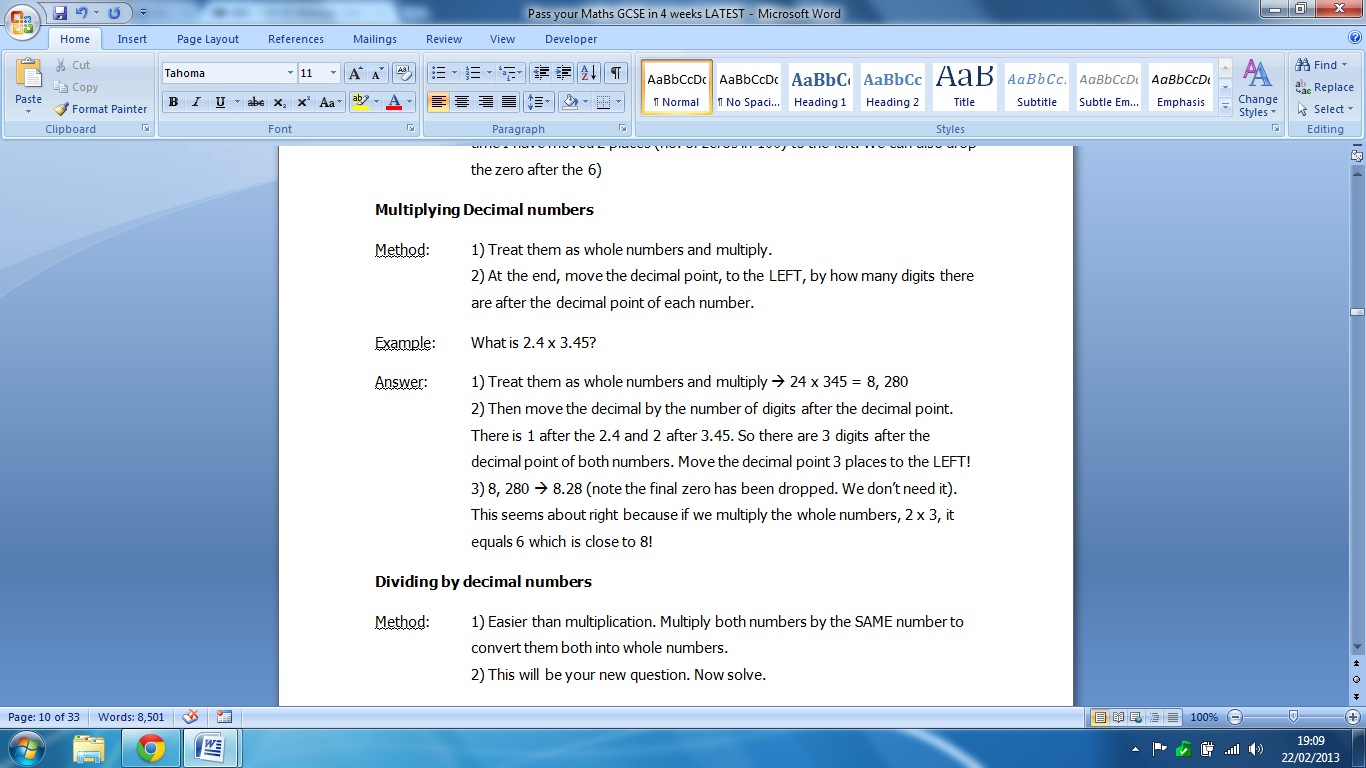
**2) Expressing a quantity as a percentage of another:**

First express it as a fraction. This is easy just put the smaller quantity over the larger quantity like so:

Now that it’s fraction, how do you convert it to a percentage? Use the diagram above.

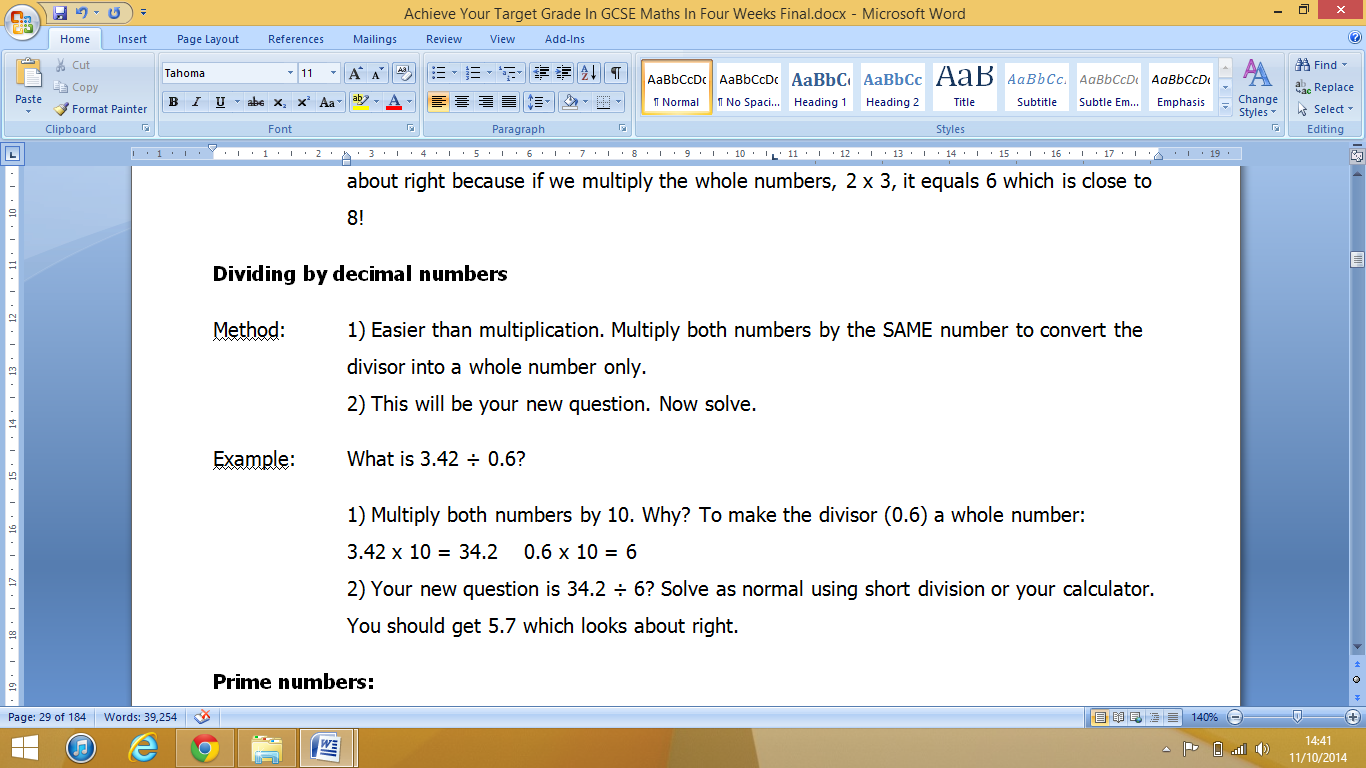
**3) Multiplying by decimal numbers**

* The key is to convert the decimal numbers into whole numbers by multiplying by 10, 100 etc. Then, multiply as normal.
* Don’t forget to divide back at the end.

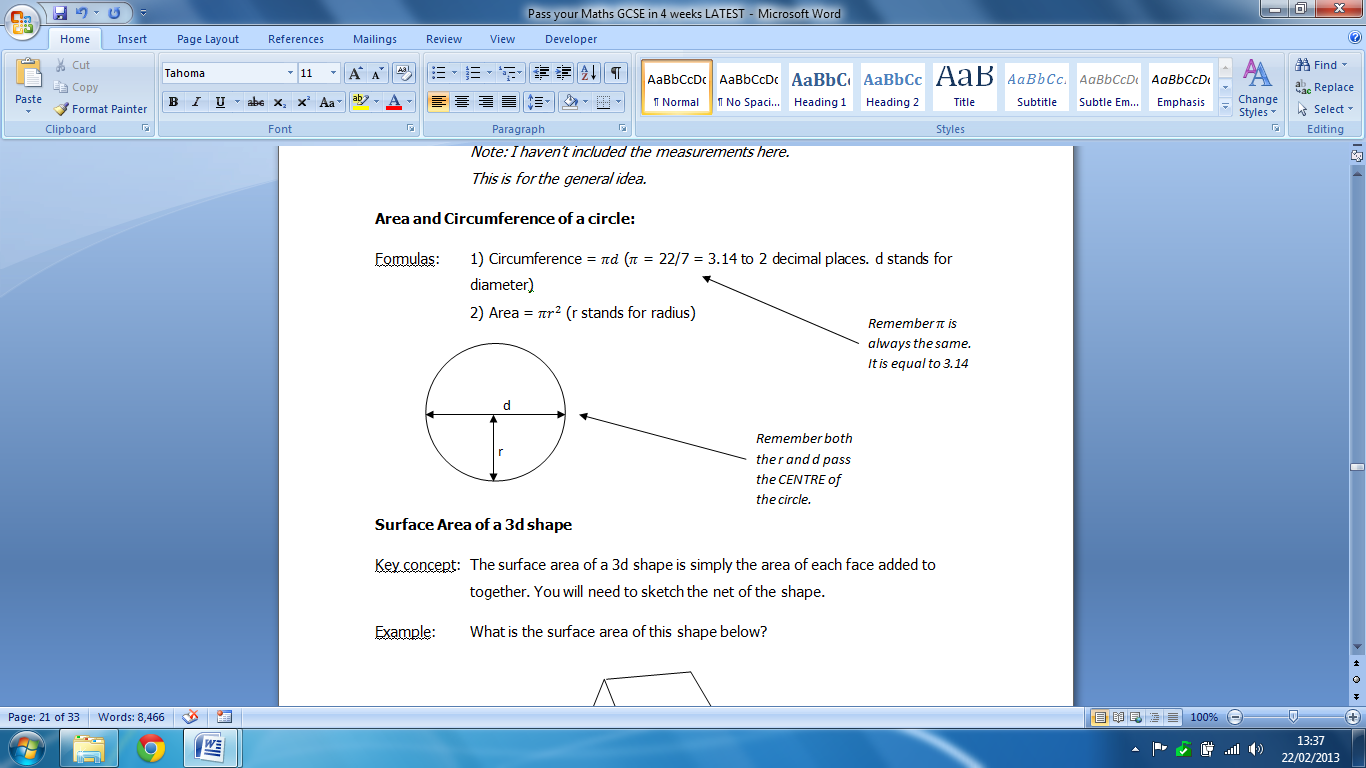
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**4) Dividing by decimal numbers**

* Easier than multiplication. Multiply both numbers by the SAME number to convert the divisor into a whole number only. This will be your new question. Now solve it.



**5) All you the formulas you need to know for a circle. Remember, these formulas apply to a FULL circle Learn them:**

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*(r: radius d: diameter)*

**Don’t forget**: If it was a semi-circle you have to half these values at the end! **6) Corresponding, alternate and supplementary angles:**

Means parallel lines – angles   
3 & 5 must be **supplementary** for them to be parallel.

Angles 1 and 2 are the **same** because they **Correspond**

Angles 1 and 3 are the **same** because they **Alternate**.

Angles 1 and 4 are **Supplementary** because they add up to 180⁰ (angles on a straight line). Remember, supplementary angles **do not** have to be next to each other. This means 2 and 4 are supplementary as well. Can you see why?

5

4

3

2

1

**7) What you have to say to get full marks on transformation questions:**

Rotation

* Rotation
* How many degrees? (90 ̊or 180 ̊)
* Which direction (clockwise/anti-clockwise?) 180 ̊ can be either!
* The point at which it’s rotated; The origin (0,0)? Or is it a random point like (2, 3)?

Reflection

* Reflection
* Mirror line (what line is it reflected in?)

Enlargement

* Enlargement
* Scale factor
* Centre of enlargement (point at which its enlarged)

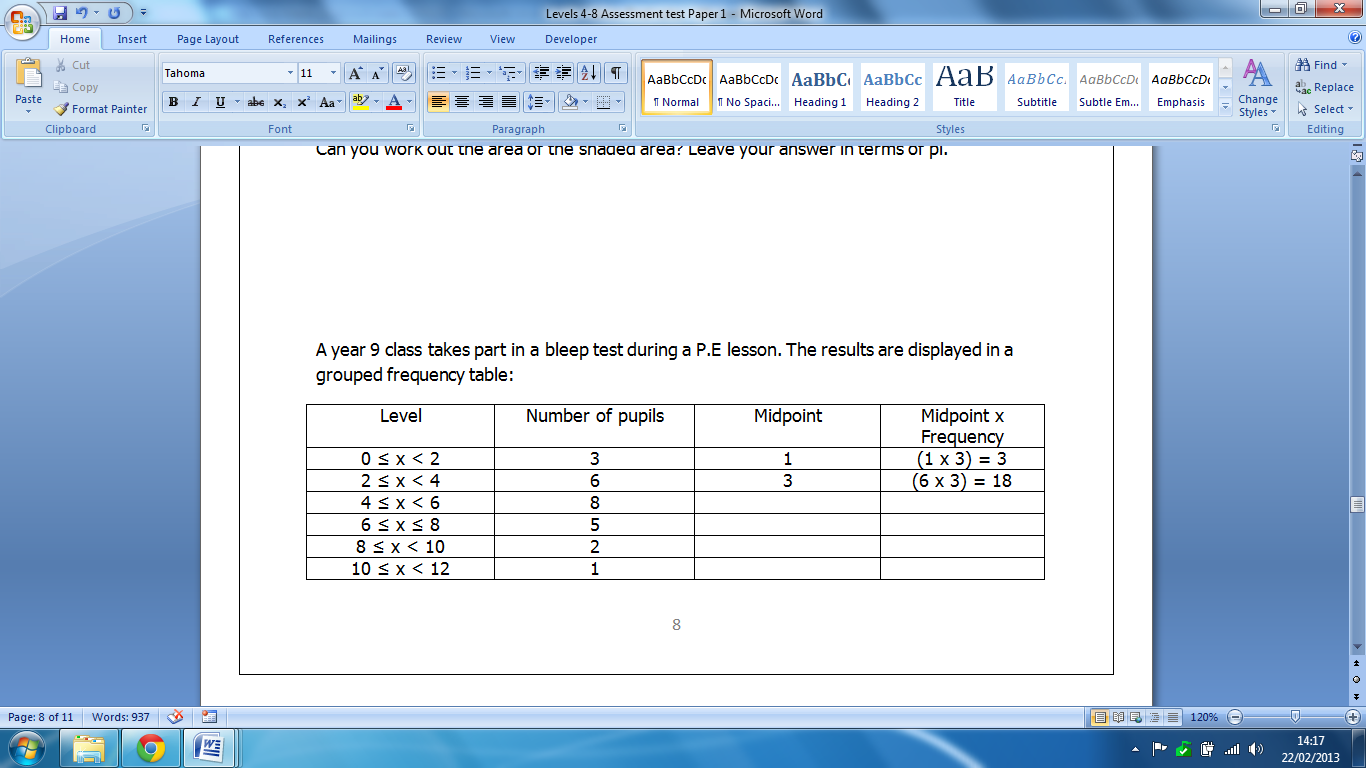
Translation

* Translation
* A vector (x, y)

*(x is left/right. y is up/down)*

You have to use tracing paper for rotation

**8) Grouped frequency tables are used for continuous data. The only difference is, you have an extra column: midpoint which is used to calculate the mean:**

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The midpoint is simply the middle value of each interval.

To calculate the mean, you do: (**4th column total ÷ 2nd column total**)

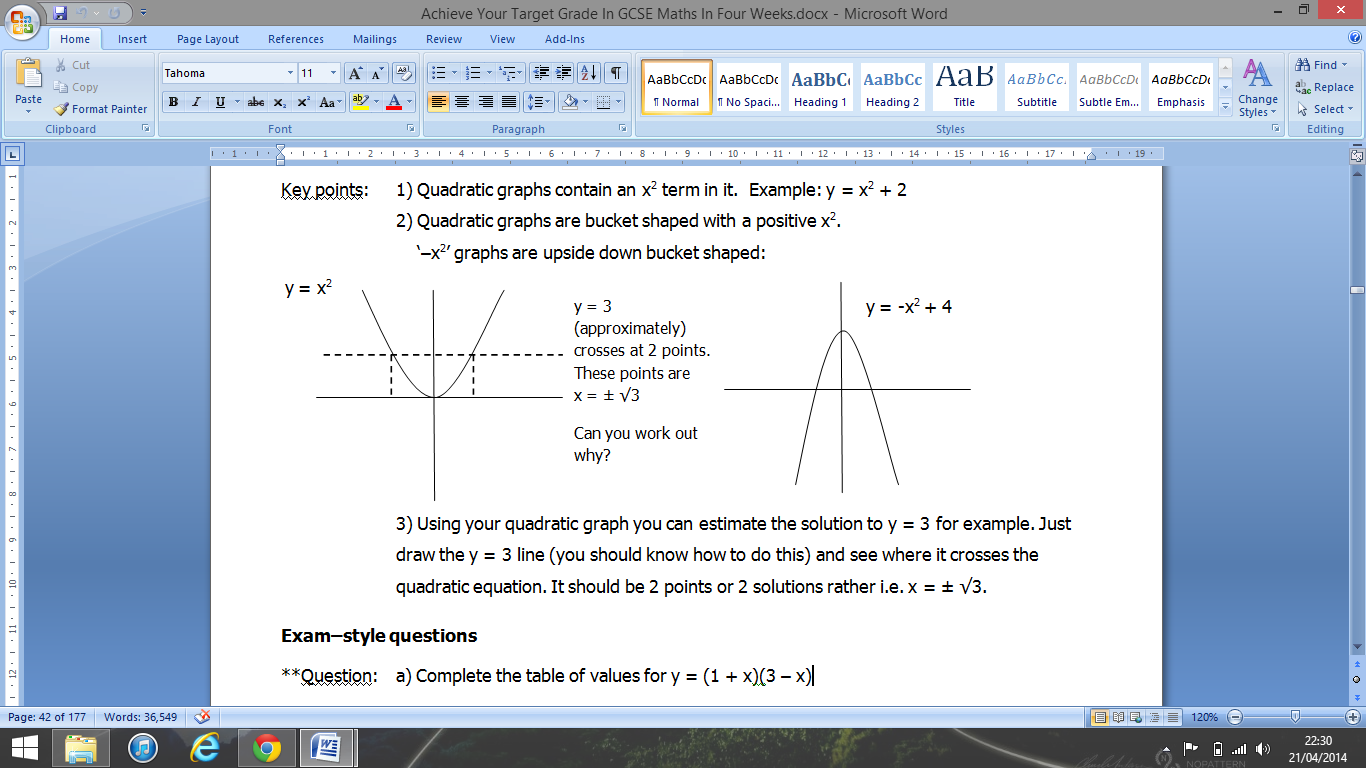
**9) Drawing a frequency polygon:**

This is easy just plot the points (midpoint, frequency) and join them up. So, if we were using the grouped frequency table above: (1, 3) (3, 6) and so on. Plot these points and join them up, in a straight line.

**10) Sign rules**

**\***Just remember this saying: If the signs are the same, then they turn into a plus. If the signs are different, they turn into a minus.

*Note: When adding/subtracting, the signs have to be NEXT to each other. When multiplying/dividing, ignore the signs at first and do the calculation. Then, think about the signs afterwards.*

**11) Quadratic graphs:**

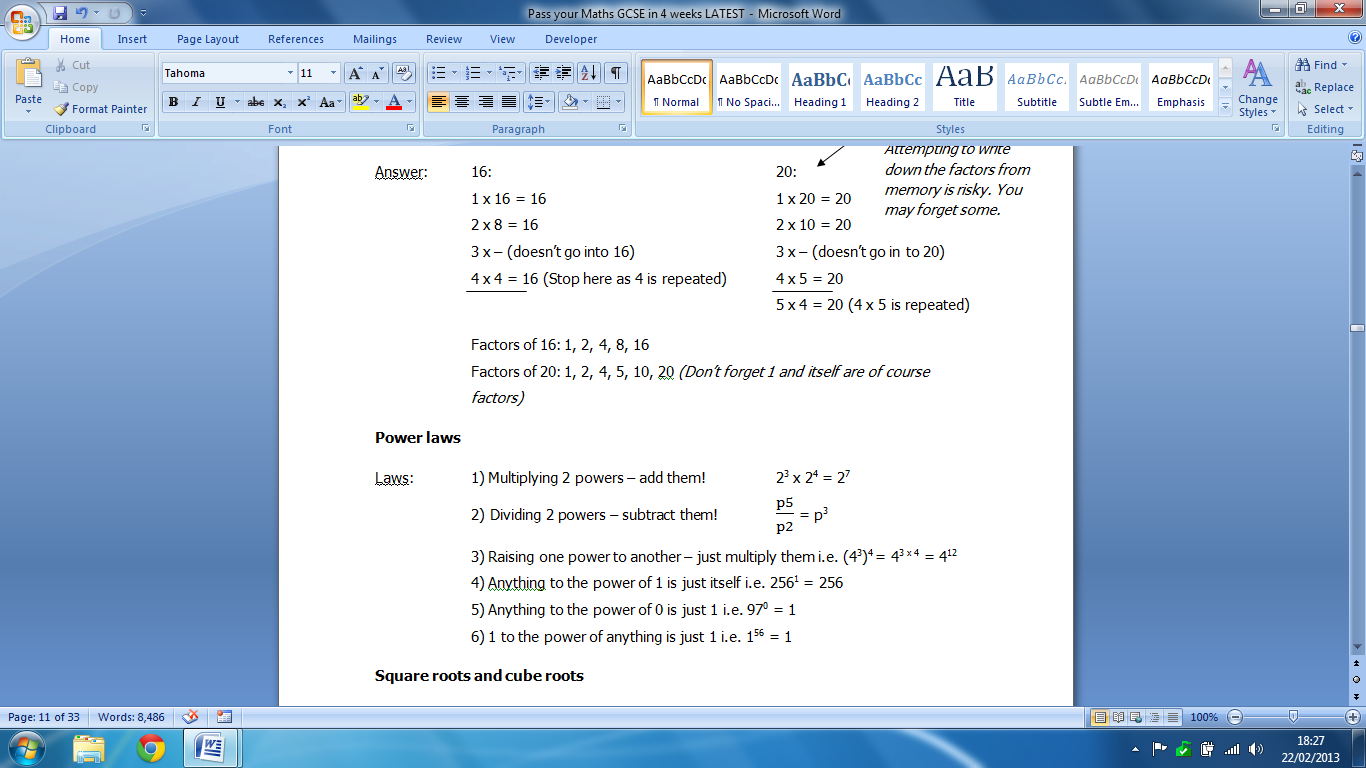
**12) Algebra:** When you’re doing algebra, think about terms! Circle your terms as well! **Remember a term is just a number, a group of letters and a positive/negative sign at the front**. Try and spot ‘like terms’. These are terms which have the same group of letters. You should simplify your terms as much as possible.

**13) Solving an algebraic equation:** Circle your terms as normal. Then move terms around so you have letters on one side of the equals and numbers on the other! Just remember whenever you move a term across the equals, change the sign! Also, what you do on one side of the equation, you have to do the OPPOSITE on the other. So, if the equation reads: = 3 you have to multiply by 5 on the R.H.S as your dividing by 5 on the L.H.S. Then you’re final answer is just y = 15

**14) A quick tip on forming equations:** If the question says: Give C in terms of h, then you know your answer should look like: C = ‘something h...’

**15) Making a letter the subject of the formula:**  This is similar to point 14) above. Making a letter, for example ‘s’, the subject of the formula just means rearrange the equation so it reads s = ....

**16) Power laws**

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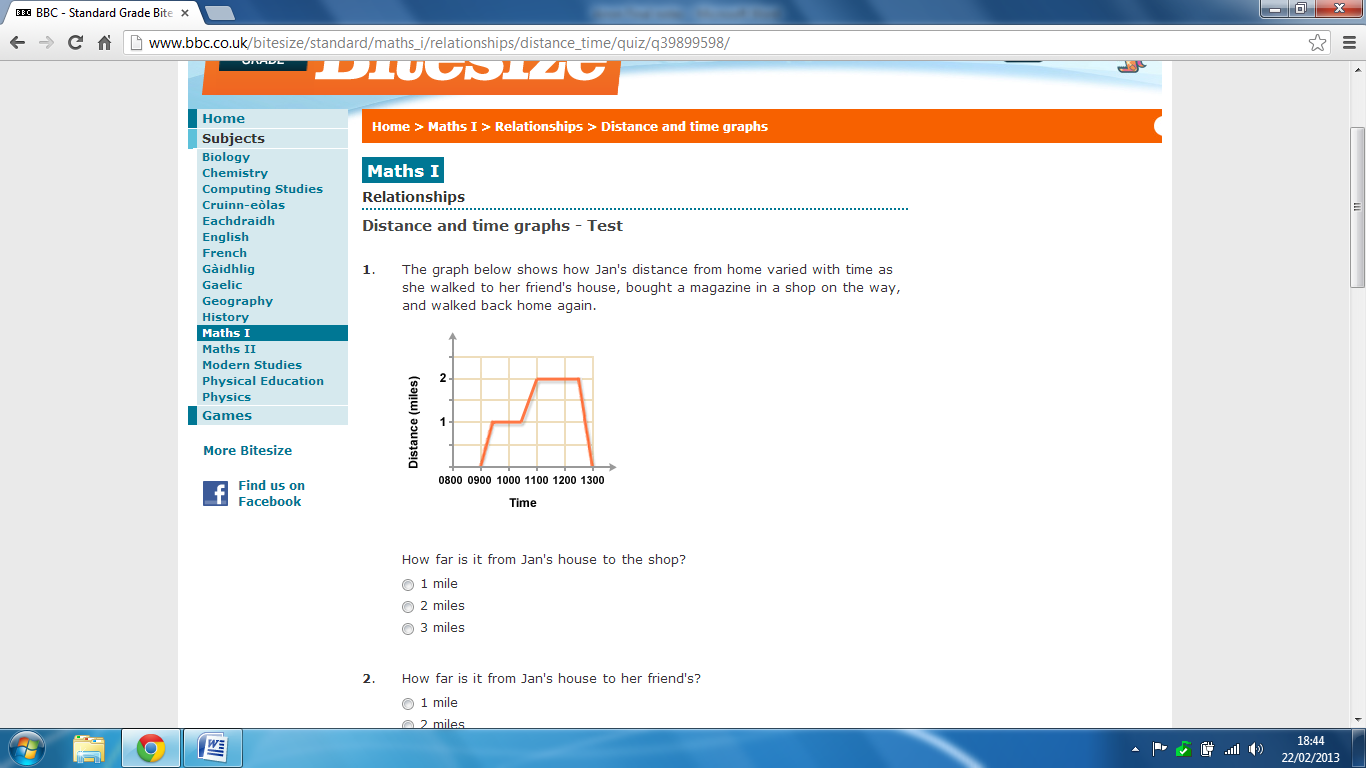
**17)** Remember the **inverse** of **‘squared’** is **‘square root’** and the **inverse** of **‘cubed’** is **‘cube root’.** If the equation read: x2 = 9. Then, x = √9. So, x = 3 OR -3. **Remember, a square root of a number has a positive solution and a negative solution**. This is due to the sign rules above. 3 x 3 = 9 and   
(-3) x (-3) = 9 as well.

**18) Formula for nth term:** a + (n – 1)d a = first term d = common difference   
 just substitute these in and simplify.

*Note: d could be negative, if the sequence is going down.*

**19) Distance-time graph**

Sometimes you do not need to use the **speed = distance ÷ time** formula. You can just use the graph. Say, we were given the following graph and we had to work out the average speed on the journey back:

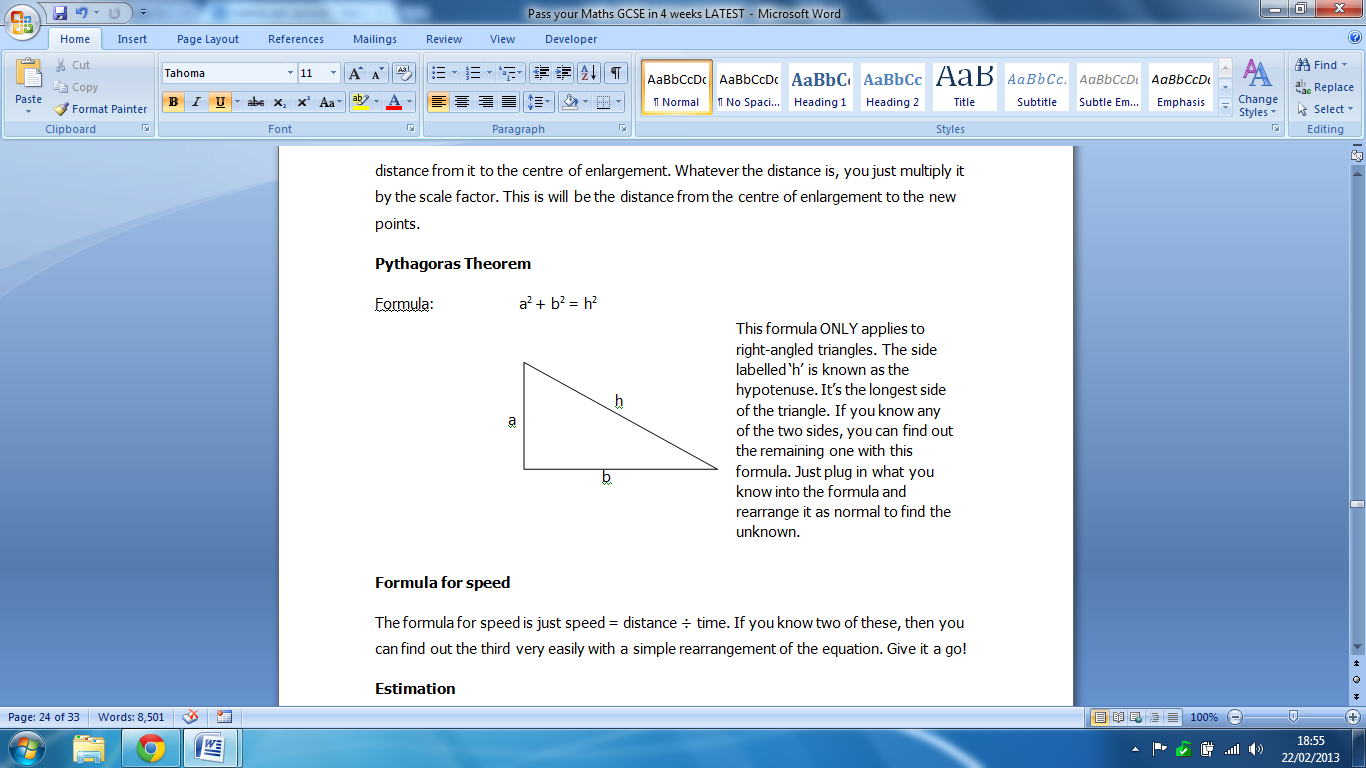


This line here is just the journey home (obviously)

Well, we can clearly see that this person travels 2 miles in 30 minutes or ½ an hour, on the way back. For average speed, we’re looking for miles per hour or mph. So, we just double 2 miles. The answer is just 4 mph.

*Note:* Be careful of the units. You may be asked for km/h or m/s (metres per second).

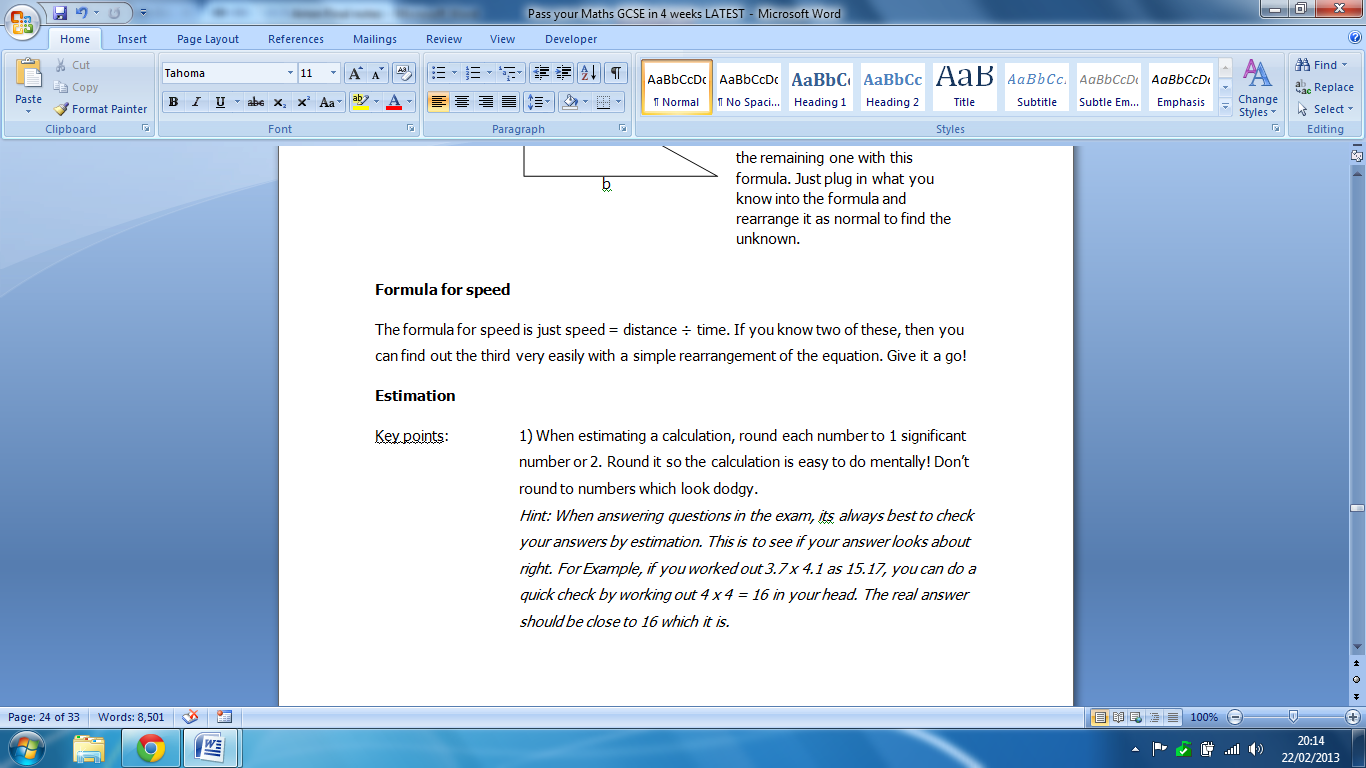
**20) Pythagoras theorem**

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**21) Some conversions you need to know**

1.6 km = 1 mile  
1 m = 39.37 inches  
1 foot = 30.5 cm  
1 inch = 2.54 cm  
1 kg = 2.2 lbs  
1 gallon = 4 ½ litres  
1 litre = 1 ¾ pints

**22) Estimation**

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**23) Trial and improvement**

Trial & improvement has a lot to do with trial and error. It simply means guessing a solution until you find the correct one. Take a look at the following example...

Example: x3 – 6x + 1 = 0 has a solution between 2 and 3. Solve this equation, correct  
to 1 decimal place.

Answer: First we sub–in x = 2 and x = 3 to get two extreme values; one too small and one too big.

(2)3 – 6(2) + 1 = 8 – 12 + 1 = – 3 (too small)  
(3)3 – 6(3) + 1 = 27 – 18 + 1 = 10 (too big)

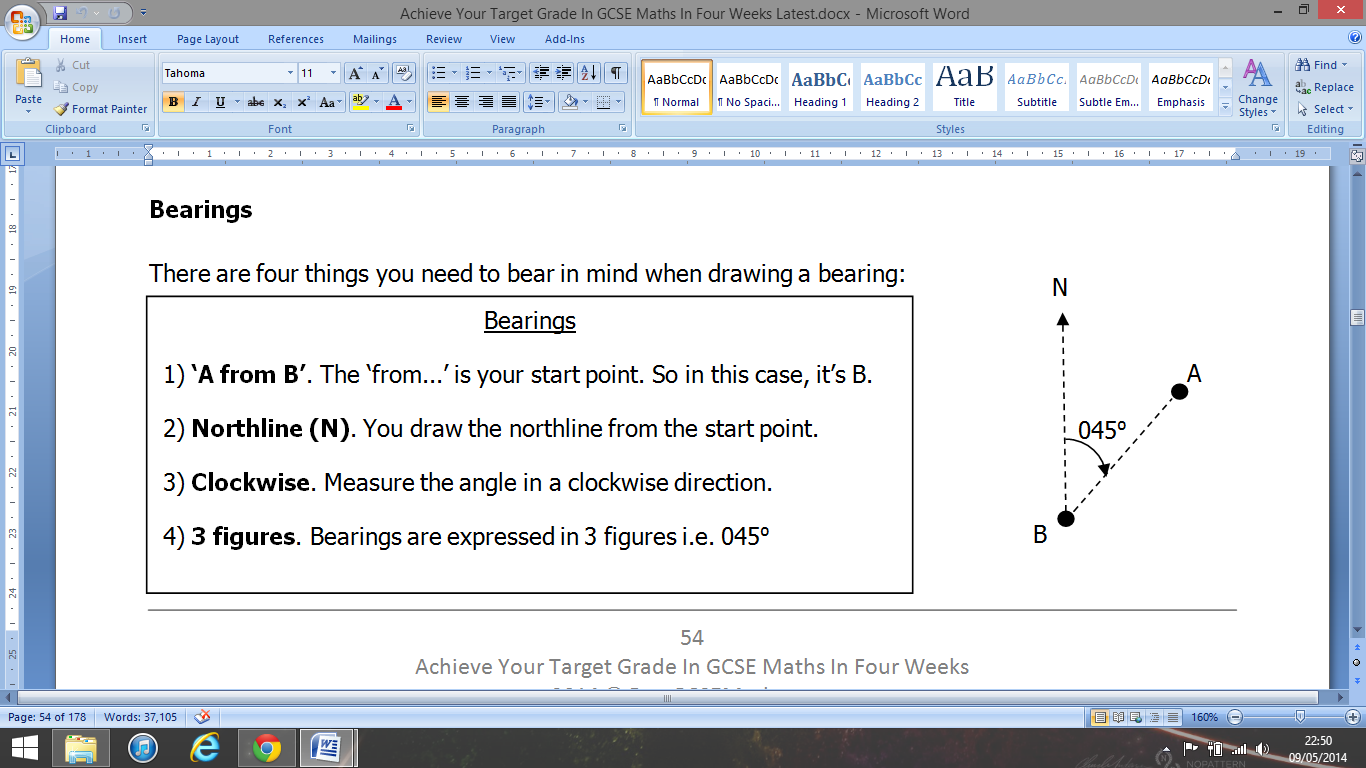
This means the solution must be between 2 and 3. As you can see when we sub–in   
x = 2, we generate an answer of – 3. This is closer to zero than the other extreme value (10), when we sub–in x = 3. So it would be wise to choose a value closer to 2 than 3. Let’s try x = 2.3

(2.3)3 – 6(2.3) + 1 = – 0.633 (too small)  
  
This is again, too small, so this means the solution must be greater than 2.3.   
Let’s try 2.4:

(2.4)3 – 6(2.4) + 1 = 0.424 (too big)

This is too big. What does this mean then? The solution must be between 2.3 and 2.4. Can you see how we’ve narrowed it down? When we get this situation: two values which is only a decimal place apart, we choose the number right in the middle of them two. In this case, it would be x = 2.35  
  
(2.35)3 – 6(2.35) + 1 = – 0.122125 (too small)

This is too small, so the solution must lie between 2.35 and 2.4 but any value between this range, will round up to 2.4 when we round it to one decimal place (think about rounding!).   
This means the answer is x = 2.4 to 1 decimal place.

**24) Bearings**

**25) The Isosceles triangle**

The Isosceles triangle has two sides that are the same length. This is usually indicated with a dashed line. This means the base angles are going to be the same. See diagrams:

The dashed line means the sides are both the same length.

b

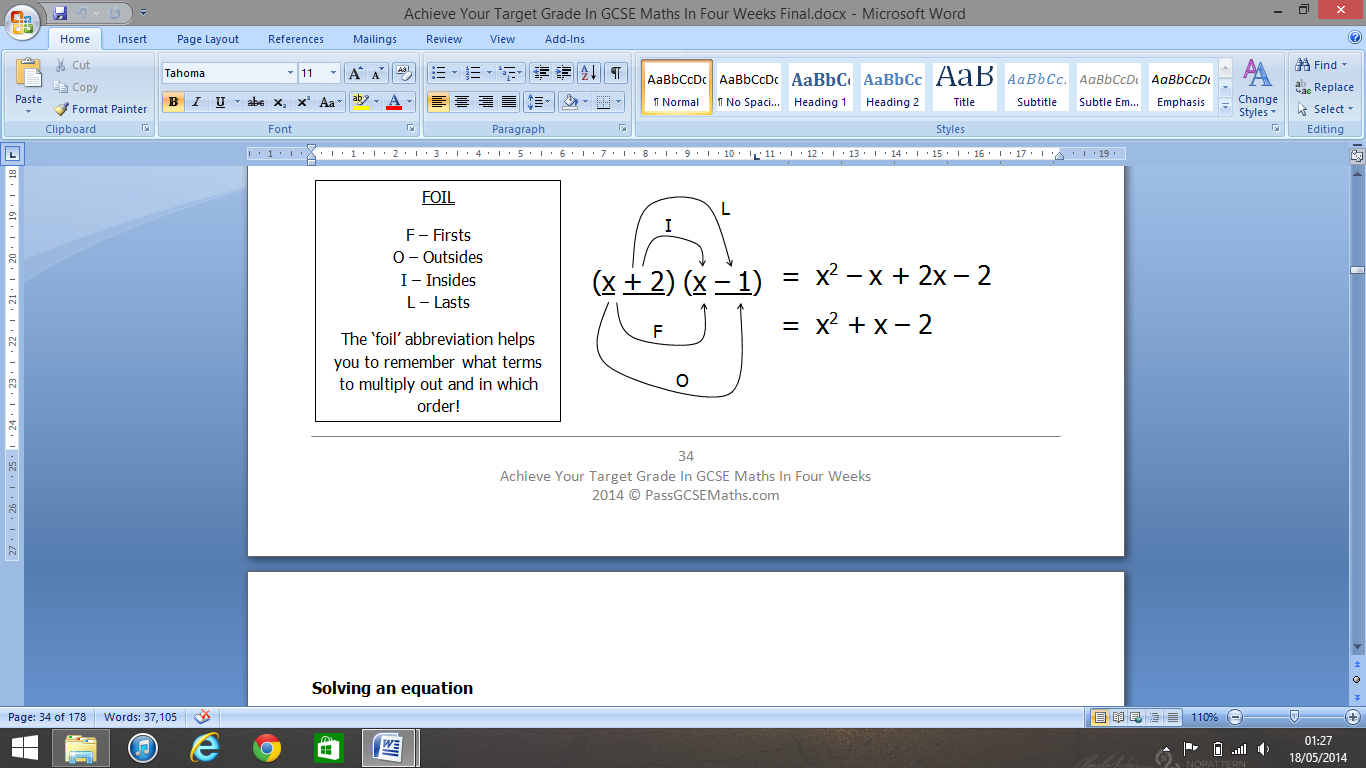
a

a

Angles are therefore the same. That’s why I called them both a’s

b

*Note: If you know one angle in an isosceles triangle, you can find all the other just by using the fact that all angles in a triangle must add up to 180!*

**26) Expanding out two brackets using the FOIL method:**

**27) Area of compound Shapes**: Compound shapes are common shapes (like rectangles, triangles etc.) joined together. It is easy to find the areas of these. First split the shape into these common shapes. Fill in the unknown measurements (you can always work out these) and then work out the area of each shape. Then, lastly sum them at the end...

9 cm

4 cm

7 cm

4 cm

Total area: 20 cm2 + 18 cm2 = 38cm2

20 cm2

18 cm2

2 cm

5 cm

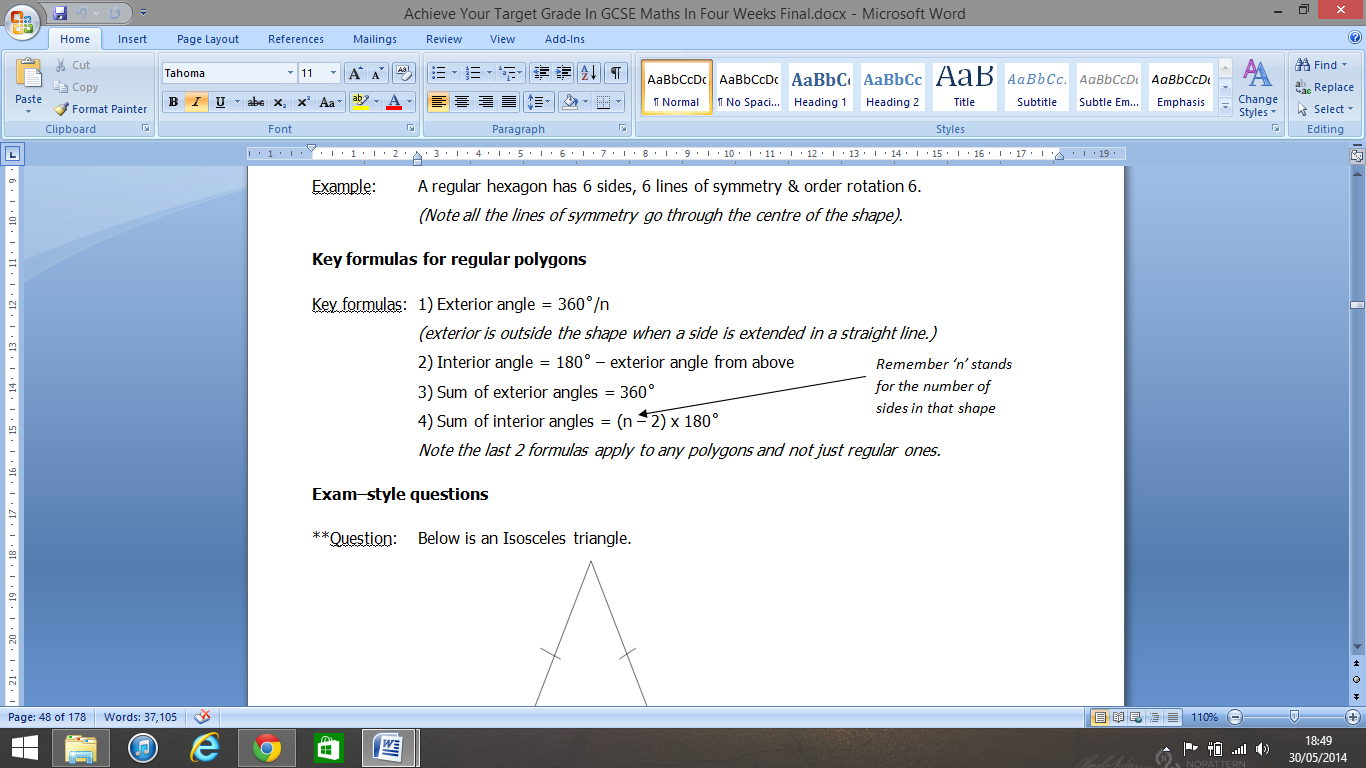
5 cm

7 cm

9 cm

Can you split the rectangle up in a different way? Your final result should be the same.

**28) Density = Mass ÷ Volume**

**29) Angle rules involve regular polygons**

**30) Exterior Angle of a triangle = Sum of Opposite Angles To The Interior Angle**

*Interior angle*

*Exterior angle*

**d = b + c**

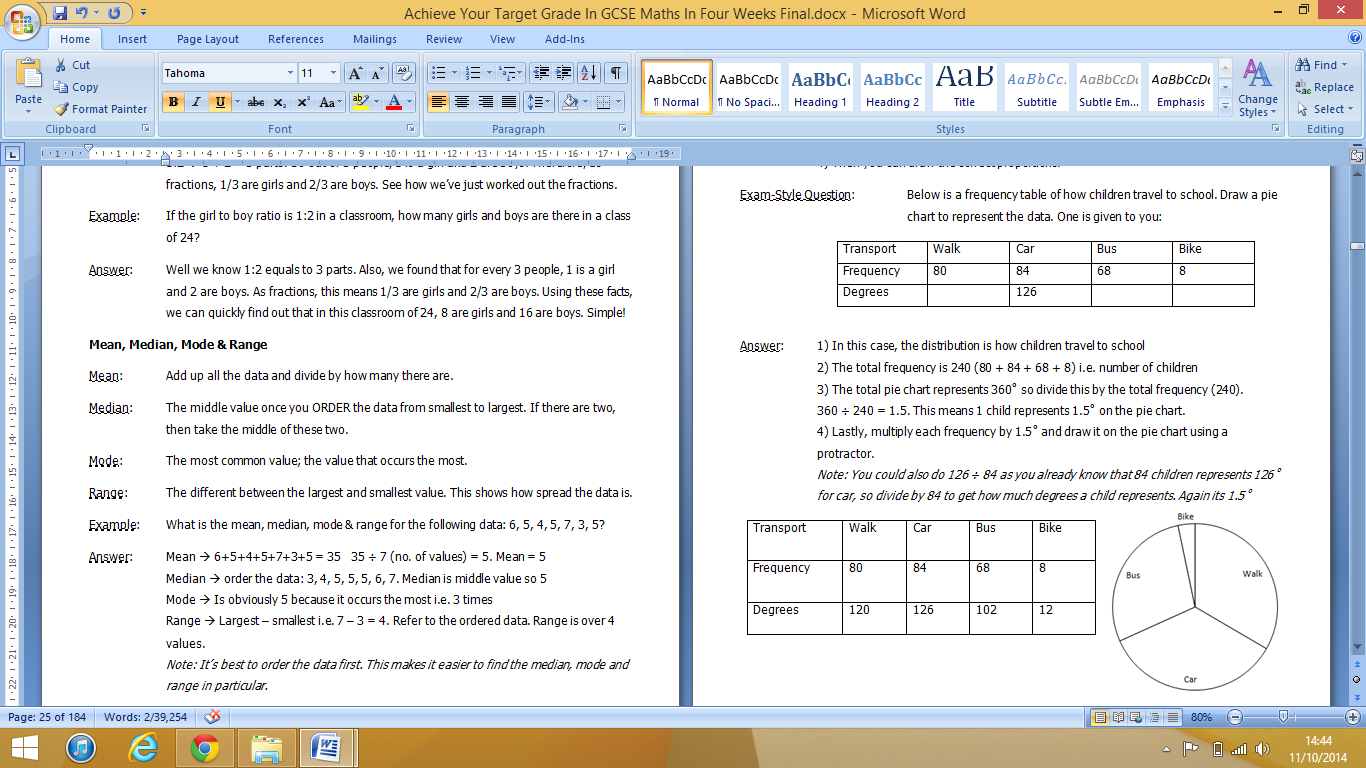
b

c

a

d

**31) In pie chart questions, remember, total frequency = 360 ̊**

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