Year 7
Maths Revision Guide

1. Sequences, Patterns & Finding the n^{th} term

e.g. 2 , 5, 8, 11 → 3n -1

Pattern number	1	2	3	4	5
Number of pieces	3	5	7		

To find out the next numbers you add 2 each time. To find the n^{th} term you use the rule 2n + 1 (to work out the 15^{th} pattern you would substitute n for 15 → 31.

Can you work out the number of pieces in pattern number 18?

2. Rules

3 → 9 there could be lots of rules to this. For example; **x3** or **x4 -3** or **x2 +3** or **+6**

3. Ratio

If you have 8 Oranges and 12 Apples the ratio of Oranges to Apples = 8:12 . This can be simplified by dividing by common factors (in this case ÷ 4 = 2:3)

If you had £27 shared between Ant & Dec in the ratio 1:8, how much will each get?

1st step- work out how many parts there are: 8+1 = 9
This means 9 parts = *£27*

2nd step- work out how much 1 part is worth: 27 ÷ 9 = 3.

3rd step- work out the value of ratios: 1 x 3 and 8 x 3.
Answer Ant has *£3 and Dec has £24*

4. Proportion

For every 6 squares, 3 are shaded in. This can be written as a fraction: 3/6 = ½

Making pancakes with Flour and Milk.

500g of pancakes is made from 400ml of milk and 50g of flour.

How could you make 2000g (2Kg) of pancakes?

2000g is 4x as much as 500g so you just need 4x as much milk (400ml x 4 = ????).

How much flour would you need to make 750g of Pancakes?

You need to know how to go from 500g to 750g (x1.5) or (÷2 and x 3). Then apply the same to how much flour you had for 500g of pancake → 50g x 1.5 = 75g. Or simply if 500 → 750 then 50→75.

If cost of 9 packets of crisps cost £2.70 what do 4 packets of crisps cost?

You must work out how much 1 packet costs then multiply that by 4. *(£2.70 ÷9) x 4 = 30p x 4 = ???*

5. Percentage of Amounts

Use % mind maps.

If you have £2000 you know 10% = £200

If 10% = £200 you know 5% = £100

If 10% = £200 and 5% = £100 you know 15% =£300

(percentage means "out of 100")

19 / 25 as a percentage (just multiply by 4 - (4x25=100))

19 x 4 = 76%

6. Equivalent Fractions, Decimals and Percentages

Remember: 0.1 = 1/10 = 10%

0.01 = 1/100 = 1%

0.25 = 1/4 = 25%

7. Angles

SAS - *ABC* is a triangle.

AB = 8 cm. ← This is a side

AC = 1 cm. ← This is a side

Angle *A* = 49°. ← This is the Angle

You will be asked to construct that triangle –

Hint: Draw AB first. Then mark out 43° from A.

8. Remember the rules:

Angles inside a **Triangle** add to 180°

Angles inside a **Square** add to 360 °

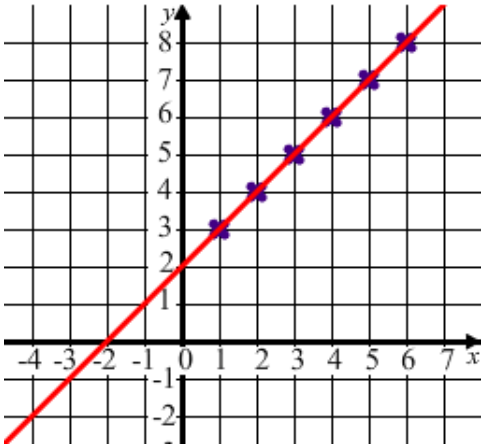
Angles inside a **Circle** add to 360 °

Angles on a **Straight** Line add to 180 °

9. Straight Line Graphs

x	–3	–2	–1	0	1	2	3
y	–1	0	1	2			5

y = x + 2



10. Number Sequences,

e.g. 5,7,9

Pattern number	1	2	3	4	5
Number of pieces		5	7	9	

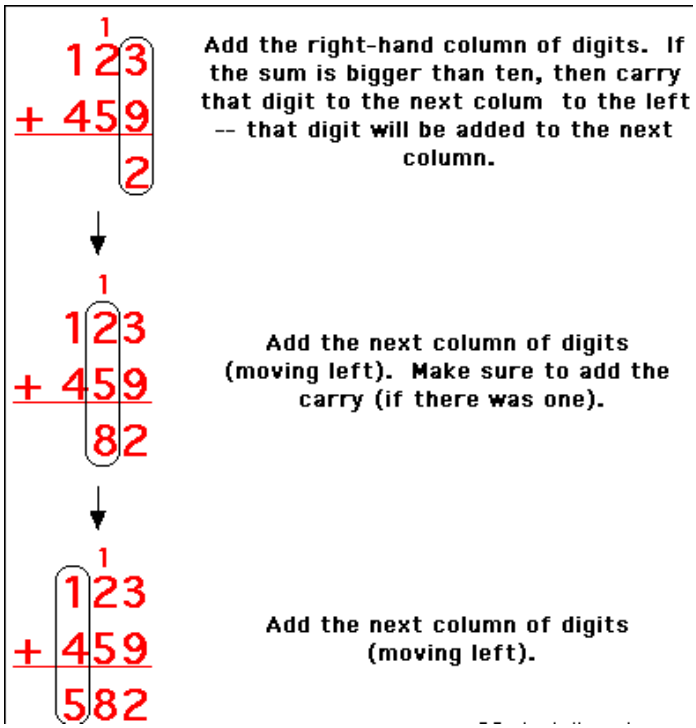
Can you work out the number of pieces in the 1st and 5th pattern?

The rule to this pattern is multiply the pattern number by 2 and add 1.

Can you work out the number of pieces in pattern number 18 or 20 or 25?

11. Calculation

Addition, Subtraction - Column Method



Short Division - Bus Shelter

$7\overline{)252}$

The first step is how many 7s in 2 – the answer is 0, with 2 left over, so we put the 0 above the bus stop and carry the 2

$$7\overline{)2^{2}52}\quad 0$$

$7\overline{)2^{2}52}\quad 0$

The next step is how many 7s in 25. We can see from our times table that 3x7=21, so the answer is 3, with 4 left over.

$$7\overline{)2^{2}5^{4}2}\quad 0\ 3$$

$7\overline{)2^{2}5^{4}2}\quad 0\ 3$

The final step is how many 7s in 42. Our times table says 6x7 = 42 so the answer is 6, with nothing left over.

So, 252 ÷ 7 = 36

$$7\overline{)2^{2}5^{4}2}\quad 0\ 3\ 6$$

Dividing by 10, 100 or 1000

The digits move 1,2 or 3 places to the right.

450 ÷ 10 = 45

450 ÷ 100 = 4.5

450 ÷ 1000 = 0.45

Multiplication - Grid Method

In this example 29 is partitioned into '20' and '9', and this makes it much easier to multiply each number separately.

29 x 6

X	20	9	Total
6	120	54	**174**

Add the two separate answers to get the final answer.

NTT…

a) 28 x 15

b) 172 +19

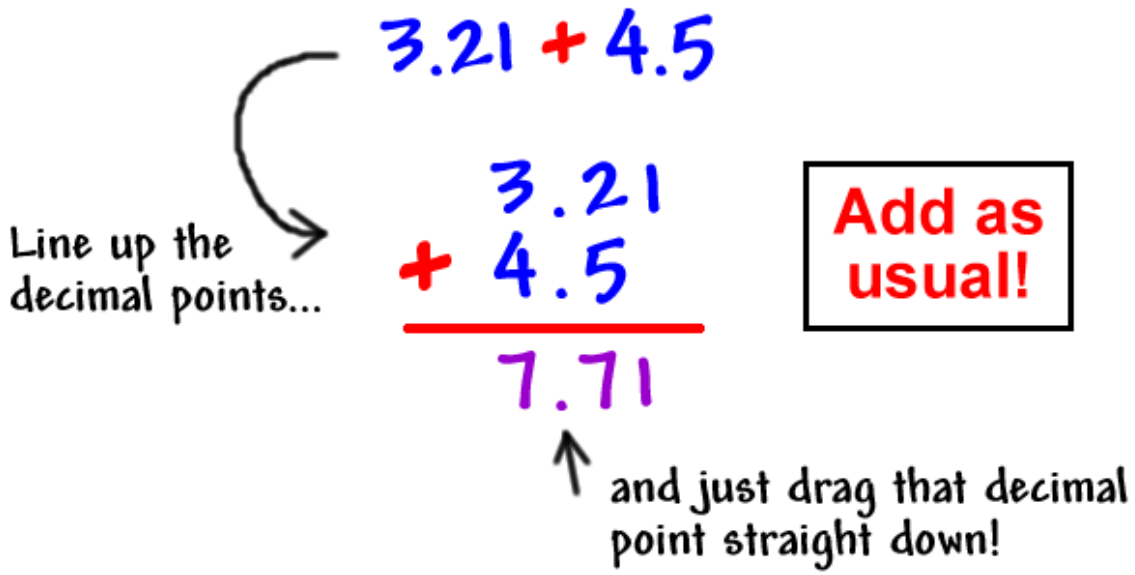
c) 253 - 63

d) 196 ÷ 5

12. Decimals

Adding Decimals

This works exactly like regular addition... you just line up the decimal points!



Ordering Decimals

Which is bigger: 1.3 or 1.27

1.3 is the same as 1.30

If we write it out like this it is easier to see what is bigger 1.30 or 1.27

1.30 is bigger!

Multiplying Decimals

Start by ignoring the decimal – use grid method then just put decimal place in answer ensuring there are the right number of places.

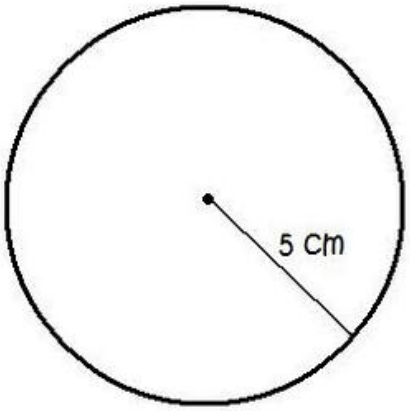
3.77 x 2.8 = ?

3.77 (2 decimal places)
x 2.8 (1 decimal place)
3016
+754
10.556 (3 decimal places)

13. Perimeter and Area

Perimeter = total length of all the sides (4+9+4+9= 26cm)
Area of rectangle= The height **times** width (4 x 9 = 36cm^2)

Area of Triangle = ½ x Height x Base
Area of Circle = πr^2 (π = 3.14, r= Radius)



A = Pi x r²
= 3.14 x 5²
= 3.14 x 25
= 78.5 Cm²

r = 5 Cm
area = ?

Circumference of circle = πD (2 x 3.14 x 5 = 31.4cm)

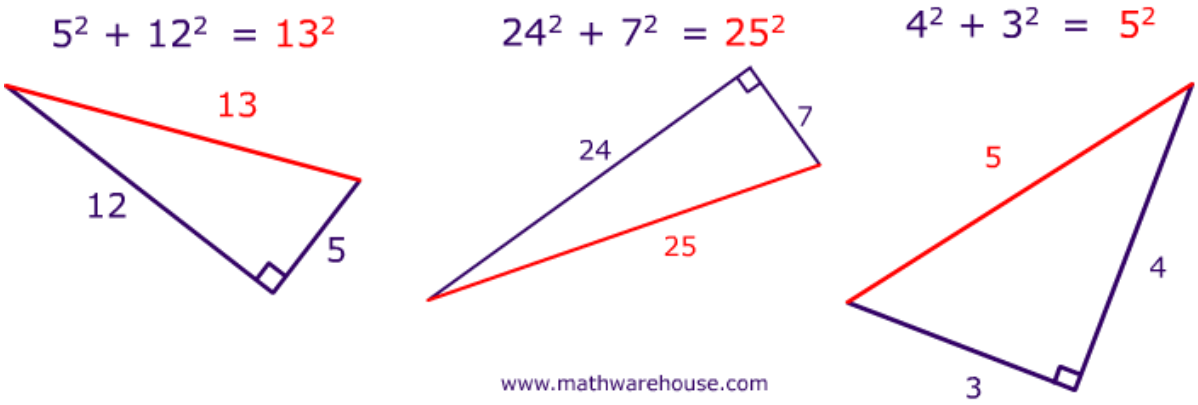
Cherry Pies(π) are Delicious and Apples r 2

14. Units of Measure

1 m = 100 cm
1 cm = 10 mm
1 mile = 1.6 Kilometers (KM) -
So how many KMs is 10 miles or 5 miles?

15. Pythagoras

$a^2 + b^2 = c^2$



16. Fractions of Amounts

½ of £40 = £20 : (40 ÷ 2) x 1

¾ of £40 = £30 : (40 ÷ 4) x 3 = 10 x 3

NTT: What is $^3/_7$ of 56?

½ of 40 = ¼ of 80

¾ of 40 = ½ of 60

17. Converting between Fractions, Decimals & Percentages

Fraction → %

X 100

e.g. 0.45 x100 = 45%

% → Fraction

÷ 100

e.g. 79% ÷ **100 = 0.79**

Dividing by 10, 100 or 1000

The digits move 1,2 or 3 places to the right.

450 ÷ 10 = 45

450 ÷ 100 = 4.5

450 ÷ 1000 = 0.45

NTT: What is 563 ÷ 10?

18. Fractions

Ordering Fractions and adding fractions!

Tip - Make the denominators the same!

1/3	4/6	2/12
X4 ↓	X2 ↓	X1 ↓
4/12	**8/12**	**2/12**

Therefore smallest → largest: 2/12 → 1/3 → 4/6

NTT a) Can you add them all together?

1/3 + 4/6 + 2/12 = **(answer is at end of booklet)**

1/3 = 5/[ ] (Numerators have x5 (1→5) therefore do the same to the denominator (3→[**15**])

NTT b) Can you find the missing number?

4/6 = 8/[ ]

19. Averages

3,4 ,4,4,5,7,8

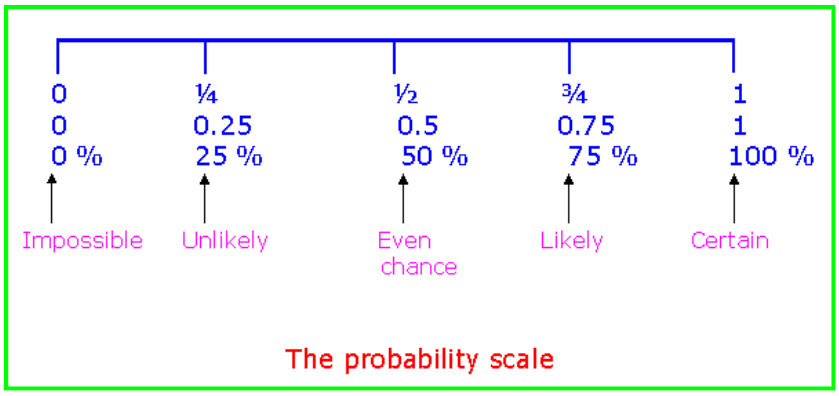
Mean = total divided by total amount of numbers = 35/7= **5**
Median = the middle number once in order = **4**
Mode = the most common number = **4**
Range = largest number minus smallest number = 8 -5 = **3**

If 2 numbers in the middle then find the mean of those.
E.g. 3,5,6,8,9,10 - 6 & 8 are the middle numbers
Median = (6/8)*2 = **7**

NTT: What is the median of 3,14,16,19,21,23?

20. Probability

Probability can be measured as a decimal, percentage or fraction.



The probability scale

The best way to measure the probability of something happening is as a fraction. If there are 5 sweets in a bag, 2 are lemon and 3 are 2 are cherry the probability of picking a lemon is $^{3}/_{5}$.
The possible outcomes are:
lemon, lemon, lemon, cherry, cherry (5)
So the probability of picking cherry would be $^{2}/_{5}$

NTT:

a) There are 7 balls in a bag, 2 are red, 1 is green and the rest are blue. What is the probability of picking a blue?

To work out the probability of 2 things happening you have to multiply the probability of each event happening together.
2 bags. 1st has 7 balls 4 of which are blue. Second bag has 5 balls, 2 of which are blue. What is the probability of picking a Blue AND then another blue: $^4/_7 \times {}^2/_5 = {}^8/_{35}$

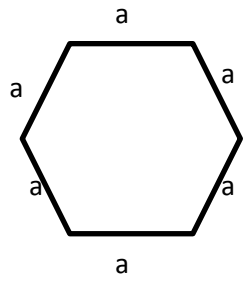
NTT:

b) What's the probability of NOT picking a blue then NOT picking another BLUE?

21. Algebra

Letters are used in maths – we call them variables – they are unknown numbers.

a + a = 2a
2a + a = 3a
3a – a = 2a
3a + 2b + a = 4a +2b



If p = perimeter p = a + a + a + a + a +a = 6a

If you were told p = 2a + 3
What would p = if a= 3
p = (2x3) + 3 = 6 + 3 = 9

NTT : p = 2a + 3
what is P when a = 7?

22. Powers / Indices

If we say 7 to the power 2 we mean $7^2 = 7 \times 7$

7 to the power 3 = $7^3 = 7 \times 7 \times 7$

$5 \times 5 \times 5 = 5^3$

$5 \times 5 \times 5 \times 5 = 5^4$

Multiplying powers:

$5^2 \times 5^2 = 5^4$

$(5 \times 5) \times (5 \times 5) = 5 \times 5 \times 5 \times 5 = 5^4$

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

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

NTT: a) $5^7 \times 5^9 =$

b) $6^5 \div 6^3 =$

Answers

16. **24** $(56 \div 7) \times 3 = 8 \times 3$

17. **56.3**

20. a) $^{14}/_{12}$ → $1^2/_{12}$

b) 8/**12**

19. **17.5**

20.a) $^4/_7$

b) $^3/_7 \times {}^3/_5 = {}^9/_{35}$

21. p = (2x7) + 3 = 14 + 3 = **17**

22. a) 5^{16}

b) 6^2