**Part one**

**PROMPT Sheet**

**7/1 Order statements inc using number line**

Example: Order **-3, -2.25,** **2**, **2⅓**

**7/2 Equivalent fractions, decimals &**

 **percentages**

* **Percentage to decimal to fraction**

27% = 0.27 = 

7% = 0.07 = 

70% = 0.7 =  = 

* **Decimal to percentage to fraction**

0.3 = 30% = 

0.03 = 3% = 

0.39 = 39% = 

* **Fraction to decimal to percentage**

 =  = 80% = 0.8

*Change to 100*

 = 3 ÷ 8 = 0.375 = 37.5%

*Divide numerator by denominator*

**7/3 Find LCM & HCF of 2 numbers**

* **LCM**

Write down multiples of each number

Pick out the lowest common multiple

e.g. To find LCM of 12 and 15

* Multiples of 12: 12, 24, 36, 48, **60**...
* Multiples of 15: 15, 30, 45, **60**

**LCM of 12 and 15 = 60**

* **HCF**

Write down factors of each number

Pick out the highest common factor

e.g. To find the HCF of 12 and 15

* Factors of 12: 1,12,2,6,**3**,4
* Factors of 15:1,15,**3**,5

**HCF of 12 and 15 = 3**

**7/4 Use squares & cubes & their roots**

**~LEARN**

|  |  |
| --- | --- |
| **Squares &** **square roots** | **Cubes &** **cube roots** |
| **12 = 1** | **=1** | **13 = 1** | **=1** |
| **22 = 4** | **=2** | **23 = 8** | **=2** |
| **32 = 9** | **=3** | **33 = 27** | **=3** |
| **42 = 16** | **=4** | **43 = 64** | **=4** |
| **52 = 25** | **=5** | **53 = 125** | **=5** |
| **62 = 36** | **=6** | **103 = 1000** | **=10** |
| **72 = 49** | **=7** |  |
| **82 = 64** | **=8** | **Use of calculator** |
| **92 = 81** | **=9** | x3x2 |
| **102 = 100** | **=10** |
| **112 = 121** | **=11** |
| **122 = 144** | **=12** |
| **132 = 169** | **=13** |
| **142 = 196** | **=14** |
| **152 = 225** | **=15** |
| **202 = 400** | **=20** |

**~Estimate value of**

**Example: Estimate the square root of 17 (√17)**

* Locate the perfect squares at either side of the number 17 (16 and 25)
* Base your estimate on the position of 17(1/9) between the two perfect squares

|  |  |
| --- | --- |
| 4 | 5 |
| √16 | √25 |

 √17 ≈ 4.1

**7/5 Four operations – positive & negative integers**

* **Add & Subtract**

Remember the rules:

When subtracting go down the number line

When adding go up the number line

8 + - 2 is the same as 8 – 2 = 6

8 - + 2 is the same as 8 – 2 = 6

8 - - 2 is the same as 8 + 2 = 10

* **Multiply & divide**

Remember the rules:

+ x + = +

Same signs give +

- x - = +

- x + = -

Different signs give +

+ x - = -

*AND THE SAME RULE APPLIES TO DIVIDE*

**7/6 Multiply & divide fractions**

* **Multiply fractions**

~Write eg 7 as 

~Change mixed numbers to improper fractions

~Multiply numerators & denominators

|  |  |  |
| --- | --- | --- |
| **Example 1** | **Example 2** | **Example 3** |
| 5 x  = x =  |  x = = 3 |  x 5 x= = 8 |

* **Divide fractions**

~Write eg 7 as 

~Change mixed numbers to improper fractions

~Flip numerator & denominator after ÷ sign

~Multiply numerators & denominators

|  |  |  |
| --- | --- | --- |
| **Example 1** | **Example 2** | **Example 3** |
| 5 ÷  = x =  = 7  |  ÷ =  x = = 1 = 1 |  ÷ 5 x= = |

**7/7 Order of operations**

**B**racket

**I**ndices

**D**ivide

Do these in the order they appear

**M**ultiply

**A**dd

Do these in the order they appear

**S**ubtract

e.g. 3 + 7 - 22 x (6 – 5) = 6

 2nd 1st

 4th 3rd

 5th

**7/8 Rounding decimals**

* **Look at the digit required**
* **Look at the first digit NOT required**

e.g. To round 5 . **47** to **1dp**

Answer **5.5** **digit NOT required**

 **Increase 4 by 1** **Is this 5 or more?**

 **YES**

e.g. To round 5 . **43** to 1dp

 Answer **5.4**  **digit NOT required**

 **leave 4 as it is** **Is this 5 or more?**

 **NO - delete**

**7/9 Write algebraic expressions**

**No ‘x’ or ‘÷’ signs in algebra**

2 x a is written 2a

a x b is written ab

a x a is written a2

a ÷ 2 is written 

**7/10 Simplify algebraic expressions**

* **Collect like terms**

Only like terms can be added & subtracted

e.g. 2a + 3a = 5a

 6y2 – 2y2 = 4y2

y2 and y are UNLIKE terms

e.g. a + 2b cannot be added

 a2 - 2a cannot be subtracted

* **Expand a single bracket**

Multiply everything inside the bracket by what is outside

2(x + 5) = 2x + 5

x(x - 5) = x2 - 5x

* **Expand and collect like terms**

Multiply everything inside the bracket by what is outside

Then collect like terms together

3(x + 2) + 2(x – 5)

=**3x** **+ 6** **+ 2x** **– 10**

=**5x** **- 4**

Watch for the negative sign in front of the bracket

It changes the sign inside the bracket

3(x + 2) **-** 2(x – 5)

=**3x** **+ 6** **- 2x** **+ 10**

=**x** **+ 16**

**7/11 Expressions, formulae, terms**

* This is an equation

**3x - 5 = 7**

Expression

Equation

Terms

* This is a formula

Length

Width

Height

Volume = length x width x height

 **Substitute values into an expression/formula**

*Remember the rules from 7/5*

**7/12 Equations of lines on a grid**



x = 3

y = 3



y = -x

y = x

**7/13 Solve equations**

~Multiply out brackets first

~Keep equation balanced - Do the same to both sides

Example: To solve 3(x – 4) = 9 (expand bracket)

 3x – 12 = 9 (+12 to each side)

 3x = 21 (÷3 both sides)

 3x = 21

 3 3

 x = 7

**7/14 Generate a sequence**

* **Understand position and term**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Position | 1 | 2 | 3 | 4 |
| Term | 3 | 7 | 11 | 15 |

 Term to term rule= +4

Example:

Given first term e.g. 3

Term to term rule: x2 – 5

Terms of sequence: 3, 1, -3, -11, -27 ...

**Special sequences**:

Triangular numbers: 1, 3, 6, 10, 15, 21...

Square numbers: 1, 4, 9, 16, 25, 26...

Cube numbers: 1, 8, 27, 64, 125, 216...

Fibonacci: 0, 1, 1, 2, 3, 5...

Geometric: 2, 6, 18, 54, 162,

Each term is x3 (COMMON RATIO

 **7/15 Ratio**

The ratio of squares to triangles can be written

squares : triangles

 4 : 6

÷ 2 ÷ 2

 **2 : 3**

**Ratios can be simplified just like fractions**

* Ratio can be simplified by cancelling

e.g. 12 : 15

 => 4 : 5

e.g. 30cm : 1m

 => 30 : 100

 => 3 : 1

* Ratio can be written in form 1 : n

e.g. 2 : 5 (÷ both parts by 2)

 => 1 : 2.5

**7/16 Divide an amount into a given ratio**

Example 1: Divide £40 in the ratio of 1 : 3 : 4

Total number of shares = 1+3+4=8

8 shares = £40

1 share = £40÷8 = £5

3 shares = 3 x £5 = £15

5 shares = 5 x £5 = £25

Example 2: A and B share some sweets in ratio 3:2

A gets 12 sweets

So 3 shares = 12

1 share = 12 ÷ 3 = 4

B gets 2 shares =2 x 4 = 8 sweets

**7/17 Express one quantity as fraction/percentage of another**

* Make sure that both quantities are expressed in the same unit
* Form a fraction using the two quantities
* Divide to form decimal then percentage

Example 1: Write 50 as a percentage of 80

 = = 0.625 = 62.5%

Example 2: Write 80 as a percentage of 50

 = = 1.6 = 160%

**7/18 Properties of 2D shapes**

**TRIANGLES – angles add up to 1800**

***Isosceles triangle***

* 2 equal sides
* 2 equal angles
* 1 line of symmetry
* No rotational symmetry

***Equilateral triangle***

* 3 equal sides
* 3 equal angles - 600
* 3 lines of symmetry
* Rotational symmetry order 3

**QUADRILATERALS – all angles add up to 3600**

***Square***

* 4 equal sides
* 4 equal angles - 900
* 4 lines of symmetry
* Rotational symmetry order 4

***Rectangle***

* Opposite sides equal
* 4 equal angles - 900
* 2 lines of symmetry
* Rotational symmetry order 2

**7/18 Properties of 2D shapes (continued)**

***Parallelogram***

* Opposite sides parallel
* Opposite angles equal
* NO lines of symmetry
* Rotational symmetry order 2

***Rhombus (like a diamond)***

* Opposite sides parallel
* Opposite angles equal
* 2 lines of symmetry
* Rotational symmetry order 2

***Trapezium***

* ONE pair opposite sides parallel

***Kite***

* One pair of opposite angles equal
* 2 pairs of adjacent sides equal
* ONE line of symmetry
* No rotational symmetry

**7/19 Transformations**

* **Translate a shape**

You need to know:

* How to move it e.g. **3 Right** **4 Down**

****

B

A

* **Rotate a shape**

You need to know:

* Angle e.g. 900
* Direction e.g. clockwise
* Centre of rotation e.g.(0,0)

****

In translation, rotation & reflection the shape and its image arecongruent

* **Reflect a shape in a line**

The line could be vertical, horizontal or diagonal

**On a grid**:

The vertical line would be called x = ?

The horizontal line would be called y = ?

The diagonal line would be called y = x or y = -x

**y=-x x y=x**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |

 **x=2**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |

* **Enlargement a shape**

You need to know:

* Centre e.g. ( 5, 4)
* Scale factor e.g. 2

****

Scale

factor 2

The image is **similar**; all lengths are 2 times the original

**7/20 Conventions for labelling**

 parallel lines perpendicular lines

 equal lines equal angles

**A point** is labelled using ONE letter

 P .

**A line** is labelled using TWO letters according to its start point and end point

 A B

 **Line AB**

**An angle** is labelled using THREE letters with the vertex letter in the middle

 **A**

 **D E**

 **Angle ADE or angle EDA**

**7/21 Plans & elevations**

Plan view

s

i

d

e

–

v

i

e

w

front elevation

Side view Plan view Front elevation

**7/22 Know & use formulae for areas**

* **Area of triangle**

Area of triangle = b x h

 2

5cm

= 8 x 5

 2

 20cm2

8cm

* **Area of parallelogram**

Area of parallelogram = b x h 5cm

 = 8 x 5

 = 40cm2 8cm

 8cm

* **Area of trapezium**

Area of trapezium = (a + b) x h

 2 5cm

 = (8 + 12) x 6

 2 12cm

 = 60cm2

**7/23 Properties of 3D shapes**

**PRISMS- same cross section through length**

***Cube and cuboid***

* **6 faces**
* **12 edges**
* **8 vertices**

***Triangular prism***

* **5 faces**
* **9 edges**
* **8 vertices**

***Cylinder – special prism***

**7/23 Properties of 3D shapes (continued)**

**PYRAMIDS- a point opposite the base**

***Pyramid – square based***

* **5 faces**
* **8 edges**
* **5 vertices**

***Pyramid – triangular based***

* **4 faces**
* **6 edges**
* **4 vertices**

***Cone – special pyramid***

**SPHERES- ball shape**

**7/24 Volume & Surface Area of cuboids**

* **Volume of cuboid**

Volume = l x w x h

3cm

 = 5 x 3 x 2

2cm

 = 30cm3

5cm

* **Surface area of cuboid**

Front = 5x3 = 15

Back = 5x3 = 15

Top = 5x2 = 10

Total Surface Area =62cm2

Bottom = 5x2 = 10

Side = 3x2 = 6

Side = 3x2 = 6

**7/25 Angles and parallel lines**

**U/C-shape**

Interior angles add to 1800

**Z-shape**

Alternate angles are equal

**F-shape**

Corresponding angles are equal

**7/26 Words and probability**

* **Language**

Examples of probability words are

* **certain**
* **likely**
* **even chance**
* **unlikely**
* **impossible**

Other words:

* **Equally likely** – when all outcomes have the same chance of occurring
* **Biased** – when all outcomes do NOT have the same chance of occurring
* **Randomness** – outcomes that cannot be predicted
* Equally likely – Outcomes that have an equal chance of occurring

**7/27 Probability scale**

* **Probability scale**

 Unlikely likely

0 1

Impossible Evens Certain

* **Probability as a number** (fraction/decimal)

P(event) = No. of outcomes which give the event

 Total number of outcomes

**7/28 Enumerate sets**

Example: Find possible ways of arranging A, B, C

**A B C**

**A C B**

**B A C**

Notice the system

**B C A**

**C A B**

**C B A**

Example: Arrange numbers 1-16 in Venn diagram

Square numbers

Even numbers

10

4

2

1

14

3

12

99

16

66

8

7

5

15

13

11

Now sets can be enumerated

Example: Even square numbers:,

Set notation for Venn diagrams indicated by shaded part:

A

B

A

B

 Set A Set B’

A

B

A

B

 Set A B Set A B

**7/29 Construct a pie chart**

|  |  |  |  |
| --- | --- | --- | --- |
| **Transport** | **Frequency** | **Angle per person** | **Angle** |
| Car | 13  | x 9 | 1170 |
| Bus | 4  | x 9 | 360 |
| Walk | 15  |  x 9 | 135 |
| Cycle | 8  |  x 9 | 72 |

 Total frequency = 40

 3600 ÷ 40 = 90 per person

* **Interpret a pie chart**

Fish

Fish

Rabbit

Rabbit

Cat

Cat

Dog

Dog

**Group 1**

**Group 2**

* When we are not told how many people are in the survey, we can only comment on proportion, by comparing the sizes of sectors in each pie chart

e.g. there is a larger proportion of the population who have a dog in Class 2 than Class 1

**It does NOT mean there are more people who have a dog**

**7/30 Measures of central tendency & range**

**~from a list**

* Mode – most frequent measure
* Median – middle measure (put them in order)
* Mean – total of measures ÷ no. of measures
* Range – Highest minus lowest measures spread

**~from a table**

|  |  |  |
| --- | --- | --- |
| Age in years(x) | Frequency(f) | fx |
| 2 | 3 | 6 |
| 3 | 5 | 15 |
| 4 | 2 | 8 |

 **Σf=10 Σfx=29**

**Mean = Σfx** = 29 = age 2.9 yr

 **Σf** 10

Mode (what there is most of) = age 3 yr

Median (middle) (10 + 1)÷2=5.5th person=age 3 yr

Range (highest minus lowest) = 4 – 2 = 2 yr

**~ Compare distributions of 2 sets of data**

Use a measure of average and a measure of spread

* Compare an average of each distribution

e.g. mean, median, mode

* Compare the spread of each distribution

e.g. range

* Make sure comments relate to the context

e.g. the boys are taller on average than the girls since the mean is larger for the boys