

# **Cumbernauld Academy**

## **Maths Department**



# **National 5 Applications of Mathematics Pupil Booklet**

## Numeracy: Measurement

1	How do you change <b>centimetres</b> to <b>metres</b> ?	Divide by 100
2	How do you change <b>metres</b> to <b>centimetres</b> ?	Multiply by 100
3	How do you change <b>Kilometres</b> to <b>metres</b> ?	Multiply by 1000
4	How do you change <b>metres</b> to <b>kilometres</b> ?	Divide by 1000
5	How do you change <b>centimetres</b> to <b>millimetres</b> ?	Multiply by 10
6	How do you change <b>millimetres</b> to <b>centimetres</b> ?	Divide by 10
7	How do you change <b>grams</b> to <b>kilograms</b> ?	Divide by 1000
8	How do you change <b>kilograms</b> to <b>grams</b> ?	Multiply by 1000
9	How many <b>centimetres cubed</b> are in a <b>litre</b> ?	1000

## Numeracy: Basic Areas and Volumes

10	When do you use <b>squared units</b> e.g. centimetres squared ( $\text{cm}^2$ ) or metres squared ( $\text{m}^2$ )?	When you are working out an area (or when the formula begins "A =")
11	When do you use <b>cubed units</b> e.g. metres cubed ( $\text{m}^3$ ) or centimetres cubed ( $\text{cm}^3$ )?	When you are working out a volume (or when the formula begins "V =")
12	How do you find the area of a <b>rectangle</b> ?	"Length times Breadth" (or $A = LB$ )
13	How do you find the area of a <b>triangle</b> ?	"Half Base times Height" ( or $A = \frac{BH}{2}$ )  (A equals B H over 2)
14	How do you find the volume of a <b>cuboid</b> ?	"Length times Breadth times Height" ( or $V = LBH$ )
15	If you are told the radius, how do you find the <b>diameter</b> of a circle?	Double it
16	If you are told the diameter, how do you find the <b>radius</b> of a circle?	Half it

## Numeracy: Fractions and Percentages

17	How do you work out a <b>fraction</b> ?	Divide the bottom and times (multiply) by the top
18	What do you divide by to work out <b>25%</b> ?	4
19	What do you divide by to work out <b>10%</b> ?	10
20	What sum do you do to work out <b>75%</b> ?	Divide by 4 and times by 3 <b>Alternative answer:</b> find three-quarters
21	What do you do to work out <b>30%</b> <u>without</u> a calculator?	Divide by 10 and times by 3 <b>Alternative answer:</b> find 10% and times by 3
22	What sum do you do to work out <b>70%</b> <u>without</u> a calculator?	Divide by 10 and times by 7 <b>Alternative answer:</b> find 10% and times by 7
23	What sum do you do to work out <b>3%</b> <u>without</u> a calculator?	Divide by 100 and times by 3 <b>Alternative answer:</b> find 1% and times by 3
24	What sum do you do to work out <b>5%</b> <u>without</u> a calculator?	Divide by 100 and times by 5 <b>Alternative answer:</b> find 1% and times by 5  <b>Alternative answer:</b> find 10% and half it
25	How do you work out a percentage with a calculator?	<b>either</b> change to a decimal and multiply <b>or</b> divide by 100 and multiply
26	What fraction is the same as $33\frac{1}{3}\%$ ? <b>(thirty three and one third per cent)</b>	$\frac{1}{3}$
27	What fraction is the same as $66\frac{2}{3}\%$ ? <b>(sixty six and two thirds per cent)</b>	$\frac{2}{3}$

## Statistics

**Don't forget to use the formula sheet in the exam:**

$$\text{Standard Deviation: } s = \frac{\sqrt{\sum(x - \bar{x})^2}}{n} = \frac{\sqrt{\sum x^2 - (\sum x)^2 / n}}{n}$$

28	How do you find the <b>Interquartile Range (IQR)</b> ?	Upper quartile take away Lower quartile
29	How do you find the Semi-Interquartile Range (SIQR)?	$\frac{\text{Upper Quartile} - \text{Lower Quartile}}{2}$
30	What does the symbol $\Sigma$ ( <b>sigma</b> ) mean?	Add together all the numbers
31	What does the symbol $\bar{x}$ ( <b>x bar</b> ) mean?	The mean
32	In the standard deviation formula, what does $n$ stand for?	How many numbers there are
33	If the <u>standard deviation</u> is <b>higher</b> , what comment can you make?	The numbers are more varied
34	If the <u>semi-interquartile range</u> is <b>higher</b> , what comment can you make?	The numbers are more varied
35	If the <u>mean or median</u> is <b>higher</b> , what comment can you make?	On average, the numbers are higher
36	If the <u>standard deviation</u> is <b>lower</b> , what comment can you make?	The numbers are more consistent
37	If the <u>semi-interquartile range</u> is <b>lower</b> , what comment can you make?	The numbers are more consistent
38	If the <u>mean or median</u> is <b>lower</b> , what comment can you make?	On average, the numbers are lower
39	What five values are shown by a boxplot?	Lowest, Lower Quartile, Median, Upper Quartile, Highest
40	How do you find an angle in a pie chart?	$360 \div \text{Total} \times \text{Frequency}$
41	How do you find the quartiles?	Put the list in order and split it into four equal groups

## Geometry

42	When do you use <b>squared units</b> e.g. centimetres squared ( $\text{cm}^2$ ) or metres squared ( $\text{m}^2$ )?	When you are working out an area (or when the formula begins "A =")
43	When do you use <b>cubed units</b> e.g. metres cubed ( $\text{m}^3$ ) or centimetres cubed ( $\text{cm}^3$ )?	When you are working out a volume (or when the formula begins "V=")
44	When do you use normal units (not squared or cubed)?	When you are working out a distance or perimeter
45	What is the formula for the area of a circle?	$A = \pi r^2$ <b>(A equals pi r squared)</b>
46	What is the formula for the <b>circumference</b> of a circle?	$C = \pi d$ <b>(C equals pi d)</b>
47	What is the formula for the volume of a <b>cylinder</b> ?	$V = \pi r^2 h$ <b>(V equals pi r squared h)</b>
48	What is the formula for the volume of a <b>cone</b> ?	$V = \frac{1}{3} \pi r^2 h$ <b>(V equals one third pi r squared h)</b>
49	What is the formula for the volume of a <b>sphere</b> ?	$V = \frac{4}{3} \pi r^3$ <b>(V equals four thirds pi r cubed)</b>
50	What is a hemisphere?	Half a sphere
51	How do you find the volume of a <b>prism</b> ?	A) Find the area of the end b) Multiply by the height
52	How do you find the perimeter of a <b>shape</b> ?	Add all the outside lengths together
53	How do you find the <b>perimeter</b> of a shape with a curved edge?	a) Use $C = \pi d$ for the curved edge b) Add on any straight lengths
54	What are the three steps involved in a <b>Pythagoras</b> question?	a) Square b) Add or take away c) Square root
55	When do you choose to <b>add</b> in a Pythagoras question?	If the side you are finding is the longest one
56	When do you choose to <b>take away</b> in a Pythagoras question?	If the side you are finding is a shorter one
57	How do you calculate gradient?	Vertical distance $\div$ Horizontal distance
58	What are the units for a gradient?	There are no units. It is just a number.

## Measures: Speed, Distance and Time

59	What is the formula for <b>speed</b> ?	Speed = $\frac{\text{Distance}}{\text{Time}}$ (or $S = \frac{D}{T}$ )
60	What is the formula for <b>distance</b> ?	Distance = Speed $\times$ Time (or $D = ST$ )
61	What is the formula for <b>time taken</b> ?	Time = $\frac{\text{Distance}}{\text{Speed}}$ (or $T = \frac{D}{S}$ )
62	How do you change minutes into a decimal?	Divide by 60
63	How do you change hours (as a decimal) into hours and minutes?	Multiply the bit after the point by 60 to get the minutes
64	In an activity network, how do you find the shortest time required for the activity?	Look for the <u>longest</u> path through the diagram from start to finish
65	What is a <b>precedence table</b> ?	A table showing a list of the tasks required to do a job showing which tasks have to come before others
66	What is a <b>prerequisite</b> task?	Something that must be completed before the next task can be begun
67	When discussing Time Zones, what does GMT mean?	Normal UK time (Greenwich Mean Time)
68	When discussing Time Zones, what does <b>BST</b> stand for?	British Summer Time

## Measures: Scale Drawing

69	If you are asked to choose a scale for a scale drawing, what would you usually begin the scale by writing?	1cm = ...
70	In a scale drawing, how do you work out what length to draw on the page?	Divide the real-life length by the scale factor
71	How do you work out a real-life length from a scale drawing?	Measure the length on the page and then multiply by the scale factor
72	What do you have to remember when measuring a <b>bearing</b> ?	a) Start from North b) Measure clockwise c) Use three digits

## Finance

73	How do you calculate somebody's monthly wage when you know their annual salary?	Divide by 12
74	How do you find net pay?	Net pay = Gross Pay – Total Deductions
75	If you get <b>double time</b> for overtime, what do you multiply by?	2
76	If you get <b>time-and-a-half</b> for overtime, what do you multiply by?	1.5
77	If you get <b>time-and-a-quarter</b> for overtime, what do you multiply by?	1.25
78	How do you find somebody's <b>taxable income</b> ?	Annual Salary – Tax allowances
79	How do you calculate somebody's annual tax?	a) Work out the taxable income b) Work out the percentage of this amount
80	When changing money from pounds into another currency, what type of sum do you do?	Multiply by the exchange rate
81	When changing money from another currency back into pounds, what type of sum do you do?	Divide by the exchange rate
82	In a credit card question, what does APR stand for?	Annual Percentage Rate (the interest rate per year)

## General Skills

83	What do you need to include when a question asks you to <b>'explain your answer'</b> (or <b>'give a reason'</b> )?	The difference between or listing the two numbers and a comparing word
84	When a question asks you to round your answer, what do you have to remember?	Write the unrounded answer as well as the rounded one
85	If the answer to a question is a fraction, what do you have to remember?	You must simplify the fraction
86	If a question uses the word "hence", what does this tell you?	Your last answer can help you somehow
87	If a question uses the word "show that", what does this tell you?	The question is telling you the answer and you have to show all the working to get that answer
88	If a question uses the words "state" or "write down", what does this tell you?	You should be able to get the answer easily without working

