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National 5
Applications of Mathematics

Q&A Booklet:
Key Facts to Memorise

Ways of using this booklet:

1) Write the questions on cards with the answers on the back and **test yourself**.
2) **Work with a friend** who is also doing National 5 Applications of Maths to take turns reading a random question and answering.
3) **Ask a friend or family member**** to test you by reading questions (on the left-hand side) to you.

The questions are on the left-hand side of each page and the answers are on the right.

If the person who is testing you has not done National 5 level maths topics recently (or ever!), they may need some help reading the maths symbols, so some mathematical symbols have been written out phonetically **(in a smaller bold underlined font) to help them.

Questions with a grey background are also repeated on the formula sheet, but it is still a good idea to memorise them ahead of tests.

Numeracy: Measurement	
1) What do you need to do in an exam question if there are a mixture of different units?	Convert so that all numbers are in the same unit before you begin
2) How do you convert **centimetres** to **metres**?	Divide by 100
3) How do you convert **metres** to **centimetres**?	Multiply by 100
4) How do you convert **kilometres** to **metres**?	Multiply by 1000
5) How do you convert **metres** to **kilometres**?	Divide by 1000
6) How do you convert **centimetres** to **millimetres**?	Multiply by 10
7) How do you convert **millimetres** to **centimetres**?	Divide by 10
8) How do you convert **grams** to **kilograms**?	Divide by 1000
9) How do you convert **kilograms** to **grams**?	Multiply by 1000
10) How do you convert **millilitres** to **litres**?	Divide by 1000
11) How do you convert **litres** to **millilitres**?	Multiply by 1000
12) How many **cubic centimetres** (cm^3) are in one **litre**?	1000

Numeracy: Basic Areas and Volumes	
13) How do you calculate the area of a **rectangle**?	"Length times Breadth" **Alternative answer:** $A = LB$
14) How do you calculate the area of a **triangle**?	"Base times Height divided by 2" **Alternative answer:** $A = \frac{BH}{2}$ **(A equals BH over 2)** **Alternative answer:** Half Base times height
15) How do you calculate the volume of a **cuboid**?	"Length times Breadth times Height" **Alternative answer:** $V = LBH$
16) If you are told the radius, how do you find the **diameter** of a circle?	Double it
17) If you are told the diameter, how do you find the **radius** of a circle?	Half it

Numeracy: Fractions and Percentages	
18) How do you calculate a **fraction**?	Divide by the bottom and multiply (times) by the top
19) What do you divide by to calculate **25%** without a calculator?	4 **Alternative answer:** find one-quarter
20) What do you divide by to calculate **10%** without a calculator?	10
21) What do you divide by to calculate **1%** without a calculator?	1
22) What calculation do you do to calculate **75%** without a calculator?	Divide by 4 and times by 3 Alternative answer: find three-quarters
23) How do you calculate a percentage <u>with</u> a calculator?	***either*** change to a decimal and then multiply ***or*** divide by 100 and then multiply
24) How do you convert a fraction to a percentage?	Top number divided by bottom number multiplied by 100 **Alternative answer:** top ÷ bottom × 100 **Alternative answer:** numerator ÷ denominator × 100
25) How to you find the decimal multiplier for a percentage increase or decrease?	1) Add to or take away from 100 2) Divide by 100
26) How do you explain which of two fractions is bigger (or smaller)?	1) Convert both fractions so that they have the same number on the bottom (the denominator) 2) The fraction with the bigger number on the top is the bigger fraction. 3) Write a sentence with two fractions and a comparing word

Statistics

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

Standard Deviation: $s = \sqrt{\frac{\sum(x-\bar{x})^2}{n-1}} = \sqrt{\frac{\sum x^2 - \left(\sum x\right)^2 / n}{n-1}}$

27) How do you find the **InterQuartile Range** (IQR)?	Upper quartile take away Lower quartile
28) In the standard deviation formula, what does the symbol $\sum$ **(sigma)** mean?	Add together all the numbers
29) In the standard deviation formula, what does the symbol $\overline{x}$ **(x bar)** mean?	The mean
30) In the standard deviation formula, what does the letter '*n*' stand for?	How many numbers there are
31) If a standard deviation is **higher**, what comment can you make?	The numbers are more varied
32) If an interquartile range is **higher**, what comment can you make?	The numbers are more varied
33) If a mean or median is **higher**, what comment can you make?	On average, the numbers are higher
34) If a standard deviation is **lower**, what comment can you make?	The numbers are more consistent
35) If an interquartile range is **lower**, what comment can you make?	The numbers are more consistent
36) If a mean or median is **lower**, what comment can you make?	On average, the numbers are lower
37) What five values are shown by a **boxplot**?	Lowest, Lower Quartile, Median, Upper Quartile, Highest

Geometry	
38) When do you use **squared units** e.g. square centimetres (cm²) or square metres (m²)?	When you are calculating an area **Alternative answer:** when formula begins "*A* ="
39) When do you use **cubed units** e.g. cubic metres (m³) or cubic centimetres (cm³)?	When you are calculating a volume **Alternative answer:** when formula begins "*V* ="
40) When do you use normal units for length (not squared or cubed)?	When you are calculating a distance or perimeter
41) What is the formula for the area of a circle?	$A = \pi r^2$ **(A equals pi r squared)**
42) What is the formula for the **circumference** of a circle?	$C = \pi d$ **(C equals pi d)**
43) What is the formula for the volume of a **cylinder**?	$V = \pi r^2 h$ **(V equals pi r squared h)**
44) What is the formula for the volume of a **cone**?	$V = \frac{1}{3}\pi r^2 h$ **(V equals one third pi r squared h)**
45) What is the formula for the volume of a **sphere**?	$V = \frac{4}{3}\pi r^3$ **(V equals four thirds pi r cubed)**
46) How do you find the volume of a **prism**?	1) Find the area of the end (cross-section) 2) Multiply by the height
47) How do you find the **perimeter** of a shape?	Add all the outside lengths together
48) How do you find the **perimeter** of a shape with a curved edge?	a) Use $C = \pi d$ for the curved edge b) Add on any straight lengths
49) If a triangle is described as **isosceles**, what does this mean?	It is symmetrical (has two equal sides and two equal angles)
50) If a triangle is described as **equilateral**, what does this mean?	All three sides and angles are the same.
51) What are the three steps involved in a **Pythagoras** calculation?	1) Square 2) Add or take away 3) Square root
52) When do you choose to **add** in a Pythagoras question?	If the side you are finding is the longest one (the hypotenuse)
53) When do you choose to **take away** in a Pythagoras question?	If the side you are finding is a shorter one
54) How do you calculate **gradient**?	Vertical distance divided by Horizontal distance **Alternative answer:** vertical over horizontal
55) What are the units for a **gradient**?	There are no units. It is just a number.

Measures: Speed, Distance and Time	
56) In speed, distance and time, what is the formula for **speed**?	$\text{Speed} = \frac{\text{Distance}}{\text{Time}}$ (or $S = \frac{D}{T}$) **(S equals D over T)**
57) In speed, distance and time, what is the formula for **distance**?	$\text{Distance} = \text{Speed} \times \text{Time}$ (or $D = ST$) **(D equals S times T)**
58) In speed, distance and time, what is the formula for **time taken**?	$\text{Time} = \frac{\text{Distance}}{\text{Speed}}$ (or $T = \frac{D}{S}$) **(T equals D over S)**
59) How do you change minutes into hours as a decimal?	Divide by 60
60) How do you change hours (as a decimal) into hours and minutes?	Multiply the bit after the decimal point by 60 to get the minutes
61) In a task planning question, how do you find the minimum time required for the activity? (the critical path)	Look for the longest path through the diagram from start to finish
62) In a task planning question, what is a **prerequisite** (or **preceding**) task?	Something that must be completed before the next task can be begun.
63) When discussing Time Zones, what does "local time" mean?	The time in the place that is being referred to

Measures: Scale Drawing	
64) 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
65) 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
66) What three things do you have to remember when measuring a **bearing?**	a) Start from North b) Measure clockwise c) Use three digits

NOT IN EXAM IN 2023

Finance	
67) How do you calculate somebody's monthly wage when you know their annual salary?	Divide by 12
68) How do you calculate **net pay**?	Net Pay = Gross Pay – Total Deductions
69) How to do calculate **profit** or **loss**?	Income take away Expenditure
70) How do you calculate the **percentage profit** or **percentage loss** on a sale?	Profit or loss ÷ original price × 100
71) How do you calculate somebody's annual tax or National Insurance?	1) Subtract the 0% rate from the gross pay. 2) Calculate the percentage of the remaining amount.
72) In a money question, what is the **balance**?	The current total on an account.
73) If you get **double time** for overtime, what do you multiply by?	2
74) If you get **time-and-a-half** for overtime, what do you multiply by?	1·5
75) If you get **time-and-a-quarter** for overtime, what do you multiply by?	1·25
76) When does **commission** get added, and when does it get taken away?	It gets added when it is a bonus paid to a salesperson It gets taken away when it is being paid to someone who is changing money from one currency into another
77) Is **interest** an example of appreciation or depreciation?	Always appreciation

General Skills: Exam Command Words	
78) What do you need to include when a question asks you to '**justify your answer**' (or '**give a reason**')?	Two numbers and a comparing word.
79) 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.
80) If the answer to a question is a fraction, what do you have to remember?	You must give the fraction in its simplest form
81) 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