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

Numeracy: Basic Calculations

10) When doing a calculation, what order do the operations come in? (BODMAS)	<ol style="list-style-type: none"> 1) Brackets first 2) then Powers/Roots (“Order” or “Other”) 3) then Multiply/Divide 4) then Add/Subtract
11) How do you decide which amount is a greater proportion ?	<ol style="list-style-type: none"> 1) Express both amounts as fractions or percentages 2) Calculate which fraction or percentage is bigger

Numeracy: Basic Areas and Volumes

12) How do you find the area of a rectangle ?	<p>“Length times Breadth”</p> <p>Alternative answer: $A = LB$</p>
13) How do you find the area of a triangle ?	<p>“Half Base times Height”</p> <p>Alternative answer: $A = \frac{BH}{2}$ (<u>A equals BH over 2</u>)</p>
14) How do you find the volume of a cuboid ?	<p>“Length times Breadth times Height”</p> <p>Alternative answer: $V = LBH$</p>
15) If you are told the radius, how do you find the diameter of a circle?	Double it
16) If you are told the diameter, how do you find the radius of a circle?	Half it

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Numeracy: Fractions and Percentages	
17) How do you calculate a fraction ?	Divide by the bottom and times (multiply) by the top
18) What do you divide by to calculate 25% ?	4
19) What do you divide by to calculate 10% ?	10
20) What sum do you do to calculate 75% ?	Divide by 4 and times by 3 Alternative answer: find three-quarters
21) What do you do to calculate 30% <u>without</u> a calculator?	Divide by 10 and times by 3 Alternative answer: find 10% and times by 3
22) What sum do you do to calculate 70% <u>without</u> a calculator?	Divide by 10 and times by 7 Alternative answer: find 10% and times by 7
23) What sum do you do to calculate 3% <u>without</u> a calculator?	Divide by 100 and times by 3 Alternative answer: find 1% and times by 3
24) What sum do you do to calculate 5% <u>without</u> a calculator?	Divide by 100 and times by 5 Alternative answer: find 1% and times by 5 Alternative answer: find 10% and half it
25) What sum do you do to calculate 2½% <u>without</u> a calculator?	Divide by 10, half it and half again Alternative answer: find 5% and half it
26) How do you calculate a percentage with a calculator?	either change to a decimal and multiply or divide by 100 and multiply
27) What fraction is the same as $33\frac{1}{3}\%$? (thirty three and one third per cent)	$\frac{1}{3}$
28) What fraction is the same as $66\frac{2}{3}\%$? (sixty six and two thirds per cent)	$\frac{2}{3}$
29) How do you explain which of two fractions is bigger?	1) Convert both so that they have the same number on the bottom 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:

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

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

Geometry

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

Measures: Speed, Distance and Time

61) What is the formula for speed ?	Speed = $\frac{\text{Distance}}{\text{Time}}$ (or $S = \frac{D}{T}$)
62) What is the formula for distance ?	Distance = Speed \times Time (or $D = ST$)
63) What is the formula for time taken ?	Time = $\frac{\text{Distance}}{\text{Speed}}$ (or $T = \frac{D}{S}$)
64) How do you change minutes into a decimal?	Divide by 60
65) How do you change hours (as a decimal) into hours and minutes?	Multiply the bit after the point by 60 to get the minutes
66) 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
67) What is a prerequisite (or preceding) task?	Something that must be completed before the next task can be begun.
68) When discussing Time Zones, what does "local time" mean?	The time in the place that the person is currently located.
69) When discussing Time Zones, what does GMT mean?	Normal UK time (Greenwich Mean Time)
70) When discussing Time Zones, what does BST stand for?	British Summer Time

Measures: Scale Drawing

71) 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
72) 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
73) If you are asked to choose a scale for a scale drawing, what would you usually begin the scale by writing?	1cm = ...
74) What three things do you have to remember when measuring a bearing ?	a) Start from North b) Measure clockwise c) Use three digits

Finance	
75) How do you calculate somebody's monthly wage when you know their annual salary?	Divide by 12
76) How do you find net pay?	Net Pay = Gross Pay – Total Deductions
77) In a money question, what is the balance ?	The money left over.
78) If you get double time for overtime, what do you multiply by?	2
79) If you get time-and-a-half for overtime, what do you multiply by?	1.5
80) If you get time-and-a-quarter for overtime, what do you multiply by?	1.25
81) How do you find somebody's taxable income ?	Annual salary – Tax allowances
82) How do you calculate somebody's annual tax or National Insurance?	1) Calculate the taxable income. 2) Calculate the percentage of this amount.
83) When changing money from pounds into another currency, what type of sum do you do?	Multiply by the exchange rate
84) When changing money from another currency back into pounds, what type of sum do you do?	Divide by the exchange rate

General Skills: Exam Command Words

85) 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.
86) 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.
87) If the answer to a question is a fraction, what do you have to remember?	You must simplify the fraction
88) If a question uses the word "hence", what does this tell you?	You must use your last answer to help you somehow
89) 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.
90) 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