

September Revision Booklet

S5/6 National 5

FORMULAE LIST

Volume of a sphere: $V = \frac{4}{3}\pi r^3$

Volume of a cone: $V = \frac{1}{3}\pi r^2 h$

Volume of a pyramid: $V = \frac{1}{3}Ah$

Textbook revision for the September Assessment		
	TJ Nat 5	Leckie & Leckie Nat 5
Surds	Pg 171 Q2&7,	Pg 5 Q3&4 Page 6 Q1&2
Indices	Pg 175 Q6, 7 &111	Pg 18 Q2, Pg 19 Q3
Standard Form	Pg 5 Q47	Pg 24 Q2-5
Expanding Brackets	P15 Q3, Pg 16 Q6&7	Pg 32 Q2, Pg 33 Q2
Factorising	P66 Q1, P67 Q2	Pg 37 Q3, Pg 40 Q3
Completing the square	Pg 187 Q2,3	Pg 43 Q3
Numerical Fractions	Pg 32 Q1 - 3	Pg 341 Q1&2, Pg 342 Q1&2
Algebraic Fractions	Pg 96 Q2,3&4	Pg 49 Q2, Pg 55 Q2, Pg 56 Q1, Pg 58 Q1
Arcs and Sectors of Circles	Pg 126 Q4, Pg 127 Q4	Pg 70 Q1, Pg 74 Q1
Volume of 3D solids	Pg 8 Q74-76	Pg 77 Q1&2, Pg 81 Q1, Pg 82 Q1 &4
Percentage change	Pg 26 Q4.5%8	Pg 331 Q4-7
Reverse Percentages	Pg 27 Q1,2&7	Pg 335 Q3-6

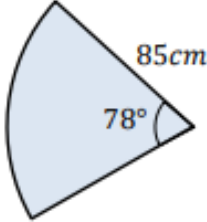
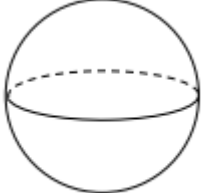
Maths workout revision for the September Assessment

<https://www.mathsworkout.co.uk/>

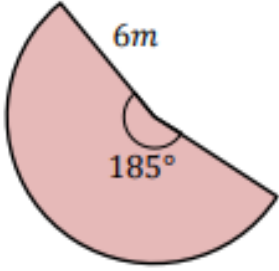
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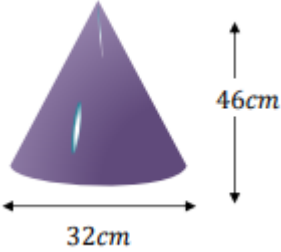
Surds	<p>Number Topic 20</p> <ul style="list-style-type: none"> • Simplifying a surd • Simplify a Product of Surds 1 • Simplifying a Sum or Difference of Surds 1
Indices	<p>Number Topic 19</p> <ul style="list-style-type: none"> • Multiplying and Dividing Indices (2 tasks) • Raising a Power to a Power • Simplifying Expressions 1 • Converting between Fractional Indices and Surds
Standard Form	Number Topic 21 - All 4 Level 5 tasks
Expanding Brackets, Factorising Completing the square	<p>Algebra Topic 12</p> <ul style="list-style-type: none"> • Expanding Brackets • Factorising Quadratics • The difference of Two Squares • Completing the Square
Numerical Fractions	<p>Number Topic 14</p> <ul style="list-style-type: none"> • Improper Fractions 1 • Adding and Subtracting Fractions 3 (2 tasks) • Multiplying and Dividing Fractions 2 (2 tasks)
Algebraic Fractions	<p>Algebra Topic 13</p> <ul style="list-style-type: none"> • A few slides from each of the four tasks
Arcs and Sectors of Circles	<p>Geometry and Measures Topic 21</p> <ul style="list-style-type: none"> • Calculating Arcs and Calculating Sectors (2 tasks)
Volume of 3D solids	<p>Geometry and Measures Topic 15</p> <ul style="list-style-type: none"> • Volume of a Cylinder, Cone and Sphere (3 tasks)
Percentage change over time and reverse percentages.	<p>Ratio, Proportion and Rates of Change Topic 7</p> <ul style="list-style-type: none"> • Calculating Compound Interest 1 and 2 • Calculating Reverse Percentage

A	S5 Nat 5 September Revision Non-Calculator	15
1	Evaluate $1\frac{2}{7} + \frac{5}{6}$	2
2	Multiply out the brackets and collect like terms $(2x + 3)(x - 5)$	2
3	Factorise $x^2 + 12x + 11$	2
4	(a) Simplify 3^0	1
	(b) Write $\sqrt{5}$ in index form.	1
	(c) Hence calculate $100^{\frac{1}{2}}$	2
5	Simplify $\frac{2}{b^2} \times \frac{3b}{4}$	2
6	simplify $\frac{(x+3)^2}{x^2+5x+6}$	3
A	S5 Nat 5 September Revision Calculator	15
7	There are 984 pupils on the school roll for Banchory High School. It is forecast that the school roll will decrease by 10% per year for the next three years. What is the expected school roll after three years? Give your answer rounded to two significant figures.	4
8	Write $x^2 + 10x + 12$ in completed square form $(x + p)^2 + q$	2
9	Simplify $10a^6b^3 \times 4a^2b^{-2}$	3


10	<p>The diagram shows a sector of a circle.</p> <p>The radius of the circle is 85 cm and the centre angle is 78°.</p> <p>Calculate the length of the arc for this sector.</p>		3
11	 <p>radius = 22cm</p> <p>Calculate the volume of a sphere with a radius of 22 centimetres</p> <p>Give your answer rounded to the nearest thousand</p>		3
30 marks			

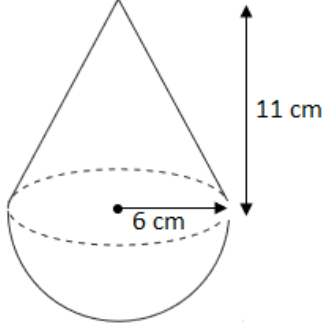
Answers to Revision Paper A			
	Non-Calculator		Calculator
1	$\left(\frac{2}{7} + \frac{5}{6}\right) = \left(\frac{12}{42} + \frac{35}{42}\right) = \frac{47}{42} = 1\frac{5}{42}$ $1 + 1\frac{5}{42} = 2\frac{5}{42}$	7	$984 \times 0.9^3 = 717.336$ <p style="text-align: center;">720 pupils</p>
2	$(2x + 3)(x - 5)$ $= 2x^2 - 10x + 3x - 15$ $= 2x^2 - 7x - 15$	8	$x^2 + 10x + 12 = (x + 5)^2 + 12 - 25$ $= (x + 5)^2 - 13$
3	$x^2 + 12x + 11 = (x + 11)(x + 1)$	9	$10a^6b^3 \times 4a^2b^{-2} = 40a^6b$
4	$3^0 = 1,$ $\sqrt{5} = 5^{\frac{1}{2}}.$ $100^{\frac{1}{2}} = \sqrt{100} = 10$	10	$Arc = \frac{78}{360} \times \pi \times 2 \times 85 = 115.7 \text{ cm}$
5	$\frac{2}{b^2} \times \frac{3b}{4} = \frac{6b}{4b^2} = \frac{3}{2b}$	11	$V = \frac{4}{3} \times \pi \times 22^3 = 44602.2381$ <p style="text-align: center;">Volume is 45 000 cm³</p>
6	$\frac{(x + 3)(x + 3)}{(x + 2)(x + 3)} = \frac{x + 3}{x + 2}$		

B	S5 Nat 5 September Revision Non-Calculator	13
1	Evaluate $1\frac{3}{7} \times \frac{2}{5}$	2
2	Multiply out the brackets and collect like terms $(3x - 1)^2 + 5x$	3
3	Write $x^2 - 4x + 11$ in completed square form $(x + p)^2 + q$	2
4	Factorise $2x^2 - 18$	2
5	Simplify $m^7 \times m^3 \div m^{-6}$	2
6	Simplify $\sqrt{12} \times \sqrt{3}$	2
B	S5 Nat 5 September Revision Calculator	17
7	<p>The population of Dundee is increasing at a steady rate of 1.7% per year.</p> <p>At present the population is 148 300.</p> <p>What is the expected population in five years time?</p>	3
8	<p>The diagram shows a sector of a circle.</p> <p>The radius of the circle is 6 metres and the centre angle is 185°.</p> <p>Calculate the area of this sector.</p>	 <p>The diagram shows a sector of a circle. The radius is labeled as 6m. The central angle is labeled as 185 degrees. The sector is shaded in a light red color.</p>
10	An insect weighs 3.82×10^{-2} grams. One day it consumes 5 times its weight in food. How much food does it eat? Give your answer in scientific notation.	2

9		<p>Calculate the volume of a cone with a diameter of 32 centimetres and a height of 46 centimetres.</p> <p>Give your answer correct to 2 significant figures.</p>	3
11	<p>The price of Bella's summer holiday is £924.</p> <p>This price includes a 5% booking fee.</p> <p>What is the price of the holiday without the booking fee?</p>		3
12	<p>Express $\frac{3}{x} + \frac{4}{x+1}$, $x \neq 0, x \neq -1$ as a single fraction in the simplest form</p>		3
30 marks			

Answers to Revision Paper B			
	Non-Calculator		Calculator
1	$1\frac{3}{7} \times \frac{2}{5} = \frac{10}{7} \times \frac{2}{5} = \frac{20}{35} = \frac{4}{7}$	7	$148\,300 \times 1.017^5 = \mathbf{161341}$
2	$(3x - 1)^2 = (3x - 1)(3x - 1)$ $= 9x^2 - 3x - 3x + 1$ $(3x - 1)^2 + 5x = \mathbf{9x^2 - x + 1}$	8	$Area = \frac{185}{360} \times \pi \times 6^2$ $Area = \mathbf{58.12\ cm^2}$
3	$(x - 2)^2 + 11 - 2^2$ $(x - 2)^2 + 7$	9	$3.82 \times 10^{-2} \times 5 = 0.191$ $\mathbf{1.91 \times 10^{-1}\ grams}$
4	$x^2 - 16 = (x + 4)(x - 4)$ $2x^2 - 18 = 2(x^2 - 9)$ $= \mathbf{2(x - 3)(x + 3)}$	10	$V = \frac{1}{3} \times \pi \times 16^2 \times 46 = 12331.798 \dots$ $V = \mathbf{12\ 000\ cm^3}$
5	$m^7 \times m^3 \div m^{-6}$ $= m^{10} \div m^{-6}$ $= \mathbf{m^{16}}$	11	$105\% = \pounds 924$ $1\% = 924 \div 105 = 8.8$ $\mathbf{100\% = \pounds 880}$
6	$\sqrt{12} \times \sqrt{3} = \sqrt{36} = \mathbf{6}$	12	$\frac{3(x + 1) + 4x}{x(x + 1)} = \frac{\mathbf{7x + 3}}{x(x + 1)}$

C	S5 Nat 5 September Revision Non-Calculator	14
1	Evaluate $\frac{1}{3} \div 2\frac{2}{3}$	2
2	Factorise $x^2 - 4x - 21$	2
3	Multiply out the brackets and collect like terms $(4x - 7)(2x + 1)$	2
4	<p>The diagram shows a sector of a circle.</p> <p>The radius of the circle is 20 mm and the angle at the centre is 45°.</p> <p>Without a calculator and using $\pi = 3.14$, find the length of the arc for this sector.</p>	3
		
5	Simplify $\sqrt{50} - \sqrt{2}$	2
6	<p>Ava is selling raffle tickets to raise money for the school charities committee. She sells 270 tickets. This represents 90% of all of her tickets. How many raffle tickets was Ava given to sell?</p>	3
C	S5 Nat 5 September Revision Calculator	16
7	<p>Shares in a company are decreasing steadily at a rate of 11% each month. Ray has shares which are currently worth £30,000. How much will their shares be worth in 4 months' time? Give your answer to the nearest whole number.</p>	4
8	Write $x^2 - 12x + 21$ in completed square form $(x + p)^2 + q$	2
9	Simplify $f^5 \times (f^3)^2$	2

10	<p>A shape is made by placing a cone on top of a hemisphere.</p> <p>The hemisphere has a radius of 6 cm.</p> <p>The cone has a radius of 6 cm and a height of 10 cm.</p> <p>Calculate the volume of this shape.</p>		4
12	<p>(a) Factorise</p> <p>(i) $x^2 + 5x + 4$</p> <p>(ii) $x^2 - 16$</p> <p>(b) Hence simplify $\frac{x^2 + 5x + 4}{x^2 - 16}$</p>		2 2
30 marks			

Answers to Revision Paper C			
	Non-Calculator		Calculator
1	$\frac{1}{3} \div 2 \frac{2}{3} = \frac{1}{3} \div \frac{8}{3} = \frac{1}{3} \times \frac{3}{8} = \frac{1}{8}$	7	$30000 \times (1 - 0.11)^4$ $30000 \times (0.89)^4 = \text{£}18822.6723$ £18823
2	$x^2 - 4x - 21 = (x - 7)(x + 3)$	8	$(x - 6)^2 + 21 - 6^2$ $(x - 6)^2 - 15$
3	$8x^2 + 4x - 14x - 7$ $8x^2 - 10x - 7$	9	$f^5 \times f^6 = f^{11}$
4	$Arc = \frac{45}{360} \times 3.14 \times 40$ $Arc = \frac{1}{8} \times 40 \times 3.14$ $Arc = 5 \times 3.14$ $Arc = 15.7 \text{ cm}$	10	<p>Volume of the cone is</p> $V = \frac{1}{3} \times \pi \times 6^2 \times 11 = 414.690 \dots$ <p>Volume of the hemisphere is</p> $V = \frac{4}{3} \times \pi \times 6^3 \div 2 = 452.389 \dots$ <p>Volume of the shape is 867 cm^3</p>
5	$\sqrt{50} - \sqrt{2} = \sqrt{25\sqrt{2}} - \sqrt{2}$ $= 5\sqrt{2} - \sqrt{2} = 4\sqrt{2}$	11	$= \frac{(x + 4)(x + 1)}{(x + 4)(x - 4)} = \frac{x + 1}{x - 4}$
6	$90\% = 270$ $10\% = 270 \div 9 = 30$ $100\% = 300$		