Term 1 Revision Booklet

S5/6 National 5

FORMULAE LIST

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

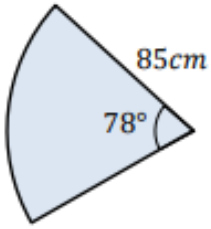
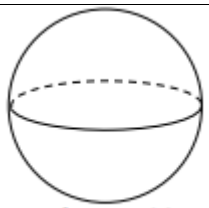
Volume of a cone: $V = \frac{1}{3}\pi r^2 h$

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

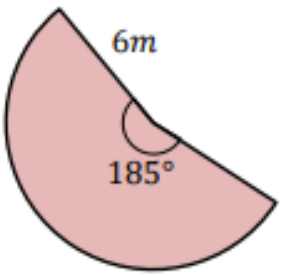
Textbook revision for the September Assessment		
	TJ Nat 5	**Leckie & Leckie Nat 5**
Surds	Pg 171 Q2&7,	Pg 5 Q3&4 Page 6 Q1&2
Indices	Pg 175 Q6, 7 &111	Pg 18 Q2, Pg 19 Q3
Standard Form	Pg 5 Q47	Pg 24 Q2-5
Expanding Brackets	P15 Q3, Pg 16 Q6&7	Pg 32 Q2, Pg 33 Q2
Factorising	P66 Q1, P67 Q2	Pg 37 Q3, Pg 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

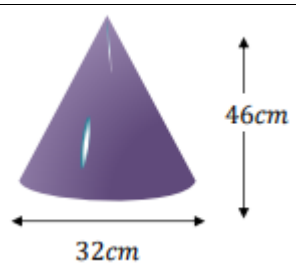
Maths workout revision for the September Assessment https://www.mathsworkout.co.uk/ Login **madras col** password **value28**	
Surds	**Number** Topic 20 • Simplifying a surd • Simplify a Product of Surds 1 • Simplifying a Sum or Difference of Surds 1
Indices	**Number** Topic 19 • Multiplying and Dividing 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	**Algebra** Topic 12 • Expanding Brackets • Factorising Quadratics • The difference of Two Squares • Completing the Square
Numerical Fractions	**Number** Topic 14 • Improper Fractions 1 • Adding and Subtracting Fractions 3 (2 tasks) • Multiplying and Dividing Fractions 2 (2 tasks)
Algebraic Fractions	**Algebra** Topic 13 • A few slides from each of the four tasks
Arcs and Sectors of Circles	**Geometry and Measures** Topic 21 • Calculating Arcs and Calculating Sectors (2 tasks)
Volume of 3D solids	**Geometry and Measures** Topic 15 • Volume of a Cylinder, Cone and Sphere (3 tasks)
Percentage change over time and reverse percentages.	**Ratio, Proportion and Rates of Change** Topic 7 • 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 (b) Write $\sqrt{5}$ in index form. (c) Hence calculate $100^{\frac{1}{2}}$	1 1 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

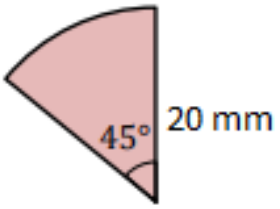
10	The diagram shows a sector of a circle. The radius of the circle is 85 cm and the centre angle is $78°$. Calculate the length of the arc for this sector. 	**3**
11	 Calculate the volume of a sphere with a radius of 22 centimetres Give your answer rounded to the nearest thousand	**3**
	30 marks	

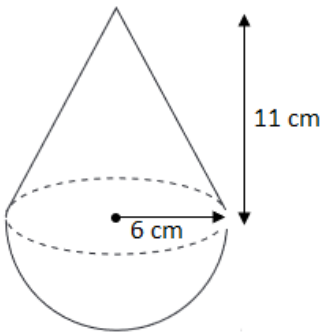
Answers to Revision Paper A			
	Non-Calculator		Calculator
1	$\left(\frac{2}{7}+\frac{5}{6}\right)=\left(\frac{12}{42}+\frac{35}{42}\right)=\frac{47}{42}=1\frac{5}{42}$ $1+1\frac{5}{42}=\mathbf{2\frac{5}{42}}$	7	$984\times 0.9^3=717.336$ $\mathbf{720\ pupils}$
2	$(2x+3)(x-5)$ $=2x^2-10x+3x-15$ $=\mathbf{2x^2-7x-15}$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

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	The population of Dundee is increasing at a steady rate of 1.7% per year. At present the population is $148\,300$. What is the expected population in five years time?	3
8	The diagram shows a sector of a circle. The radius of the circle is 6 metres and the centre angle is $185°$. Calculate the area of this sector. 	3
10	An insect weighs $3.82 \times 10^{-2} grams$. One day it consumes 5 times its weight in food. How much food does it eat? Give your answer in scientific notation.	2

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

Answers to Revision Paper B			
	Non-Calculator		Calculator
1	$1\frac{3}{7}\times\frac{2}{5}=\frac{10}{7}\times\frac{2}{5}=\frac{20}{35}=\mathbf{\frac{4}{7}}$	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	$Area=\frac{185}{360}\times\pi\times 6^2$ $\boldsymbol{Area=\ 58.12\ cm^2}$
3	$(x-2)^2+11-2^2$ $\mathbf{(x-2)^2+7}$	9	$3.82\times10^{-2}\times5=\ 0.191$ $\mathbf{1.91\times10^{-1}\ grams}$
4	$x^2-16=\mathbf{(x+4)(x-4)}$ $2x^2-18=2(x^2-9)$ $=\mathbf{2(x-3)(x+3)}$	10	$V=\frac{1}{3}\times\pi\times16^2\times46=12331.798\ldots$ $\boldsymbol{V=\ 12\,000\ cm^3}$
5	$m^7\times m^3\div m^{-6}$ $=m^{10}\div m^{-6}$ $=\boldsymbol{m^{16}}$	11	$105\%=£924$ $1\%=924\div105=8.8$ $\mathbf{100\%=£880}$
6	$\sqrt{12}\times\sqrt{3}=\sqrt{36}=\mathbf{6}$	12	$\frac{3(x+1)+4x}{x(x+1)}=\mathbf{\frac{7x+3}{x(x+1)}}$

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	The diagram shows a sector of a circle. The radius of the circle is 20 mm and the angle at the centre is $45°$. Without a calculator and using $\pi = 3.14$, find the length of the arc for this sector. 	3
5	Simplify $\sqrt{50} - \sqrt{2}$	2
6	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?	3
C	**S5 Nat 5 September Revision Calculator**	16
7	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**.	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	A shape is made by placing a cone on top of a hemisphere. The hemisphere has a radius of 6 cm. The cone has a radius of 6 cm and a height of 10 cm. Calculate the volume of this shape.  	**4**
12	(a) Factorise (i) $x^2 + 5x + 4$ (ii) $x^2 - 16$ (b) Hence simplify $\frac{x^2+5x+4}{x^2-16}$	**2** **2**
	30 marks	

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