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N5 Exam Study Pack

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Algebra

Answers Included!

For marking schemes, please go to N5 Maths Past Paper link HERE

FORMULAE LIST

The roots of $ax^2 + bx + c = 0$ are $x = \dfrac{-b \pm \sqrt{(b^2 - 4ac)}}{2a}$

Sine rule: $\dfrac{a}{\sin A} = \dfrac{b}{\sin B} = \dfrac{c}{\sin C}$

Cosine rule: $a^2 = b^2 + c^2 - 2bc \cos A$ or $\cos A = \dfrac{b^2 + c^2 - a^2}{2bc}$

Area of a triangle: Area = $\frac{1}{2} ab \sin C$

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

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

Volume of a Pyramid: Volume = $\dfrac{1}{3}Ah$

Standard deviation: $s = \sqrt{\dfrac{\sum(x - \bar{x})^2}{n-1}} = \sqrt{\dfrac{\sum x^2 - (\sum x)^2 / n}{n-1}}$, where n is the sample size.

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Algebra

Source: SQA 2024 N5 Maths P1 Q2	
2. Given that $f(x)=(x+3)^2$, evaluate $f(7)$.	2
Answer: $f(7) = 100$	

Source: SQA 2024 N5 Maths P1 Q3	
3. Expand and simplify $(x+1)(x^2-4x+5)$.	3
Answer: $x^3 - 3x^2 + x + 5$	

Source: SQA 2024 N5 Maths P1 Q7	
7. Solve, algebraically, the system of equations $2p-7r=11$ $3p+2r=4$	3
Answer: $p = 2,\ r = -1$	

Source: SQA 2024 N5 Maths P2 Q4	
4. Solve, algebraically, the inequation $5(x-2)+4<7x+8.$	3
Answer: $x > -7$	

Source: SQA 2024 N5 Maths P2 Q6	
6. (a) Factorise y^2-6y.	1
(b) Hence simplify $\frac{y^2-6y}{y^2-3y-18}$.	2
Answers: (a) $y(y-6)$ (b) $\frac{y}{y+3}$	

Source: SQA 2024 N5 Maths P2 Q9	
9. Change the subject of the formula $f = \frac{2d+3}{e}$ to d.	3
Answer: $d = \frac{ef-3}{2}$	

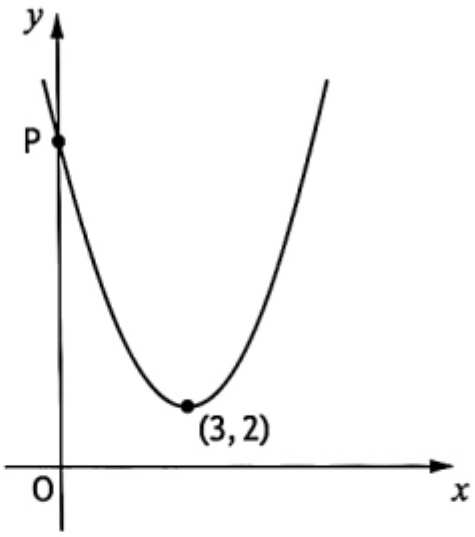
Source: SQA 2024 N5 Maths P2 Q12	
12. Express $\frac{2}{x+5} + \frac{3}{x-4}, \quad x \neq -5, x \neq 4$ as a single fraction in its simplest form.	3
Answer: $\frac{5x+7}{(x+5)(x-4)}$	

Source: SQA 2023 N5 Maths P1 Q2	
2. Expand and simplify $(x+7)^2+6(x^2-10)$.	3
Answer: $7x^2+14x-11$	

Source: SQA 2023 N5 Maths P1 Q3	
3. Solve, algebraically, the system of equations $2x+3y=8$ $5x+2y=-2.$	3
Answer: $x=-2, \quad y=4$	

Source: SQA 2023 N5 Maths P1 Q4

4. The graph below shows part of a parabola of the form $y=(x+a)^2+b$.



(a) (i) State the value of a. 1

(ii) State the value of b. 1

(b) P is the point $(0, c)$.
Find the value of c. 1

Answers:

$(a)\ (i)\ a=-3 \qquad (ii)\ b=2 \qquad (b)\ c=11$

Source: SQA 2023 N5 Maths P1 Q5	
5. Determine the nature of the roots of the function $f(x) = 4x^2 + 6x - 1$.	2
Answer: $Since\ b^2 - 4ac > 0\ there\ are\ two\ real\ and\ distinct\ roots$	

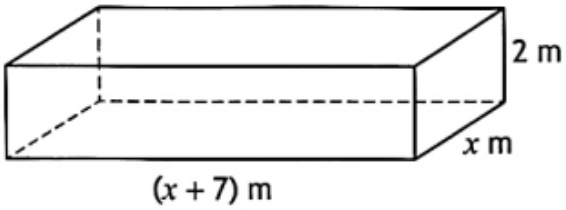
Source: SQA 2023 N5 Maths P1 Q12	
12. Simplify $\frac{5c^{-2}}{c^3 \times c^4}$. Give your answer with a **positive** power.	3
Answer: $\frac{5}{c^9}$	

Source: SQA 2023 N5 Maths P1 Q14	
14. Solve, algebraically, the inequation $\frac{x+1}{3}-2>\frac{3x}{5}$.	3
Answer: $x<-\frac{25}{4}$	

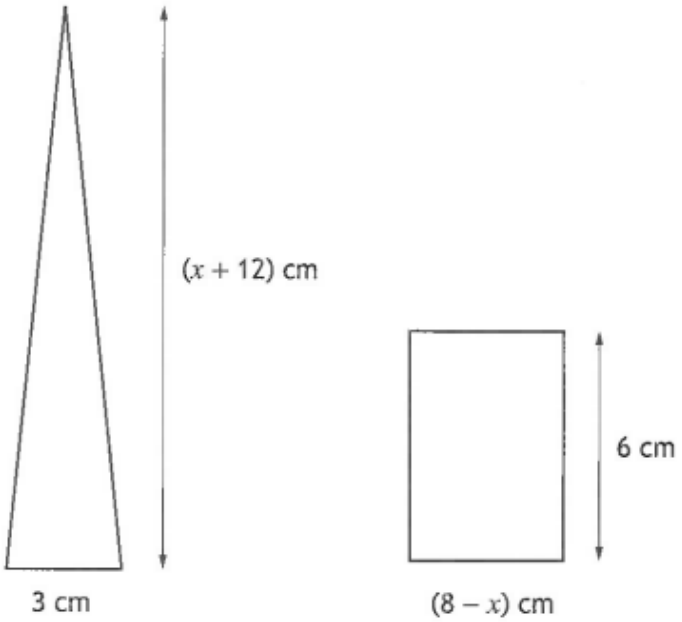
Source: SQA 2023 N5 Maths P2 Q7	
7. Change the subject of the formula $P=\frac{1}{3}mn-r$ to m.	3
Answer: $m=\frac{3(P+r)}{n}$	

Source: SQA 2023 N5 Maths P2 Q10	
10. Express $\frac{7}{x-3}-\frac{2}{x}, \quad x \neq 3, x \neq 0$ as a single fraction in its simplest form.	3
Answer: $\frac{5x+6}{x(x-3)}$	

Source: SQA 2023 N5 Maths P2 Q12	
12. Simplify $\frac{x^2-16}{x^2+x-20}$.	3
Answer: $\frac{x+4}{x+5}$	

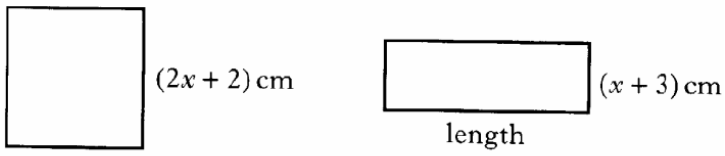
Source: SQA 2023 N5 Maths P2 Q14	
14. A storage unit, built in the shape of a cuboid, is shown.  It has length $(x+7)$ metres, breadth x metres and height 2 metres. The volume of this unit is 45 cubic metres. (a) Show that $2x^2+14x-45=0$.	2
(b) Calculate x, the breadth of the storage unit. Give your answer correct to 1 decimal place.	4
Answers: $(a)\ As\ per\ proof \quad (b)\ x = 2.4\ m$	

Source: SQA 2022 N5 Maths P1 Q12	
Express $\frac{4}{x+2} \div \frac{5}{(x+2)^2}$, $x \neq -2$ as a single fraction in its simplest form.	2
Answer: $\frac{4x+8}{5}$	

Source: SQA 2022 N5 Maths P1 Q15	
 (a) Find an expression for the area of the triangle. (b) Given that the area of the triangle is equal to the area of the rectangle, find algebraically the value of x.	1 4
Answers: (a) $\frac{3x+36}{2}$ (b) $x = 4cm$	

Source: SQA 2022 N5 Maths P2 Q1	
Expand and simplify $(3x-2)(2x^2+5x-1)$.	3
Answer: $6x^3 + 11x^2 - 13x + 2$	

Source: SQA 2022 N5 Maths P2 Q12	
Simplify $\frac{2ab+6a}{b^2-9}$.	3
Answer: $\frac{2a}{b-3}$	

2019 P1	**3.** Expand and simplify $(x+5)(2x^2-7x-3)$.	3
Ans	$2x^3+3x^2-38x-15$	
2018 P1	**2.** Expand and simplify $(3x+1)(x-1)+2(x^2-5)$.	3
Ans	$5x^2-2x-11$	
2014 P1	**2.** Multiply out the brackets and collect like terms: $(2x-5)(3x+1)$.	2
Ans	$6x^2-13x-5$	
2015 P1	**4.** Multiply out the brackets and collect like terms $(x-4)(x^2+x-2)$.	3
Ans	x^3-3x^2-6x+8	
2017 P1	**4.** Expand and simplify $(2x+3)(x^2-4x+1)$.	3
Ans	$2x^3-5x^2-10x+3$	
PP A P1	12. The square and rectangle shown below have the same perimeter.  Show that the length of the rectangle is $(3x+1)$ centimetres.	2
Ans	P(rectangle) = P(square) $2l+2(x+3)=4(2x+2)$ $l+x+3=2(2x+2)$ $l=4x+4-x-3$ $l=3x+1$ as required	
PP A P1	**3.** Multiply out the brackets and collect like terms. $(x+4)(2x^2+3x-1)$	3
Ans	$2x^3+11x^2+11x-4$	

PP B P1	9. Multiply out the brackets and collect like terms. $(x-3)(x^2+4x-1)$	3
Ans	$x^3+x^2-13x+3$	
PP C P1	3. Simplify $3(2x-4)-4(3x+1)$	3
Ans	$-6x-16$	
PP E P1	2. Multiply out the brackets and collect like terms. $(4x+2)(x-5)+3x$	3
Ans	$4x^2-15x-10$	
2016 P2	4. Factorise fully $3x^2-48$.	2
Ans	$3(x+4)(x-4)$	
2017 P2	9. (a) Factorise $4x^2-25$. (b) Hence simplify $\frac{4x^2-25}{2x^2-x-10}$.	1 3
Ans	(a) $(2x+5)(2x-5)$ (b) $\frac{2x+5}{x+2}$	
PP A P1	2. Factorise $x^2+2x-15$.	2
Ans	$(x+5)(x-3)$	
PP B P1	6. (a) Factorise p^2-4q^2. (b) Hence simplify $\frac{p^2-4q^2}{3p+6q}$.	1 2
Ans	6a. $(p+2q)(p-2q)$ b. $\frac{p-2q}{3}$	
PP C P1	5. Solve, by factorising $7+6x-x^2=0$.	3
Ans	$x=7, x=-1$	

PP F P1	2. (a) Factorise $4x^2 - y^2$. (b) Hence simplify $\frac{4x^2 - y^2}{6x + 3y}$.	1 2
Ans	(a) $(2x + y)(2x - y)$ (b) $\frac{2x-y}{3}$	