

N5 EXPRESSIONS & FORMULAE 1.3

This resource is to support pupils in passing the appropriate National 5 Assessment Standard. The questions and marking schemes used are from SQA past papers and as such test the topics in their entirety from grade A to C and *may* include other areas from the course.

In addition the questions from **Paper 1 (P1)** should be completed **without** the use of a calculator and questions from **Paper 2 (P2)** permit the use of a calculator.

Each Assessment Standard is used to ensure pupils have the minimum competency on the specified sub-skills for the National 5 course. As such each Assessment Standard will test grade C work on that specific topic.

This resource is divided into two sections:

- Section A has an example on each sub skill for the relevant Assessment Standard and the marking scheme for these questions
- Section B has extra practice questions on this Assessment Standard and the marking scheme for these questions

<u>Unit Assessment Standard</u>	<u>Sub skills</u>	Section A – Question Number
Expressions & Formulae 1.3	reducing an algebraic fraction to its simplest form	Q1
Applying algebraic skills to algebraic fractions	applying one of the four operations to algebraic fractions	Q2 (adding) Q3 (subtracting) Q4 (multiplying) Q5 (dividing)

FORMULAE LIST

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

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

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

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

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: $V = \frac{1}{3}Ah$

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

Section A

Section A

Q		Marks
1 P1	<p>Write, $\frac{(2y+1)^2(3p-4)^3}{(3p-4)(2y-1)}$ in its simplest form</p> <p>when $p \neq \frac{4}{3}$ and $y \neq \frac{1}{2}$</p>	1
2 P1	<p>5. Express as a single fraction in its simplest form</p> $\frac{1}{p} + \frac{2}{(p+5)}$	2
3 P2	<p>9. Express $\frac{7}{x+5} - \frac{3}{x}$,</p> <p>when $x \neq -5$, $x \neq 0$, as a single fraction in its simplest form.</p>	3
4 P1	<p>Write as a single fraction:</p> $\frac{3q}{2p} \times \frac{6t}{10p}$	2
5 P1	<p>Write as a single fraction:</p> $\frac{3q}{2p} \div \frac{6t}{10p}$	2

Section A

MARKING

SCHEME

<u>Section A - Marking Scheme</u>													
1	<ul style="list-style-type: none"> Reduce to simplest form $\frac{(2y+1)^2(3p-4)^2}{(2y-1)}$ 												
2	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center; vertical-align: top; width: 10%;">5</td> <td style="padding: 5px;"> <p>Ans: $\frac{3p+5}{p(p+5)}$</p> <ul style="list-style-type: none"> common denominator simplified numerator </td> <td style="padding: 5px;"> <ul style="list-style-type: none"> $\frac{\dots}{p(p+5)}$ or $\frac{\dots}{p^2+5p}$ $\frac{3p+5}{\dots}$ </td> <td style="text-align: right; vertical-align: bottom;">2KU</td> </tr> <tr> <td colspan="4" style="padding: 5px;"> <p>Notes:</p> <p>(i) for wrong simplification beyond the correct answer award $\frac{1}{2}$</p> </td> </tr> </table>	5	<p>Ans: $\frac{3p+5}{p(p+5)}$</p> <ul style="list-style-type: none"> common denominator simplified numerator 	<ul style="list-style-type: none"> $\frac{\dots}{p(p+5)}$ or $\frac{\dots}{p^2+5p}$ $\frac{3p+5}{\dots}$ 	2KU	<p>Notes:</p> <p>(i) for wrong simplification beyond the correct answer award $\frac{1}{2}$</p>							
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4	<ul style="list-style-type: none"> Multiply numerators and denominators $\frac{3q \times 6t}{2p \times 10p}$ Correct answer $\frac{18qt}{20p^2} = \left(\frac{9qt}{10p^2} \right)$ 												

5	<ul style="list-style-type: none"><li data-bbox="215 257 821 324">• Multiply by inversion of fraction<li data-bbox="215 403 542 459">• Correct answer	
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$$\times \frac{10p}{6t}$$

$$\frac{30pq}{12pt} = \left(\frac{5q}{6t} \right)$$

Section B

Section B

Paper 1 Questions

Q		Marks
1	<p>13. A new fraction is obtained by adding x to the numerator and denominator of the fraction $\frac{17}{24}$.</p> <p>This new fraction is equivalent to $\frac{2}{3}$.</p> <p>Calculate the value of x.</p>	3 (2.1)

No Paper 2 Questions

Section B

MARKING

SCHEME

Section B – Marking Scheme

Marking Scheme

Paper 1

Q				Marks
1	13	<p><u>algebraic method</u></p> <p>Ans: $x = -3$</p> <ul style="list-style-type: none"> • strategy • processing • solution 	<ul style="list-style-type: none"> • $\frac{17+x}{24+x}$ • $\frac{17+x}{24+x} = \frac{2}{3}$ • $x = -3$ <p style="text-align: right;">3RE</p>	