Unit 1

Number and Algebra

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1.2 Algebraic Expressions and Formulae

Answer **all** questions. Show your workings clearly in the space provided.

1. (a) Factorise $4a^2 + 6a + 2$.
   (b) Hence, explain why given any whole number a, $4a^2 + 6a + 2$ is always an even number.

Answer: (a) _____ [1]

(b) _____

_____

_____ [1]

2. Factorise each of the following expressions completely.
   (a) $2p^2 + 6pq - 8q^2$
   (b) $3a^2 - 12b^2 + 8a + 16b$

Answer: (a) _____ [2]

(b) _____ [2]

3. (a) Without the use of calculator, evaluate $\frac{49 \times 5^{299} - 7 \times 5^{300}}{14 \times 5^{298}}$.

(b) Given that $\frac{a+3b}{5a-b} = \frac{3}{7}$, find the value of $\frac{2a}{7b}$.

(c) Make x the subject of the equation $\frac{1}{y} + \frac{1}{x^3} = \frac{3}{5z}$.

Answer: (a) _____ [2]

(b) _____ [2]

(c) _____ [3]

4. (a) Given that $a + b = 5$ and $ab = 8$, find the value of $1 + \frac{2}{a} + \frac{2}{b}$.

(b) Given that $2p^2 - 32q^2 = 92$ and $p - 4q = 4$, find the value of $p^2 + 8q + 16q^2$.

(c) Given that $3x = -2z\sqrt{\frac{y-3}{w+3y}}$, express y in terms of x, z and w.

Answer: (a) _____ [2]

(b) _____ [3]

(c) _____ [3]