

Topical Revision Paper 1

Term 1 Unit 1 Advanced Algebraic Manipulation

Question 1:

Given that $x^2 - 4x = y^2 - 4y$ and that $x \neq y$, find the value of $3\sqrt{x+y}$. [3]

Answer: 6

Question 2:

Simplify into a single fraction $\frac{x^3 + 8y^3}{x^2 - 4y^2} - \frac{16xy^2 - 4x^3}{(4y - 2x)^2}$. [4]

Answer: $\frac{2x^2 + 4y^2}{x - 2y}$

Question 3:

(a) Factorise completely $2a^3 + 6a^2b - 8ab^2 - 24b^3$. [3]

(b) Make q the subject of the formula $pq = \sqrt{4q^2 - 9p^2}$. [3]

Answer:

(a) $2(a - 2b)(a + 2b)(a + 3b)$ (b) $q = \pm \frac{3p}{\sqrt{4 - p^2}}$

Question 4:

(a) It is given that $R = \frac{1}{\sqrt{1 - \frac{v^2}{c^2}}}$.

(i) Find the value of R when $v = \sqrt{5}$ and $c = 3$. [1]

(ii) Express v in terms of R and c . [3]

(b) Factorise completely $x^4 - x^2 + 14xy - 49y^2$. [3]

Answer:

(a) $\frac{3}{2}$ (b) $v = \pm \frac{c}{R} \sqrt{R^2 - 1}$ (c) $(x^2 - x + 7y)(x^2 + x - 7y)$

Question 5:

(a) Given that $4a - 3b = a + 2b$, find the value of $\frac{2ab}{a^2 + 2b^2}$. [3]

(b) Solve for x and y if $\sqrt{x} - 3y^3 - 1 = 2\sqrt{x} - 5y^3 - 3 = 0$. [4]

Answer:

(a) $\frac{30}{43}$ (b) $x = 16, y = 1$