

TY Hons Maths – Homework No. 5

1. Simplify the following two algebraic expressions:

(i) $\frac{3x^2 - 16x + 5}{x^2 - 6x + 5}$

(ii) $\frac{1 - \frac{3}{2x}}{2 + \frac{4}{x}}$

2. Simplify $(\sqrt{x} - \sqrt{y})(\sqrt{x} + \sqrt{y})$

3. Simplify $(\sqrt{5} - 3)(\sqrt{5} + 3)$

4. Solve the following systems of simultaneous equations: $\begin{cases} x^2 - y^2 = 24 \\ x - 2y = 3 \end{cases}$

5.

The volume of a closed cardboard box is 36 cm^3 .
The length of the box is three times its width.
The width of the box is $x \text{ cm}$.



(i) Show that the total surface area of the box is $(6x^2 + \frac{96}{x}) \text{ cm}^2$.

6. Write down a quadratic whose roots are $\frac{1}{4}$ and $\frac{1}{2}$.

Express your answer in the form $ax^2 + bx + c = 0$ where $a, b, c \in \mathbb{Z}$.

7. Find the real numbers a and b such that $x^2 + 8x + 7 = (x + a)^2 + b$

8. Show that $\frac{x^3 - y^3}{x - y} = (x + y)^2 - xy$