

Topic X1: Indices, surds and quadratics (Post-TT A) [43]

1.

(i) Express $\sqrt{300} - \sqrt{48}$ in the form $k\sqrt{3}$, where k is an integer. [3]

(ii) Express $\frac{15 + \sqrt{40}}{\sqrt{5}}$ in the form $a\sqrt{5} + b\sqrt{2}$, where a and b are integers. [3]

2.

Solve the equations

(i) $10^p = 0.1$, [1]

(ii) $(25k^2)^{\frac{1}{3}} = 15$, [3]

(iii) $t^{-\frac{1}{3}} = \frac{1}{2}$. [2]

3.

Express $x^2 - 12x + 1$ in the form $(x - p)^2 + q$. [3]

4.

Solve the inequalities

(i) $-9 \leq 6x + 5 \leq 0$, [3]

(ii) $6x + 5 < x^2 + 2x - 7$. [5]

5.

Solve the equation $2x - 7x^{\frac{1}{2}} + 3 = 0$. [5]

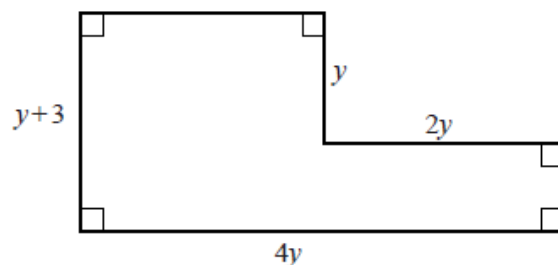
6.

The quadratic equation $kx^2 - 30x + 25k = 0$ has equal roots. Find the possible values of k . [4]

7.

(i) A rectangular tile has length $4x$ cm and width $(x + 3)$ cm. The area of the rectangle is less than 112 cm². By writing down and solving an inequality, determine the set of possible values of x . [6]

(ii) A second rectangular tile of length $4y$ cm and width $(y + 3)$ cm has a rectangle of length $2y$ cm and width y cm removed from one corner as shown in the diagram.



Given that the perimeter of this tile is between 20 cm and 54 cm, determine the set of possible values of y . [5]