



$$\begin{aligned}
 \text{iii)} & \quad (4x^2 - 9x + 2) (7x^2 - 13x - 2) (28x^2 - 3x - 1) \\
 & = \underline{(x-2)} \underline{(4x-1)} \underline{(x-2)} \underline{(7x+1)} \underline{(4x-1)} \underline{(7x+1)} \\
 & = (x-2) (4x-1) (7x+1)
 \end{aligned}$$

$$\begin{array}{r}
 \text{A} \quad \text{M} \\
 9 \quad + 8 \\
 \hline
 -8-1 \quad -8x-1 \\
 \end{array}$$

$$\begin{array}{r}
 -8 \\
 4 \quad -2 \\
 \hline
 -1 \\
 4
 \end{array}$$

$$\begin{array}{r}
 4x^2 - 8x - 1x + 2 \\
 4x(x-2) - 1(x-2)
 \end{array}$$

square root of

$$\text{iv.) } \left(2x^2 + \frac{17}{6}x + 1\right) \left(\frac{3}{2}x^2 + 4x + 2\right) \left(\frac{4}{3}x^2 + \frac{11}{3}x + 2\right)$$

$$= \sqrt{\left(\frac{12x^2 + 17x + 6}{6}\right) \times \left(\frac{3x^2 + 8x + 4}{2}\right) \left(\frac{4x^2 + 11x + 6}{3}\right)}$$

$$= \sqrt{\frac{1}{36} (12x^2 + 17x + 6) (3x^2 + 8x + 4) (4x^2 + 11x + 6)}$$

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$$= \sqrt{\frac{1}{36} \underbrace{(3x+2)}_{\text{blue}} \underbrace{(4x+3)}_{\text{red}} \underbrace{(x+2)}_{\text{yellow}} \underbrace{(3x+2)}_{\text{blue}} \underbrace{(4x+3)}_{\text{red}} \underbrace{(x+2)}_{\text{yellow}}}} = \frac{1}{6} (3x+2) (4x+3) (x+2)$$

Example 3.20

$$i) \sqrt{16x^2 + 9y^2 - 24xy + 24x - 18y + 9}$$

$$\sqrt{16x^2 + 9y^2 + 9 - \underline{24xy} + \underline{24x} - \underline{18y}}$$

$a^2 + b^2 + c^2 + 2ab + 2bc + 2ac = (a + b + c)^2$

$$\sqrt{(4x)^2 + (-3y)^2 + (3) + (2 \times 4x \times -3y) + (2x - 3y \times 3) + (2 \times 4x \times 3)}$$

$$\sqrt{(4x + (-3y) + 3)^2} = \sqrt{(4x - 3y + 3)^2} = (4x - 3y + 3)$$

square root of

$$\text{iii) } \left(\sqrt{15}x^2 + (\sqrt{3} + \sqrt{10})x + \sqrt{2} \right) \left(\sqrt{5}x^2 + (2\sqrt{5} + 1)x + 2 \right) \left(\sqrt{3}x^2 + (\sqrt{2} + 2\sqrt{3})x + 2\sqrt{2} \right)$$

↓ factorize

$$\sqrt{15}x^2 + \sqrt{3}x + \sqrt{10}x + \sqrt{2}$$

$$\sqrt{3}x(\sqrt{5}x + 1) + \sqrt{2}(\sqrt{5}x + 1)$$

$$(\sqrt{3}x + \sqrt{2})(\sqrt{5}x + 1)$$

↓ factorize

$$\sqrt{5}x^2 + 2\sqrt{5}x + 1x + 2$$

$$\sqrt{5}x(x+2) + 1(x+2)$$

$$(\sqrt{5}x + 1)(x+2)$$

↓ factorize

$$\sqrt{3}x^2 + \sqrt{2}x + 2\sqrt{3}x + 2\sqrt{2}$$

$$x(\sqrt{3}x + \sqrt{2}) + 2(\sqrt{3}x + \sqrt{2})$$

$$(x+2)(\sqrt{3}x + \sqrt{2})$$

$$= \sqrt{(\sqrt{3}x + \sqrt{2})(\sqrt{5}x + 1)(\sqrt{5}x + 1)(x+2)(x+2)(\sqrt{3}x + \sqrt{2})}$$

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$$= (\sqrt{3}x + \sqrt{2})(\sqrt{5}x + 1)(x+2)$$