Expanding Trinomials

1. $(x+2)(x+3)(x+4)$
2. $(x+1)(x+4)(x+5)$
3. $(x-1)(x+2)(2x+3)$
4. $(2x-1)(x-3)(x+2)$
5. $(x-3)(x-3)(x-3)$

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1. $(x+2)(x+3)(x+4)$

$$= [x^2+2x+3x+6](x+4)$$

$$= [x^2+5x+6](x+4)$$

$$= x^3+5x^2+6x$$
$$\quad +4x^2+20x+24$$

$$= x^3+9x^2+26x+24$$

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2. $(x+1)(x+4)(x+5)$

$$= [x^2+x+4x+4](x+5)$$

$$= [x^2+5x+4](x+5)$$

$$= x^3+5x^2+4x$$
$$\quad +5x^2+25x+20$$

$$= x^3+10x^2+29x+20$$

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3. $(x-1)(x+2)(2x+3)$

$= [x^2 - x + 2x - 2](2x+3)$

$= [x^2 + x - 2](2x+3)$

$$\begin{array}{l} = \quad 2x^3 + 2x^2 - 4x \\ \qquad\quad + 3x^2 + 3x - 6 \\ \hline = \quad 2x^3 + 5x^2 - x - 6 \end{array}$$

4. $(2x-1)(x-3)(x+2)$

$= [2x^2 - x - 6x + 3](x+2)$

$= [2x^2 - 7x + 3](x+2)$

$$\begin{array}{l} = \quad 2x^3 - 7x^2 + 3x \\ \qquad\quad + 4x^2 - 14x + 6 \\ \hline = \quad 2x^3 - 3x^2 - 11x + 6 \end{array}$$

5. $(x-3)(x-3)(x-3)$

$= [x^2 - 3x - 3x + 9](x-3)$

$= [x^2 - 6x + 9](x-3)$

$$\begin{array}{l} = \quad x^3 - 6x^2 + 9x \\ \qquad\quad - 3x^2 + 18x - 27 \\ \hline = \quad x^3 - 9x^2 + 27x - 27 \end{array}$$