Example: $\left(-2a^3-10+16a+39a^2-15a^4\right)\div\left(2-4a-5a^2\right)$

$$
\begin{array}{r}
3a^2-2a-5 \\
-5a^2-4a+2\overline{\smash{\big)}\,-15a^4-2a^3+39a^2+16a-10} \\
-\left(-15a^4-12a^3+6a^2\right) \\
\hline
10a^3+33a^2+16a \\
-\left(10a^3+8a^2-4a\right) \\
\hline
25a^2+20a-10 \\
-\left(25a^2+20a-10\right) \\
\hline
0
\end{array}
$$

The area of a rectangle is given as $\underbrace{x^3+4x^2-3x-12}_{\text{Area}}$.

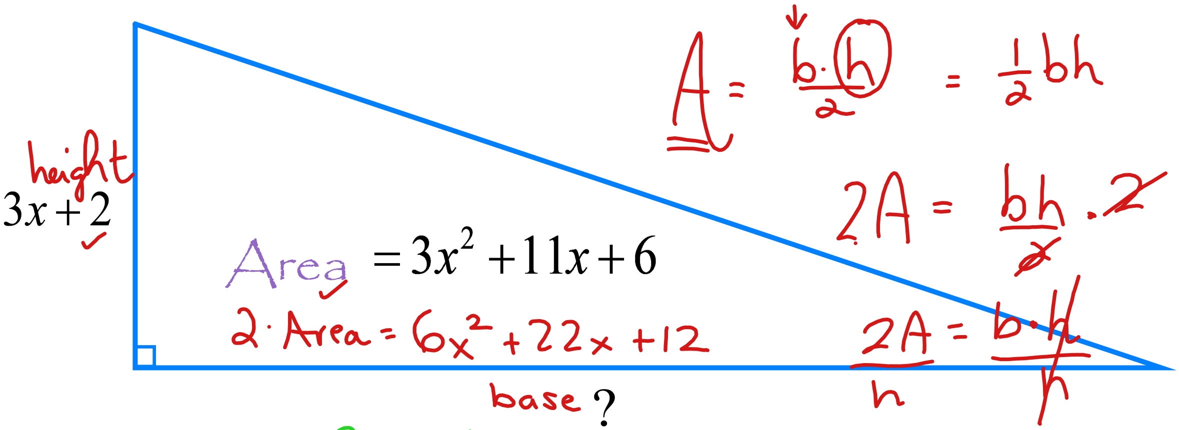
If the width is $\underbrace{x+4}_{\text{width}}$, determine the expression that represents the length.

$$\boxed{A = L \times W}$$

$\therefore A \div W = L$

$$\begin{array}{r|l} & x^2 - 3 \\ \hline x+4 & x^3+4x^2-3x-12 \\ & -(x^3+4x^2) \\ \hline & \quad -3x-12 \\ & -(-3x-12) \\ \hline & \quad 0 \end{array}$$

Ans: Length is (x^2-3)



$2 \cdot \text{Area} = 6x^2 + 22x + 12$

$A = \frac{b \cdot h}{2} = \frac{1}{2} bh$

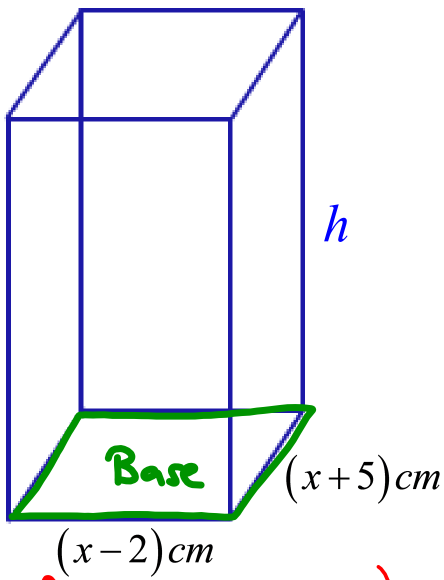
$2A = \frac{bh}{\cancel{2}} \cdot \cancel{2}$

$\frac{2A}{h} = \frac{b \cdot \cancel{h}}{\cancel{h}}$

$\frac{\boxed{2A}}{h} = b$

$$
\begin{array}{r}
2x + 6 \\
3x+2 \overline{) \, 6x^2 + 22x + 12} \\
-(6x^2 + 4x) \qquad \\
\hline
18x + 12 \\
-(18x + 12) \\
\hline
0
\end{array}
$$

Base is $(2x+6)$



The volume of this prism is $(x^3+10x^2+11x-70)cm^3$. What expression could represent its height?

✓ calculate

$$V = A_b \cdot h$$

$$A_b = L \cdot W$$

$$h = \frac{V}{A_b}$$

$$A_b = (x-2)(x+5)$$
$$= x^2 + 5x - 2x - 10$$
$$= x^2 + 3x - 10$$

$$h = x^2+3x-10 \overline{\smash{)}\, x^3+10x^2+11x-70}$$

$$h = \begin{array}{r} x + 7 \\ x^2 + 3x - 10 \overline{\big) x^3 + 10x^2 + 11x - 70} \\ -\left(x^3 + 3x^2 - 10x\right) \\ \hline 7x^2 + 21x - 70 \\ -\left(7x^2 + 21x - 70\right) \\ \hline 0 \end{array}$$

height is $(x+7)$ cm.