


20. If $(x + 2)$ and $(x - 3)$ are both factors of $2x^3 + ax^2 - 17x + b$, find the values of a and b .

Hence find the third factor.

Remember...
If $(x - a)$ is a factor
 $f(a) = 0$



$$f(-2) = 2(-2)^3 + a(-2)^2 - 17(-2) + b = 0$$

$$-16 + 4a + 34 + b = 0$$

$$4a + b = -18$$

$$f(3) = 2(3)^3 + a(3)^2 - 17(3) + b = 0$$

$$54 + 9a - 51 + b = 0$$

$$9a + b = -3$$

$$9a + b = -3$$

$$-4a - b = 18$$

$$5a = 15$$

$a = 3$

$$4(3) + b = -18$$

$$12 + b = -18$$

$b = -30$

$$2x^3 + 3x^2 - 17x - 30$$

multiply given factors : $(x+2)(x-3) = x^2 - 3x + 2x - 6 = x^2 - x - 6$

divide $x^2 - x - 6 \overline{) 2x^3 + 3x^2 - 17x - 30}$

$$\begin{array}{r} 2x + 5 \\ \underline{2x^3 + 2x^2 + 12x} \\ 5x^2 - 5x - 30 \\ \underline{5x^2 + 5x + 30} \\ 0 \end{array}$$

other factor is
 $(2x + 5)$

or just divide by $x+2$ or $x-3$

$$x+2 \overline{) 2x^3 + 3x^2 - 17x - 30}$$