

Using Factor Theorem

① Sub in Roots to get 2 equations

② Solve

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.

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

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

$$4a + b = -18$$

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

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

$$9a + b = -3$$

$$\begin{array}{r} 9a + b = -3 \\ -4a - b = 18 \\ \hline 5a = 15 \\ a = 3 \end{array}$$

$$\begin{array}{r} 4a + b = -18 \\ 4(3) + b = -18 \\ 12 + b = -18 \\ b = -30 \end{array}$$

$$f(x) = 2x^3 + 3x^2 - 17x - 30$$

① Find quadratic factor by multiplying 2 linear factors

② Divide

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.

$$f(x) = 2x^3 + 3x^2 - 17x - 30$$

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

$$= x^2 - x - 6$$

$$\begin{array}{r} 2x + 5 \\ x^2 - x - 6 \overline{) 2x^3 + 3x^2 - 17x - 30} \\ \underline{+ 2x^3 + 2x^2 + 12x} \\ 5x^2 - 5x - 30 \\ \underline{+ 5x^2 + 5x + 30} \\ 0 \end{array}$$

other factor: $(2x + 5)$