

Synthetic Division

Determine the quotient

$$\begin{array}{r} 2x^2 + 11x - 6 \\ x - 6 \overline{) 2x^3 - x^2 - 72x + 36} \\ \underline{-2x^2 - 12x^2} \\ 11x^2 - 72x \\ \underline{-11x^2 - 66x} \\ -6x + 36 \\ \underline{-6x + 36} \\ 0 \end{array}$$

Using Synthetic Division

$$\begin{array}{r|rrrr}
 x-6 & 2x^3 & -x^2 & -72x & +36 \\
 \hline
 x=6 \rightarrow 6 & 2 & -1 & -72 & +36 \\
 + & \downarrow & \nearrow 12 & \nearrow 66 & \nearrow -36 \\
 \hline
 & 2x^2 & 11x & -6 & \boxed{OR}
 \end{array}$$

$$\begin{aligned}
 \therefore 2x^3 - x^2 - 72x + 36 \\
 = (x-6)(2x^2 + 11x - 6)
 \end{aligned}$$

$$2x - 1 \overline{) 2x^3 - x^2 - 72x + 36}$$

Zero

$$x = \frac{1}{2}$$

$\frac{1}{2}$	2	-1	-72	36
+	↓		0	-36
	2	0	-72	0

* when $a \neq 1$ in your divisor $(ax-b)$ the quotient needs to be divided by a

\therefore the factor $\frac{2x^2}{2} + \frac{0x}{2} - \frac{72}{2}$ is really $x^2 - 36$

$$\therefore 2x^3 - x^2 - 72x + 36$$

$$= (2x-1)(x^2 - 36)$$

$$= (2x-1)(x+6)(x-6)$$

$$x-1 \overline{) x^3 + 2x^2 - x - 2}$$

x^3	x^2	x	#
●	● ●	○	○ ○
	○ ●	○ ○	○ ●
		○ ○	○ ●

x	#
●	○

1 3 2

$$x^2 + 3x + 2$$

17 a) Factor

$$2x^5 + 3x^4 - 10x^3 - 15x^2 + 8x + 12$$

$f(1) = 0 \therefore x-1$ is a factor

1	2	3	-10	-15	8	12
+	↓	2	5	-5	-20	-12
	2	5	-5	-20	-12	0

$2x^4 + 5x^3 - 5x^2 - 20x - 12$

Complete
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Using Synthetic Division