

Synthetic Division

1) $(x^3 + 2x^2 - x - 2) \div (x - 1)$

1	1	2	-1	-2
↓	↓	1	3	2
	1	3	2	0

↑ Remainder

Answer: $\boxed{1x^2 + 3x + 2}$

① Make sure that the polynomial is in standard form

② Make sure there is no missing terms!

2) $(5z + z^2 + 6) \div (z + 3)$

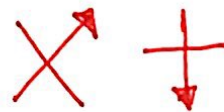
$z^2 + 5z + 6$ ✓

-3	1	5	6
↓	↓	-3	-6
	1	2	0

↑ Remainder

$$\begin{array}{r} z + 3 = 0 \\ -3 \quad -3 \\ \hline z = -3 \end{array}$$

Answer: $\boxed{1z + 2}$



$$3) (2v^3 - 20v^2 + 56v - 46) \div (v-6)$$

$$6 \begin{array}{r|rrrr} & 2 & -20 & 56 & -46 \\ & \downarrow & & & \\ \hline & 2 & -8 & 8 & 2 \end{array}$$

↑ Remainder

$$\begin{array}{r} v-6=0 \\ +6 \quad +6 \\ \hline v=6 \end{array}$$

Answer: $\boxed{2v^2 - 8v + 8 + \frac{2}{v-6}}$

$$4) (4x^3 - 2x + 3) \div (x+1)$$

$$4x^3 + 0x^2 - 2x + 3$$

↑ missing term has a coefficient of 0

$$-1 \begin{array}{r|rrrr} & 4 & 0 & -2 & 3 \\ & \downarrow & & & \\ \hline & 4 & -4 & 2 & 1 \end{array}$$

↑ Remainder

$$\begin{array}{r} x+1=0 \\ -1 \quad -1 \\ \hline x=-1 \end{array}$$

Answer: $\boxed{4x^2 - 4x + 2 + \frac{1}{x+1}}$

Remainder Theorem

$$1) (4x^3 - 2x + 3) \div (x+1)$$

$$\begin{aligned} f(-1) &= 4(-1)^3 - 2(-1) + 3 \\ &= \boxed{1} \end{aligned}$$

$$\begin{array}{r} x+1=0 \\ -1 \quad -1 \\ \hline x=-1 \end{array}$$

$(x+1)$ is not a factor since the remainder isn't 0!

2) Is $(x-1)$ a factor of $f(x) = x^3 + 2x^2 - 2x - 1$?

$$\begin{array}{r} x-1 = 0 \\ +1 \quad +1 \\ \hline x = 1 \end{array}$$

$$\begin{aligned} f(1) &= (1)^3 + 2(1)^2 - 2(1) - 1 \\ &= \boxed{0} \end{aligned}$$

Yes! $x-1$ is a factor because we get a remainder of 0.

Turn in class work

Homework is Page 4.2!