The method: The remainder theorem

P(c) is the remainder when P(x) is divided by x − c.

$P(x) = x^2 - 6x + 2; \quad P(4) = -6$

$$\begin{array}{r|rrr} 4 & 1 & -6 & 2 \\ & & 4 & -8 \\ \hline & 1 & -2 & -6 \end{array}$$ synthetic division by x − 4

The remainder is −6, so P(4) = −6. the remainder theorem

$P(4) = (4)^2 - 6(4) + 2 = -6$ check by putting it in

Problems 1 and 2 worked out · Version 0A

$P(x) = 2x^2 - 6x - 5; \quad P(-3) = 31$

$$\begin{array}{r|rrr} -3 & 2 & -6 & -5 \\ & & -6 & 36 \\ \hline & 2 & -12 & 31 \end{array}$$ synthetic division by x + 3

The remainder is 31, so P(−3) = 31. the remainder theorem

$P(-3) = 2(-3)^2 - 6(-3) - 5 = 31$ check by putting it in

$P(x) = x^3 + 5x^2 + 2x + 6; \quad P(3) = 84$

$$\begin{array}{r|rrrr} 3 & 1 & 5 & 2 & 6 \\ & & 3 & 24 & 78 \\ \hline & 1 & 8 & 26 & 84 \end{array}$$ synthetic division by x − 3

The remainder is 84, so P(3) = 84. the remainder theorem

$P(3) = (3)^3 + 5(3)^2 + 2(3) + 6 = 84$ check by putting it in

The remainder theorem · Version 0A

1) 31 2) 84 3) −11 4) 246 5) 6 6) 20 7) −46
8) 74 9) 48 10) −6 11) 93 12) 13 13) −144
14) 12