St Peter the Apostle High School <u>Maths Department</u>



Higher Practice Questions

7. Polynomials



Find the quotient and remainder when each polynomial is divided by the given divisor:

(a)
$$(6x^2 - 23x - 11) \div (x + 2)$$
 (b) $(x^3 + 6x^2 - 3x - 9) \div (x - 5)$

(c)
$$(2x^3+3x^2-9x+10) \div (x+5)$$
 (d) $(x^4-2x^2+5) \div (x-1)$

Find the quotient and remainder when each polynomial is divided by the given divisor:

(a)
$$(4x^2 + 6x - 2) \div (2x - 1)$$
 (b) $(2x^3 + x^2 + 4x + 4) \div (2x - 3)$



- (a) Show that (x + 4) is a factor of $(x^3 + 8x^2 + 11x 20)$ and hence factorise fully
- (b) Show that (x + 1) is a factor of $(2x^3 3x^2 3x + 2)$ and hence factorise fully
- (c) Show that (x 2) is a factor of $(x^3 5x^2 + 2x + 8)$ and hence factorise fully



Factorise fully:

(a) $x^3 - 7x + 6$

- **(b)** $2x^3 + 3x^2 2x 3$
- (c) $2x^3 x^2 13x 6$
- (d) $3x^3 + 8x^2 5x 6$
- (e) $x^4 + 5x^3 + 5x^2 5x 6$
- (f) $2x^4 + 6x^3 + 6x^2 + 2x$



Find the value of \boldsymbol{p} in each polynomial if

(a)
$$(x + 4)$$
 is a factor of $x^3 - 5x^2 - px + 80$

(b)
$$(x-4)$$
 is a factor of $x^3 - 9x^2 + px - 28$

(c)
$$(x + 5)$$
 is a factor of $3x^4 + 15x^3 - px^2 - 9x + 5$



Find the value of ${\pmb p}$ and ${\pmb q}$ in each polynomial if

(a)
$$(x-2)$$
 and $(x-3)$ are factors of $2x^3 + px^2 + qx - 6$

(b)
$$(x-3)$$
 and $(x+5)$ are factors of $2x^3 + px^2 + qx - 15$

(c)
$$(x+2)$$
 and $(x-1)$ are factors of $px^3 + qx + 2$

$$f(x) = 2x^3 + \boldsymbol{a}x^2 + \boldsymbol{b}x + 4$$

Given that (x - 2) is a factor of f(x), and the remainder when f(x) is

divided by (x - 5) is 54, find the values of a and b.



When $x^4 - x^3 + x^2 + ax + b$ is divided by (x - 1), the remainder is 0 When $x^4 - x^3 + x^2 + ax + b$ is divided by (x - 2), the remainder is 11 Find the values of **a** and **b**.



For the polynomial $10x^3 - 27x^2 + ax + b$ the remainder is -45 when the polynomial is divided by (x - 2)

The same polynomial has a remainder of -24 when divided by (x + 1)

Find the values of **a** and **b**.

From each graph find an expression for f(x)













(a) Show that the equation $x^3 + 2x^2 - 5 = 0$ has a root between 1 and 1.5

Calculate the value of this root correct to 2 decimal places.

(b) Show that the equation $x^3 - x^2 - 2x + 1 = 0$ has a root between 1.5 and 2

Calculate the value of this root correct to 2 decimal places.



$$f(x) = x^{3} + 1$$

$$g(x) = 2x + 1$$

$$h(x) = 17 - 11x$$

(a) Find g(f(x))

- (b) Show that the $g(f(x)) + xh(x) 9 = 2x^3 11x^2 + 17x 6$
- (c) (i) Show that x 2 is a factor of $2x^3 11x^2 + 17x 6$ (ii) Factorise $2x^3 - 11x^2 + 17x - 6$

(d) Hence, or otherwise, solve g(f(x)) + xh(x) = 9