

test
polynomials

1) Find the value of $p(-2)$ if $p(x) = 2x^2 - 2x + 1$

Solⁿ
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$$\begin{aligned} p(-2) &= 2(-2)^2 - 2(-2) + 1 \\ &= 8 + 4 + 1 \\ &= \underline{13} \end{aligned}$$



2) Find the remainder obtained on dividing $(8x^3 + 4x^2 + 2x + 1)$ by $(2x + 1)$

$$\text{Zero of } 2x+1 = -\frac{1}{2}$$

$$R = 8\left(-\frac{1}{2}\right)^3 + 4\left(-\frac{1}{2}\right)^2 + 2\left(-\frac{1}{2}\right) + 1$$

$$= -1 + 1 - 1 + 1$$

$$= 0$$

3) Find the value of 'a' if $y^4 - 3y^3 + 4y - 6ay^2 + 1$ leaves remainder 10 when divided by $y + 1$.

put $y = -1$

$$(-1)^4 - 3(-1)^3 + 4(-1) - 6a(-1)^2 + 1 = 10$$

$$\Rightarrow 1 + 3 - 4 - 6a + 1 = 10$$

$$\Rightarrow -6a = 9$$

$$\Rightarrow a = -\frac{3}{2}$$

4) Write the identity you will use to multiply 1002 by 1003.

$$(x+a)(x+b) = x^2 + (a+b)x + ab$$

5) evaluate: $(2x-3y)^2$

$$(2x)^2 - 2(2x)(3y) + (3y)^2$$

$$= 4x^2 - 12xy + 9y^2$$

6) evaluate: $(2x+3y)^2 - (2x-3y)^2$

$$\begin{aligned} & (a+b)^2 - (a-b)^2 \\ &= (a^2 + b^2 + 2ab) - (a^2 + b^2 - 2ab) \\ &= a^2 + b^2 + 2ab - a^2 - b^2 + 2ab \\ &= 2ab + 2ab \\ &= 4ab \\ &= 4(2x)(3y) \\ &= 24xy \end{aligned}$$

7) evaluate: $(2x-1)^3$

$$(2x)^3 - 3(2x)^2(1) + 3(2x)(1)^2 - (1)^3$$
$$= \underline{8x^3 - 12x^2 + 6x - 1}$$

8) evaluate: $30^3 - 20^3 - 10^3$

$$a + b + c = 30 + (-20) + (-10) = 0$$

$$\therefore a^3 + b^3 + c^3 = 3abc$$

$$= 3(30)(-20)(-10)$$

$$= \underline{18000}$$

9) simplify: $\frac{7.83 \times 7.83 - 1.17 \times 1.17}{6.66}$

$$\frac{7.83^2 - 1.17^2}{6.66}$$

$$= \frac{(7.83 + 1.17)(7.83 - 1.17)}{6.66}$$

$$= \frac{(9.00) \cancel{(6.66)}}{\cancel{6.66}}$$

$$= \underline{\underline{9}}$$

10) For what value of k the polynomials $x^5 - 2x^4 + kx^3 - 7x^2 + 2x - 11$ and $5x^3 - 7x^2 + 2x - k$ leave the same remainder when divided by $x - 1$?

$$\text{Zero of } x-1 = 1$$

$$R_1 = P(1) = (1)^5 - 2(1)^4 + k(1)^3 - 7(1)^2 + 2(1) - 11$$

$$= 1 - 2 + k - 7 + 2 - 11$$

$$= k - 17$$

$$R_2 = Q(1) = 5(1)^3 - 7(1)^2 + 2(1) - k = -k$$

$$R_1 = R_2$$

$$k - 17 = -k$$

$$k = \frac{17}{2}$$

11) Factorize: $x^2 + 5x - 6$

$$x^2 + 6x - x - 6$$

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

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

12) Factorize: $a^3 + 27b^3$

$$\begin{aligned} & (a)^3 + (3b)^3 \\ = & (a + 3b) \left[(a)^2 - (a)(3b) + (3b)^2 \right] \\ = & (a + 3b) (a^2 - 3ab + 9b^2) \end{aligned}$$

13) Volume of cube is $x^3 + 2x^2 + \frac{4x}{3} + \frac{8}{27}$. Find length of its side.

$$V = x^3 + 3(x)^2\left(\frac{2}{3}\right) + 3(x)\left(\frac{2}{3}\right)^2 + \left(\frac{2}{3}\right)^3$$

$$\text{side}^3 = \left(x + \frac{2}{3}\right)^3$$

$$\text{side} = \left(x + \frac{2}{3}\right) \text{ units}$$

14) factorise: $x^3 + 6x^2 + 11x + 6$

$$p(x) = x^3 + 6x^2 + 11x + 6$$

$$p(-1) = (-1)^3 + 6(-1)^2 + 11(-1) + 6 \\ = 0$$

$\therefore (x+1)$ is a factor of $p(x)$

$$x^2 + 5x + 6 = (x+2)(x+3)$$

$$p(x) = \underline{(x+1)(x+2)(x+3)}$$

$$\begin{array}{r} x^2 + 5x + 6 \\ x+1 \overline{) x^3 + 6x^2 + 11x + 6} \end{array}$$

$$\underline{\underline{0}}$$

15) Find zero of $3x - 2$.

$$\text{Zero} = \frac{2}{3}$$

16) Is $x + 1$ a factor of $x^4 - x^3 + x^2 - x + 1$?

$$R = (-1)^4 - (-1)^3 + (-1)^2 - (-1) + 1$$

$$= 1 + 1 + 1 + 1 + 1$$


$$= 5 \neq 0$$

$\therefore (x+1)$ is not its factor

17) Write identity: $a^3 + b^3$

$$(a+b)(a^2 - ab + b^2)$$

18) Write identity: $a^3 + b^3 + c^3 - 3abc$

$$(a+b+c)(a^2+b^2+c^2-ab-bc-ca)$$


19) expand: $(-a+b-c)^2$

$$(-a)^2 + (b)^2 + (-c)^2 + 2(-a)(b) + 2(b)(-c) + 2(-c)(-a)$$

$$= a^2 + b^2 + c^2 - 2ab - 2bc + 2ca$$

20) Find the product of $(2x + 3)(2x - 1)$

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

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

4x² + 4x - 3

end