POYNOMIALS 1

1. Work out:

a) $(x^5 - 2x^3 + 3x - 4) + (x^4 - 2x^3 + 3x - 2) =$

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

c) $(2x^4 - x^3 + 5x) - 3 \cdot (x^4 + 2x^2 - 2x - 3) =$

d) $\left(\frac{2}{5}x^3 + \frac{1}{5}x^2 - x + 3\right) - \left(\frac{2}{5}x^3 - \frac{2}{5}x^2 - \frac{1}{5}x - 4\right) =$

e) $-5x^2y \cdot (x^2y - 3xy^2 + 4xy - 2) =$

f) $(x^3 - 5x^2 - 2) \cdot (x^2 + 5) =$

2. Factorise the following expressions:

a) $mn - 4m^2 - 5m =$

b) $5xy^2 + 10xy + 5x =$

c) $12x^3y^4 - 8y^3x^2 =$

d) $x^4 - 25x^2 =$

e) $4x^4 + 4x^3 + x^2 =$

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

g) $x^4 - 12x^2 + 36$

h) $100 - 9a^2 =$

i) $25x^2y - y =$

j) $16a^2b - 9b =$

k) $3a^3 - 27ab^4 =$

SOLUTION

1. Work out:

a) $(x^5-2x^3+3x-4)+(x^4-2x^3+3x-2)=x^5+x^4-4x^3+6x-6$

b) $(x^3-x+2)-(3x^2+2x-3)-(2x^3-x^2+1)=-x^3-2x^2-3x+4$

c) $(2x^4-x^3+5x)-3(x^4+2x^2-2x-3)=2x^4-x^3+5x-3x^4-6x^2+$
$+6x+9=-x^4-x^3-6x^2+11x+9$

d) $\left(\frac{2}{5}x^3+\frac{1}{5}x^2-x+3\right)-\left(\frac{2}{5}x^3-\frac{2}{5}x^2-\frac{1}{5}x-4\right)=\frac{3}{5}x^2-\frac{4}{5}x+7$

e) $-5x^2y.(x^2y-3xy^2+4xy-2)=-5x^4y^2+15x^3y^3-20x^3y^2+10x^2y$

f) $(x^3-5x^2-2)\cdot(x^2+5)=x^5-5x^4-2x^2+5x^3-25x^2-10=$
$=x^5-5x^4+5x^3-27x^2-10$

2. Factorise the following expressions:

a) $mn-4m^2-5m=m(n-4m-5)$

b) $5xy^2+10xy+5x=5x\left(y^2+2y+1\right)=5x(y+1)^2$

c) $12x^3y^4-8y^3x^2=4x^2y^3(3xy-2)$

d) $x^4-25x^2=x^2\left(x^2-25\right)=x^2(x-5)(x+5)$

e) $4x^4+4x^3+x^2=x^2\left(4x^2+4x+1\right)=x^2(2x+1)^2$

f) $x(x-2)+x(x-1)=x(x-2+x-1)=x(2x-3)$

g) $x^4-12x^2+36=\left(x^2+6\right)^2$

h) $100-9a^2=(10-3a)(10+3a)$

i) $25x^2y-y=y\left(25x^2-1\right)=y(5x-1)(5x+1)$

j) $16a^2b-9b=b\left(16a^2-9\right)=b(4a-3)(4a+3)$

k) $3a^3-27ab^4=3a\left(a^2-9b^4\right)=3a\left(a-3b^2\right)\left(a+3b^2\right)$