UNIT 6: ALGEBRA AND POLYNOMIALS

Exercise 1: Write a fifth-degree polynomial in two variables with leading coefficient -7 and constant term 17

Exercise 2:

a) Write a first-degree trinomial in two variables

b) Write a first-degree trinomial in one variable

Exercise 3: Write an eighth-degree binomial in three variables, leading coefficient thirteen and no constant term

Exercise 4: Could you get the same result for two different values of the variable when evaluating a polynomial? Justify your answer.

Exercise 5: Evaluate these polynomials in the given values of the variables:

a) $P(x)=5x^3-2x^2+8x-1$ when a) $x=2$ and b) $x=3$

b) $Q(a,b)=7a^3b+a-5b^2$ when a) $a=1,\ b=-2$ and b) $a=2,\ b=-1$

c) $R(x)=-x^3+3x^2-9$ when a) $x=1$, b) $x=-2$ and c) $x=0$

d) $C(x)=-x^2+4x-1$ when a) $x=-2$, b) $x=5$, c) $x=-3$

Exercise 6: Indicate the values of the variable for which the numerical value of the polynomial $P(x)=x(x-2)(3x-1)$ is zero

Exercise 7: Given the polynomials:

$P(x)=2x^3-5x^2+7x$

$Q(x)=-7x^3+x^2-9x+2$

$R(x)=9x^3-x^2-x-2$

Work out:

a) $P+Q=$ b) $P-Q=$

c) $P-R-Q=$ d) $Q+R=$

Exercise 8: Given the polynomials:

$P(x)=6x^5-5x^4+7x^3-3x+4$

$Q(x)=7x^5+x^4+7x^3-3x+4$

$R(x)=-x^5+x^4-x^3+x^2-x+1$

Work out:

a) $P+Q=$ b) $P+R=$

c) $R-Q=$ d) $P-R+Q=$

Exercise 9: Work out:

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

b) $(5x^2 + 2x - 7)(x^2 - 6x) =$

c) $(x^3y^2 - 7x^2y)(xy - 3y) =$

d) $(2x - 15)(2x + 15) =$

e) $(2xz^3 - 5x^2z)(x - z) =$

f) $x^3(2x^2 - x) - x^2(7x^2 - 2) =$

g) $(7x^3 + 5x)(7x^3 + 5x) =$

h) $(x + 1)^3 =$

i) $(x + 1)^4 =$

Exercise 10: Take out all the common factors:

a) $2x^5 - 5x^4 + 3x^2 + 7x =$

b) $x^7 - 2x^6 + 5x^4 - 8x^3 =$

c) $30v^3w^7 + 9v^8wt - 24v^4w^5 - 3v^2w =$

d) $7x^3y^5 + 14x^2y^6 - 49x^8y^2 =$

e) $-10u^4v^2 + 20u^5v^3z - 5u^3v^2 =$

f) $12(x - 2)^5 + 9(x - 2)^3 + 6(x - 2)^2 + 3(x - 2) =$

Exercise 11: Take out all the common factors:

a) $28x^2yz - 42xy^2z + 56xyz^2 =$

b) $18x^6 - 24x^5 + 12x^4 =$

c) $a^3bc^2 + a^2b^3c^4 + abc^2 =$

d) $45u^4v^2 - 40u^3v^4 - 5u^2v^4 =$

e) $24x^5y^2z^3 - 8x^2yz^3 + 32x^6y^3z^4 + 40x^7y^7z^8 =$

Exercise 12: Expand these expressions using quadratic multiplication formulas:

a) $(x + 3)^2 =$

b) $(t - 8)(t + 8) =$

c) $(5x - 7)^2 =$

d) $(t + 3y)(t - 3y) =$

e) $(7a^5 + b)(7a^5 - b) =$

f) $(au + bv)^2 =$

g) $(4 + 5wy^7)^2 =$

h) $(8x^2 - 1)^2 =$

i) $(11 - 2x^4y^5)(11 + 2x^3y^7) =$

j) $(z^3 - 5z^2)^2 =$

Exercise 13: Expand these expressions using quadratic multiplication formulas:

a) $(x^4 - y^3)^2 =$

b) $(5v^2 - 2w^9)^2 =$

c) $(3x + 5y^3)(3x - 5y^3) =$

d) $(abc - t^5)(abc + t^5) =$

e) $(x^3y^7 - w^5)^2 =$

f) $(4x^2y - 3x^3z^5)^2 =$

Exercise 14: Express using quadratic multiplication formulas:

a) $a^2+10a+25=$

b) $x^4-18x^2+81=$

c) $u^6-4v^6=$

d) $64u^{10}-32u^5v+2v^2=$

e) $x^2-20xy^4+25y^8=$

f) $t^2+12t-36=$

g) $25x^{12}y^8z^4-60x^6y^4z^2a^2b^5+36a^4b^{10}=$

Exercise 15: Factor these expressions taking out common factors and using quadratic multiplication formulas:

a) $3x^4-12x^3+12x^2=$

b) $5x^3+70x^2+245x=$

c) $63x^3y-7xy^3=$

d) $2u^7+4u^4w^2+2uw^4=$

e) $x^{12}y^2-9x^2y^2=$

f) $a^{13}b-4a^7b^2+4ab^3=$

Exercise 16: Prove that the square of any odd number is also an odd number