

**ACTIVITIES: ALGEBRAIC EXPRESSIONS:**

1. Write using algebraic language:

- a) The double of a number plus seven.
- b) The triple of a number minus one.
- b) The double of the sum of a number and three.
- d) The half of the difference between a number and four.
- e) The square of the addition of a number and five.
- f) The cube of the half of a number.
- g) The half of the square of a number.
- h) A number plus its square.
- i) Five times the square of a number.
- j) The half of the difference of a number and five.

2. Calculate the numerical value of the algebraic expression  $2x^2 - 5$  when:

- a)  $x=2$
- b)  $x=0$
- c)  $x=-1$
- d)  $x= \frac{1}{3}$

3. Calculate the numerical value of the algebraic expression  $2a + 3b^2 - 5$  when:

- a)  $a=2, b=-1$
- b)  $a=-1, b=2$

4. Calculate:

- a)  $x^4 + x^3 - x^2 + x^4 - x^3 - x^2$
- b)  $3x^3 - (5x^3 + 7x^3)$
- c)  $9x^2 - (x^2 - 3x^2)$
- d)  $9xy^2 - 5xy^2 + 7xy^2 - xy^2$

5. Calculate:

- a)  $x^2 \cdot 3x$
- b)  $5x^2 \cdot 2x^3 \cdot x$
- c)  $(10x^5 \cdot 4x) : (5x^2)$
- d)  $(7x^3 \cdot 6x^4) : (3x^5)$

6. Calculate:

- a)  $15x \cdot 2x^2 : x + 20x \cdot x^3 : 4x^2$
- b)  $2x^2 \cdot 2 \cdot 3x^3 - 5x^4 \cdot 4x^2 : 2x$
- c)  $(-16xy^2 + 2xy^2) : (3xy + 4xy)$
- d)  $(3x + 8x - 7x) \cdot (2x^2 + 5x^2 - 6x^2)$

7. Given the polynomial  $P(x) = 2x^4 - x^3 + 2x^2 - 5$ , calculate the following numerical values:

$$P(1)$$

$$P(0)$$

$$P(-2)$$

8. Given the polynomials:

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

$$Q(x) = x^3 - 4x^2 - 3x + 2$$

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

Calculate: a)  $P(x) - Q(x)$

b)  $(P(x) + Q(x)) \cdot R(x)$

9. Calculate:

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

b)  $(8x^5 + 10x^3 - 2x^2) : (-2x)$

c)  $(9x^7 + 12x^5 + 3x^4 - 6x^2) : (3x^2)$

d)  $(9x^9 - 7x^7 + 5x^5 - 3x^3) : x^3$

10. Calculate:

a)  $(3x^2 - 5x + 1) \cdot (x - 5)$

b)  $(x^3 - 3x + 2) \cdot (2x - 1)$

c)  $(x^2 - x + 1) \cdot (x^2 + 1)$

d)  $(x^2 + 2x - 1) \cdot (x^2 - 2)$

11. Factorise the algebraic expressions below:

- a)  $5x^3 - 35x$
- b)  $2x^3 - 4x^2 + 8x$
- c)  $5x + 25$
- d)  $3x^5 - x^4 + 5x^2$

12. Expand the following special products:

- a)  $(x+4)^2$
- b)  $(x-3)^2$
- c)  $(x+2) \cdot (x-2)$
- d)  $(x+1)^2$
- e)  $(2x-3)^2$
- f)  $(a+5) \cdot (a-5)$
- g)  $(x-6) \cdot (x+6)$
- h)  $(3x+1)^2$

13. Simplify the following algebraic expressions, factorising first:

- a)  $\frac{3x-6}{3x+9}$
- b)  $\frac{x^2+2x}{2x+4}$
- c)  $\frac{x^2-4x}{x^2+3x}$
- d)  $\frac{x^2-1}{2x-2}$

**SOLUTIONS:**

1º/ a)  $2x+7$       b)  $3x-1$       c)  $2(x+3)$       d)  $\frac{x-4}{2}$       e)  $(x+5)^2$

f)  $\left(\frac{x}{2}\right)^3$       g)  $\frac{x^2}{2}$       h)  $x+x^2$       i)  $5x^2$       f)  $\frac{x-5}{2}$

2º/ a) 3      b) -5      c) -3      d)  $\frac{-43}{9}$

3º/ a) 2      b) 5

4º/ a)  $2x^4-2x^2$       b)  $-9x^3$       c)  $11x^2$       d)  $10xy^2$

5º/ a)  $3x^3$       b)  $10x^6$       c)  $8x^4$       d)  $14x^2$

6º/ a)  $35x^2$       b)  $2x^5$       c)  $-2y$       d)  $4x^3$

7º/ -2; -5; 43

8º/ a)  $2x^3+9x^2+2x-6$

b)  $4x^5-11x^4+13x^3+15x^2-14x-10$

9º/ a)  $-2x^4+10x^3-2x^2+10x$

b)  $-4x^4-5x^2+x$

c)  $3x^5+4x^3+x^2-2$

d)  $9x^6-7x^4+5x^2-3$

10º/ a)  $3x^3-20x^2+26x-5$

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

c)  $x^4-x^3+2x^2-x+1$

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

11º/ a)  $5x(x^2-7)$

b)  $2x(x^2-2x+4)$

c)  $5(x+5)$

d)  $x^2(3x^3-x^2+5)$

12º/ a)  $x^2+8x+16$

b)  $x^2-6x+9$

c)  $x^2-4$

d)  $x^2+2x+1$

e)  $4x^2-12x+9$

f)  $a^2-25$

g)  $x^2-36$

h)  $9x^2+6x+1$

13º/ a)  $\frac{x-2}{x+3}$

b)  $\frac{x}{2}$

c)  $\frac{x-4}{x+3}$

d)  $\frac{x+1}{2}$