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𝟙 ❦ Polynomials

1 Simplify the following expressions.

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

b) $(2pq - 3p^2)(p + 2q) - (q^2 - 2pq)(2p - q)$
$=$

2 Let $A = x^2 - 3$, $B = 1 - 2x^2$, and $C = x^3 - x + 1$. Simplify the following expressions.

a) $C - (B + 3A)$
$=$

b) $A - \big(B - (C - A)\big)$
$=$

3 Simplify the following expression.

a) $-a^2 \times (-b)^3 =$

b) $a \times (a^2)^3 \times (a^3)^2 =$

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

d) $ab^3(a^2 - 5b^2) =$

e) $(-3a^2b)^3 \times (-2ab^3)^2 =$

4 Expand the following and simplify terms.

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

b) $(3x - 4)(7x - 1) =$

c) $(5x + y)(x + 5y) =$

d) $(x^2 - 3xy - y^2)(2x - 3y) =$

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

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

5 Prove the following formulas. [Expand the left hand side and simplify it to show that it agree with the right hand side.]

a) $(a+b)(a^2-ab+b^2)=a^3+b^3$

b) $(a-b)(a^2+ab+b^2)=a^3-b^3$

c) $(x+y)^2-(x-y)^2=4xy$