Thirteenth Set of Homework for Math 05

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Please note: You should fully justify your answers.

1 Products of Polynomials

1. Simplify the following:
   (a) $3x^5(-2x^2)^3$
   (b) $-2xy(-3xy^2)^3(-x^4y^5)^2$
2. Expand and simplify:
   (a) $-2x(x^3+4x^2-5x-21)$
   (b) $(a-2)(a+2)$
   (c) $(x+2)(x-7)$
   (d) $(2x-3y)(2x+3y)$
   (e) $(x-8)(x+1)$
   (f) $(2x-3)(3x+7)$
   (g) $(x^2-4)(x^2+4)$
   (h) $(3x-y)(4x-3y)$
   (i) $(2x-1)(3x^3-2x^2+3x-7)$
   (j) $(x-2)(x^2+2x+4)$
   (k) $(x+3)(x^2-3x+9)$
   (l) $(x+2)(x^4-2x^3+4x^2-8x+16)$
   (m) $x(3x^2-7)(x-2)$
   (n) $(x-1)(x+1)(x+2)$
   (o) $(a-1)(a+1)(a^2+1)$
3. Expand and simplify:
   (a) $(x+2)^2$
   (b) $(-x+2)^2$
   (c) $(2x+3)^2$
   (d) $(x-1)^2$
   (e) $(x+2)^2$
   (f) $(x+2)^3$
   (g) $(3x-5y)^2$
   (h) $(a+b)^2$
   (i) $(a-b)^2$
   (j) $(a-b)^3$
   (k) $(a+b)^3$
   (l) $(a+b)^4$
   (m) $(a+b+c)^2$

4. Put the following polynomials in Simplified Expanded Form:
   (a) $(x-y)^2-(x-y)(x+y)$
   (b) $(x+3)^2-(x-3)^2$
   (c) $(a+b+c)^2-(a+b-c)^2$
   (d) $(x+y+z)^2+(x-y)^2+(y-z)^2+(x-z)^2$
   (e) $(x+y)^2-2x^2+(y-x)(x+y)+2xy$
   (f) $(a-b)^3-(a+b)^3+2b(3a^2+b^2)$
   (g) $(a-b)\left((2a-b)^2-(a-2b)^2\right)+3ab(a+b)$

2 Dividing polynomials by monomials

1. Perform the following divisions:
   (a) $\dfrac{2ab-3b}{b}$
   (b) $\dfrac{6x-12}{4}$
   (c) $\dfrac{15x^3-3x^2+6x}{3x}$
   (d) $\dfrac{3xy-4x^2+x}{x}$
   (e) $\dfrac{25x^2y^3-10x^4y^2-5xy^2}{5xy}$
   (f) $\dfrac{3a^4b^3c^2-6ab^2c-2a^2b^2c^2}{3abc}$
   (g) $\dfrac{4x^3y^4z^5w^3-2x^2yz^3w^4+6x^5y^3z^4w^5-8x^2y^2z^3w^4}{-2x^2yz^2w^3}$
2. Simplify the following expressions:
   (a) $\dfrac{(2a-3b)(4a+3b)-8a^2}{3b}$
   (b) $\dfrac{(2x+3y)^2-4x^2-9y^2}{2xy}$
   (c) $\dfrac{(a+b)^3-a^3-b^3}{3ab}$
   (d) $\dfrac{(a+b)^2-4ab}{(a-b)^2}$