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1) a) $(3-x)^5$

$1(3)^5(-x)^0 + 5(3)^4(-x)^1 + 10(3)^3(-x)^2 + 10(3)^2(-x)^3 + 5(3)^1(-x)^4 + 1(3)^0(-x)^5$

$243 - 405x + 270x^2 - 90x^3 + 15x^4 - x^5$

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

$1(2x)^4(y)^0 + 4(2x)^3(y)^1 + 6(2x)^2(y)^2 + 4(2x)^1(y)^3 + 1(2x)^0(y)^4$

$16x^4 + 32x^3y + 24x^2y^2 + 8xy^3 + y^4$

c) $(3x-2y)^5$

$1(3x)^5(-2y)^0 + 5(3x)^4(-2y)^1 + 10(3x)^3(-2y)^2 + 10(3x)^2(-2y)^3 + 5(3x)^1(-2y)^4 + 1(3x)^0(-2y)^5$

$244x^5 - 810x^4y + 1080x^3y^2 - 720x^2y^3 + 240xy^4 - 32y^5$

2) $(5+2x)^4$

$4(5)^1(2x)^3$

a) $160x^3$ coefficient = 160

2b) $(2-3x)^5$

$10(2)^2(-3x)^3$

$-1080x^3$ coefficient = -1080

c) $(3-\frac{1}{2}x)^4$

$4(3)^1(-\frac{1}{2}x)^3$

$-\frac{3}{2}x^3$ coefficient = $-\frac{3}{2}$

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

$1(1)^3(3x)^0 + 3(1)^2(3x)^1 + 3(1)^1(3x)^2 + 1(1)^0(3x)^3$

$1 + 9x + 27x^2 + 27x^3$

$(1+9x+27x^2+27x^3)(1-2x)$

$1 - 2x + 9x - 18x^2 + 27x^2 - 54x^3 + 27x^3 - 54x^4$

$1 + 7x + 9x^2 - 27x^3 - 54x^4$

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4) $(2+3x)^4$

$1(2)^4(3x)^0 + 4(2)^3(3x)^1 + 6(2)^2(3x)^2 + 4(2)^1(3x)^3 + 1(2)^0(3x)^4$

a) $16 + 96x + 216x^2 + 216x^3 + 81x^4$

b) $16 - 96x + 216x^2 - 216x^3 + 81x^4$

5) coefficient of $x^2 = 1350$

$6\times(3)^2\times(xk)^2$

$54x^2k^2$

$54k^2 = 1350$

$54k^2 - 1350$

$k^2 - 25 = 0$

$(k+5)(k-5)$ $k = \pm 5$

6) $(4+k)^3$

$1(4)^3(k)^0 \quad 3(4)^2(k)^1 \quad 3(4)^1(k)^2 \quad 1(4)^0(k)^3$

a) $64 + 48k + 12k^2 + k^3$

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

$a = 4 \quad b = x^2 - x \quad n = 3$

$1(4^3) + 3(4)^2(x^2-x)^1 + 3(4)^1(x^2-x)^2 + 1(4)^0(x^2-x)^3$

$64 + 48x^2 - 48x + 12x^4 - 24x^3 + 12x^2 + x^6 - 3x^5 + 3x^4 - x^3$

$64 - 48x + 60x^2 - 25x^3 + 15x^4 - 3x^5 + x^6$

7) $(5+x)(2-kx)^3$

$3(2)^2(-kx)^1 \quad 3(2)^1(-kx)^2$

$-12kx \quad +6k^2x^2$

$(-12kx)(x) \quad (5)(6k^2x^2)$

$-12kx^2 \quad +30k^2x^2$

$30k^2 - 12k - 18 = 0$

$k = 1 \quad k = -3/5$

-3

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$-3 \quad 1$

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