MAT 099 § 5.4 #s 1, 4, 7, 10, 23–25, 27–30, 35, 36, 51, 75

#s 1–16 Multiply

(1) $(-4x^3)(3x^2) = (-4)(3)(x^{3+2}) = -12x^5$

(4) $5x(6x-4) = (5x)(6x) + (5x)(-4)$

$= (5)(6)x^{1+1} + (5)(-4)x$

$= 30x^2 - 20x$

(7) $-4ab(xa^2 + ya^2 - 3)$

$= (-4ab)(xa^2) + (-4ab)(ya^2) + (-4ab)(-3)$

$= -4a^{1+2}bx + (-4)a^{1+2}by + (-4)(-3)ab$

$= -4a^3bx - 4a^3by + 12ab$

(10) $(y+5)(3y-2) = (y)(3y) + (y)(-2) + (5)(3y) + (5)(-2)$

$= 3y^2 \underbrace{-2y + 15y}_{\text{collect}} - 10 = 3y^2 + 13y - 10$

#s 17–34 Multiply the binomials

(23) $\left(3x + \frac{1}{2}\right)\left(3x - \frac{1}{2}\right) = (3x)^2 - \left(\frac{1}{2}\right)^2$

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

$= 3^2x^2 - \frac{1^2}{2^2} = \boxed{9x^2 - \frac{1}{4}}$

MAT 099 § 5.4 #s 24, 25, 27-30, 35, 36, 51, 75

(24) $(2x - \frac{1}{3})(2x + \frac{1}{3}) = (2x)^2 - (\frac{1}{3})^2 = \boxed{4x^2 - \frac{1}{9}}$

(25) $(5x^2 - 2y^2)(x^2 - 3y^2) = \cancel{(5x^2)(x^2)}$

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

$= 5x^4 - 15x^2y^2 - 2x^2y^2 + 6y^4$

$= \boxed{5x^4 - 17x^2y^2 + 6y^4}$

(27) $(x+4)^2 = x^2 + 2(x)(4) + 4^2 = \boxed{x^2 + 8x + 16}$

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

Learn to do it the way I showed above. But here's the same one the long way:

$(x+4)(x+4) = (x)(x) + (x)(4) + (4)(x) + (4)(4)$

$= x^2 + 4x + 4x + 16 = x^2 + 8x + 16$

(28) $(x-5)^2 = x^2 - (2)(x)(5) + 5^2 = \boxed{x^2 - 10x + 25}$

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

(29) $(6y-1)(6y+1) = (6y)^2 - 1^2 = \boxed{36y^2 - 1}$

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

(30) $(7x-9)(7x+9) = \boxed{49x^2 - 81}$

MAT 099 §5.4 #s 35, 36, 51, 75

#s 35–42. Multiply using "special" product methods

(35) $[3+(4b+1)]^2$ This is an $(x+y)^2 = x^2+2xy+y^2$ situation

$= 3^2 + 2(3)(4b+1) + (4b+1)^2$ ← ANOTHER ONE INSIDE!

$= 9 + 6(4b+1) + (4b)^2 + 2(4b)(1) + 1^2$

$= 9 + 24b + 6 + 16b^2 + 8b + 1$

$= 16 + 32b + 16b^2 = \boxed{16b^2 + 32b + 16}$

Descending order shows good style.

(36) $[5-(3b-3)]^2 = 5^2 - 2(5)(3b-3) + (3b-3)^2$

$= 25 - 10(3b-3) + (3b)^2 - 2(3b)(3) + 3^2$

$= 25 - 30b + 30 + 9b^2 - 18b + 9$

$= 64 - 48b + 9b^2 = \boxed{9b^2 - 48b + 64}$

(51) $(2x^3+5)(5x^2+4x+1)$

$= \boxed{10x^5 + 8x^4 + 2x^3 + 25x^2 + 20x + 5}$

(75) $(x+y)(2x-1)(x+1) = (x+y)[(2x-1)(x+1)]$

$= (x+y)[2x^2 + x - 1] =$

$= \boxed{2x^3 + x^2 - x + 2x^2y + xy - y}$

I usually write yx as xy automatically.