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$$\begin{aligned} 2. a) (x+2)^5 &= x^5 + 5x^4(2) + 10x^3(2)^2 + 10x^2(2)^3 + 5x(2)^4 + (2)^5 \\ &= x^5 + 10x^4 + 40x^3 + 80x^2 + 80x + 32 \end{aligned}$$

$$\begin{aligned} b) (x-1)^6 &= x^6 + 6x^5(-1)^1 + 15x^4(-1)^2 + 20x^3(-1)^3 + 15x^2(-1)^4 + 6x(-1)^5 + (-1)^6 \\ &= x^6 - 6x^5 + 15x^4 - 20x^3 + 15x^2 - 6x + 1 \end{aligned}$$

$$\begin{aligned} c) (2x-3)^3 &= (2x)^3 + 3(2x)^2(-3)^1 + 3(2x)(-3)^2 + (-3)^3 \\ &= 8x^3 - 36x^2 + 54x - 27 \end{aligned}$$

$$\begin{aligned} 4. a) (k+3)^4 &= k^4 + 4k^3(3)^1 + 6k^2(3)^2 + 4k(3)^3 + (3)^4 \\ &= k^4 + 12k^3 + 54k^2 + 108k + 81 \end{aligned}$$

$$\begin{aligned} b) (y-5)^6 &= y^6 + 6y^5(-5)^1 + 15y^4(-5)^2 + 20y^3(-5)^3 + 15y^2(-5)^4 + 6y(-5)^5 + (-5)^6 \\ &= y^6 - 30y^5 + 375y^4 - 2500y^3 + 9375y^2 - 18750y + 15625 \end{aligned}$$

$$\begin{aligned} c) (3q-4)^4 &= (3q)^4 + 4(3q)^3(-4) + 6(3q)^2(-4)^2 + 4(3q)(-4)^3 + (-4)^4 \\ &= 81q^4 - 432q^3 + 864q^2 - 768q + 256 \end{aligned}$$

$$\begin{aligned} d) (2x+7y)^3 &= (2x)^3 + 3(2x)^2(7y) + 3(2x)(7y)^2 + (7y)^3 \\ &= 8x^3 + 84x^2y + 294xy^2 + 343y^3 \end{aligned}$$

$$\begin{aligned} f) (2z^3-3y^2)^5 &= (2z^3)^5 + 5(2z^3)^4(-3y^2)^1 + 10(2z^3)^3(-3y^2)^2 + 10(2z^3)^2(-3y^2)^3 + 5(2z^3)(-3y^2)^4 + (-3y^2)^5 \\ &= 32z^{15} - 240z^{12}y^2 + 720z^9y^4 - 1080z^6y^6 + 810z^3y^8 - 243y^{10} \end{aligned}$$

5.a)

		1	9	36	84	126	126	84	36	9	1
	1		10	45	120	210					
		1		11	55	165					
			1	12	66						
				13	78						

Note the pattern

↑9
↑10
↑11
↑12
↑13

$$\begin{aligned}
 & (x-2)^3 \\
 &= x^3 + 13x^{12}(-2) + 78x^{11}(-2)^2 \\
 &= x^3 - 26x^{12} + 312x^{11} \quad \text{are the first 3 terms}
 \end{aligned}$$

$$\begin{aligned}
 10. & (3x-5y)^6 \\
 &= (3x)^6 + 6(3x)^5(-5y)^1 + 15(3x)^4(-5y)^2 + 20(3x)^3(-5y)^3 + 15(3x)^2(-5y)^4 + 6(3x)(-5y)^5 + (-5y)^6 \\
 &= 729x^6 - 7290x^5y + 30375x^4y^2 - 67500x^3y^3 + 84375x^2y^4 - 56250xy^5 + 15625y^6
 \end{aligned}$$