

## 6.3 Pascal's Triangle - Worksheet #2

MCR3U

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SOLUTIONS

1) Expand each expression using Pascal's triangle

a)  $(x+4)^3$

$$= 1x^3 + 3x^2(4) + 3x(4^2) + 1(4^3)$$

$$= x^3 + 12x^2 + 48x + 64$$

b)  $(1-2x)^4$

$$= 1(1^4) + 4(1^3)(-2x) + 6(1^2)(-2x)^2 + 4(1)(-2x)^3 + 1(-2x)^4$$

$$= 1 - 8x + 24x^2 - 32x^3 + 16x^4$$

c)  $(3x+y)^2$

$$= 1(3x)^2 + 2(3x)(y) + 1(y)^2$$

$$= 9x^2 + 6xy + y^2$$

d)  $(x-5)^5$

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

$$= x^5 - 25x^4 + 250x^3 - 1250x^2 + 3125x - 3125$$

e)  $(3+2n)^6$

$$= 1(3)^6 + 6(3)^5(2n) + 15(3)^4(2n)^2 + 20(3)^3(2n)^3$$

$$+ 15(3)^2(2n)^4 + 6(3)(2n)^5 + 1(2n)^6$$

$$= 729 + 2916n + 4860n^2 + 4320n^3$$

$$+ 2160n^4 + 576n^5 + 64n^6$$

f)  $(x-7)^{11}$

skip.

g)  $(2x + 5)^7$

$$= 1(2x)^7 + 7(2x)^6(5) + 21(2x)^5(5)^2 + 35(2x)^4(5)^3 + 35(2x)^3(5)^4 + 21(2x)^2(5)^5 + 7(2x)(5)^6 + 1(5)^7$$

$$= 128x^7 + 2240x^6 + 16800x^5 + 70000x^4 + 175000x^3 + 262500x^2 + 218750x + 78125$$

## Answers

1. a)  $x^3 + 12x^2 + 48x + 64$

b)  $1 - 8x + 24x^2 - 32x^3 + 16x^4$

c)  $9x^2 + 6xy + y^2$

d)  $x^5 - 25x^4 + 250x^3 - 1250x^2 + 3125x - 3125$

e)  $729 + 2916n + 4860n^2 + 4320n^3 + 2160n^4 + 576n^5 + 64n^6$

f)  $x^{11} - 77x^{10} + 2695x^9 - 56595x^8 + 792330x^7 - 7764834x^6 + 54353838x^5 - 271769190x^4$   
 $+ 951192165x^3 - 2219448285x^2 + 3107227739x - 1977326743$

g)  $128x^7 + 2240x^6 + 16800x^5 + 70000x^4 + 175000x^3 + 262500x^2 + 218750x + 78125$