Solutions

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1. The first four entries of the 12th row of Pascal's triangle are 1, 12, 66, and 220. Determine the first four entries of the 13th row of the triangle.

1 12 66 220

= 1 13 78 286

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2. Expand and simplify each binomial power.

a) $(x+2)^5$

$= 1(x)^5(2)^0 + 5(x)^4(2)^1$

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

$+ 5(x)^1(2)^4 + 1(x)^0(2)^5$

$= x^5 + 10x^4 + 40x^3 + 80x^2 + 80x + 32$

1
1 1
1 2 1
1 3 3 1
1 4 6 4 1
1 5 10 10 5 1

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4. Expand and simplify each binomial power.

K a) $(k+3)^4$

$= 1(k)^4(3)^0 + 4(k)^3(3)^1$

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

$= k^4 + 12k^3 + 54k^2 + 108k + 81$

1
1 1
1 2 1
1 3 3 1
1 4 6 4 1

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4. Expand and simplify each binomial power.

K

c) $(3q - 4)^4$

$= 1(3q)^4(-4)^0 + 4(3q)^3(-4)^1$

$+ 6(3q)^2(-4)^2 + 4(3q)^1(-4)^3 + 1(3q)^0(-4)^4$

$= 81q^4 - 432q^3 + 864q^2 - 768q + 256$

1
1 1
1 2 1
1 3 3 1
1 4 6 4 1

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4. Expand and simplify each binomial power.

K

d) $(2x + 7y)^3$

$= 1(2x)^3(7y)^0 + 3(2x)^2(7y)^1$

$+ 3(2x)^1(7y)^2 + 1(2x)^0(7y)^3$

$= 8x^3 + 84x^2y + 294xy^2 + 343y^3$

1
1 1
1 2 1
1 3 3 1

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5. Expand and simplify the first three terms of each binomial power.

b) $(3y + 5)^9$

9TH row = 1, 9, 36, 84, 126, 126, 84, 36, 9, 1

$= 1(3y)^9(5)^0 + 9(3y)^8(5)^1 + 36(3y)^7(5)^2$
$+ 84(3y)^6(5)^3 + 126(3y)^5(5)^4 + 126(3y)^4(5)^5$
$+ 84(3y)^3(5)^6 + 36(3y)^2(5)^7 + 9(3y)(5)^8 + 1(3y)^0(5)^9$

$= 19683y^9 + 295245y^8 + 1968300y^7$
$+ 7654500y^6 + 19136250y^5 + 31893750y^4$
$+ 35437500y^3 + 25312500y^2 + 10546875y$
$+ 1953125$

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10. Expand and simplify $(3x - 5y)^6$.

1
1 1
1 2 1
1 3 3 1
1 4 6 4 1
1 5 10 10 5 1
1 6 15 20 15 6 1

$= 1(3x)^6(-5y)^0 + 6(3x)^5(-5y)^1$
$+ 15(3x)^4(-5y)^2 + 20(3x)^3(-5y)^3$
$+ 15(3x)^2(-5y)^4 + 6(3x)^1(-5y)^5$
$+ 1(3x)^0(-5y)^6$

$= 729x^6 - 7290x^5y + 30375x^4y^2 - 67500x^3y^3$
$+ 84375x^2y^4 - 56250xy^5 + 15625y^6$

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