Mathematics 174

Quiz # 27

Name: Key

You must show your work to get full credit.

1. Write out the first 6 row of Pascal's Triangle. That it starts with the two rows $\binom{0}{0} = 1$ and $\binom{1}{0}, \binom{1}{1} = 1, 1$ and ends with the row that starts $\binom{5}{0}, \binom{5}{1} = 1, 5, \ldots$.

1

1 1

1 2 1

1 3 3 1

1 4 6 4 1

1 5 10 10 5 1

2. Use Pascal's Triangle to expand the following:

(a) $(a+b)^3 =$ $a^3 + 3a^2b + 3ab^2 + b^3$

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

$= 2^4x^4 + 4\cdot 2^3(-3)x^3y + 6\cdot 2^2(-3)^2x^2y^2 + 4\cdot 2(-3)^3xy^3 + (-3)^4y^4$

$= 16x^4 - 192x^3y + 216x^2y^2 - 216xy^3 + 81y^4$

(c) $\left(t + \frac{1}{t}\right)^3 = t^3 + 3t^2\left(\frac{1}{t}\right) + 3t\left(\frac{1}{t}\right)^2 + \left(\frac{1}{t}\right)^3$

$= t^3 + 3t + \frac{3}{t} + \frac{1}{t^3}$