# Section 11.7: cont'd

Thursday, March 19, 2015
11:30 AM

Expand:

$(m+2)^5$

Pascal's triangle:

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

$= 1m^5 + 5m^4(2) + 10m^3(2)^2 + 10m^2(2)^3 + 5m(2)^4 + 1\cdot 2^5$

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

$(m-2)^5 = m^5 - 10m^4 + 40m^3 - 80m^2 + 80m - 32$

← if you have a difference instead of a sum, just alternate signs

$(2x-3)^3 = 1\cdot(2x)^3 - 3(2x)^2(3) + 3(2x)(3)^2 - 1\cdot(3)^3$

$= 8x^3 - 36x^2 + 54x - 27$

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$(1+i)^7 = 1\cdot 1^7 + 7\,1^6 i + 21\,1^5 i^2 + 35\,1^4 i^3 + 35\,1^3 i^4 + 21\,1^2 i^5 + 7\,1 i^6 + 1\cdot i^7$

$= 1 + 7i + 21(-1) + 35(-i) + 35(1) + 21(i) + 7(-1) + (-i)$

$= 1 + 7i - 21 - 35i + 35 + 21i - 7 - i$

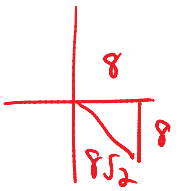
$i^5 = i^4 i \quad = 8 - 8i$

note: $(1+i)^7 = \left(\sqrt{2}\, e^{i\pi/4}\right)^7$

$= (\sqrt{2})^7 e^{i\,7\pi/4}$

$= 8\sqrt{2}\, e^{i\,7\pi/4}$

$= 8 - 8i$

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$(\sqrt{2} - \sqrt{3})^4 = 1 \cdot \sqrt{2}^4 - 4\sqrt{2}^3\sqrt{3} + 6\sqrt{2}^2\sqrt{3}^2 - 4\sqrt{2}\sqrt{3}^3 + 1 \cdot \sqrt{3}^4$

$= 4 - 4 \cdot 2\sqrt{2}\sqrt{3} + 6 \cdot 2 \cdot 3 - 4\sqrt{2}\,3\sqrt{3} + 9$

$= 4 - 8\sqrt{6} + 36 - 12\sqrt{6} + 9$

$= 49 - 20\sqrt{6}$

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digressions:

①

$11^0 = 1$

$11^1 = 11$

$11^2 = 121$

$11^3 = 1331$

$11^4 = 14641$

why? $11^n = (10+1)^n$

② is there another way to get the coefficients?

$(x+y)^8 = x^8 + \_\_ x^7y + \_\_ x^6y^2 + \dots$

↑

the coeff $= \frac{8!}{6!2!}$

$nC_r$

$\frac{8!}{6!2!} = {}_8C_6$