

Section 11.7: cont'd

Thursday, March 17, 2016
10:37 AM

$$\begin{aligned}
 (1+i)^7 &= 1^7 + 7i^6 + 21i^5 + 35i^4 + 35i^3 + 21i^2 + 7i + i^7 \\
 &= 1 + 7i - 21 - 35i + 35 + 21i - 7 - i \\
 &= 8 - 8i
 \end{aligned}$$

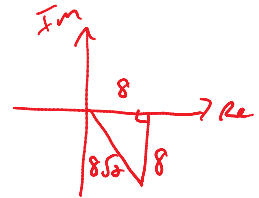
1							
1	1						
1	2	1					
1	3	3	1				
1	4	6	4	1			
1	5	10	10	5	1		
1	6	15	20	15	6	1	
1	7	21	35	35	21	7	1

- $i = i$
- $i^2 = -1$
- $i^3 = -i$
- $i^4 = 1$
- $i^5 = i$
- $i^6 = -1$
- $i^7 = -i$

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



$$\begin{aligned}
 &= (\sqrt{2})^7 e^{i7\pi/4} \\
 &= 8\sqrt{2} e^{i7\pi/4}
 \end{aligned}$$



$$\begin{aligned}
 (\sqrt{2} - \sqrt{3})^4 &= \sqrt{2}^4 - 4\sqrt{2}^3\sqrt{3} + 6\sqrt{2}^2\sqrt{3}^2 - 4\sqrt{2}\sqrt{3}^3 + \sqrt{3}^4 \\
 &= 4 - 4 \cdot 2\sqrt{2} \cdot \sqrt{3} + 6 \cdot 2 \cdot 3 - 4\sqrt{2} \cdot 3\sqrt{3} + 9 \\
 &= 4 - 8\sqrt{6} + 36 - 12\sqrt{6} + 9 \\
 &= 49 - 20\sqrt{6}
 \end{aligned}$$

note:

- $11^0 = 1$
- $11^1 = 11$
- $11^2 = 121$
- $11^3 = 1331$
- $11^4 = 14641$

$$11^3 = (10+1)^3$$

can you calculate the numbers from Pascal's triangle directly?
(discussion)

$$(x+y)^8 = x^8 + 8x^7y + 28x^6y^2$$

$$28 = \frac{8!}{6!2!} = {}_8C_2$$