

- review perfect squares, difference of squares
- sum & difference of cubes by first principles
- sum & difference of cubes pattern
- applications to higher-order polys

Sep 21-7:54 PM

Assigned Work:

p.182 # 2adg, 3, 5, 7, 8

$$\begin{aligned}
 3(c) & \quad \text{cd} \\
 & \quad \underline{(x+5)^3} - \underline{(2x+1)^3} \\
 & \quad A \qquad \qquad \qquad B \\
 & = A^3 - B^3 \\
 & = (A - B)(A^2 + AB + B^2) \\
 & = ((x+5) - (2x+1))((x+5)^2 + (x+5)(2x+1) + (2x+1)^2) \\
 & = (-x+4)(x^2 + 10x + 25 + 2x^2 + 11x + 5 + 4x^2 + 4x + 1) \\
 & = (-x+4)(7x^2 + 25x + 31) \quad \begin{matrix} S & 25 \\ P & 217 \\ I & \times \end{matrix} \\
 & \quad \text{cannot be factored}
 \end{aligned}$$

expand $(a+b)^n \rightarrow$ Pascal's Triangle

$$\begin{aligned}
 & (a+b)^3 \\
 & = 1a^3 + 3a^2b + 3ab^2 + 1b^3 \\
 & \quad \begin{array}{c} n=0 & 1 \\ n=1 & 1 & 1 \\ n=2 & 1 & 2 & 1 \\ n=3 & 1 & 3 & 3 & 1 \\ & 1 & 4 & 6 & 4 & 1 \end{array} \\
 & \quad \text{coefficients}
 \end{aligned}$$

Sep 25-9:27 PM

$$\begin{aligned}
 S(d) &= \frac{1}{512} x^9 - 512 & 512 = 8^3 \\
 &= \frac{1}{8^3} (x^3)^3 - 8^3 & = (2^3)^3 \\
 &= \left(\frac{x^3}{8}\right)^3 - 8^3 & = 2^9 \\
 &\quad A^3 - B^3 \\
 &= \left(\frac{x^3}{8} - 8\right) \left(\left(\frac{x^3}{8}\right)^2 + \left(\frac{x^3}{8}\right)(8) + 8^2 \right) \\
 &\quad (A - B)(A^2 + AB + B^2) \\
 &= \left(\left(\frac{x}{2}\right)^3 - 2^3\right) \left(\frac{x^6}{64} + x^3 + 64 \right) \\
 &= \left(\frac{x}{2} - 2\right) \left(\left(\frac{x}{2}\right)^2 + \left(\frac{x}{2}\right)(2) + 2^2 \right) \left(\frac{x^6}{64} + x^3 + 64 \right) \\
 &= \left(\frac{x}{2} - 2\right) \left(\frac{x^2}{4} + x + 4 \right) \left(\frac{x^6}{64} + x^3 + 64 \right)
 \end{aligned}$$

Sep 29-10:38 AM

$$\begin{aligned}
 LS &= \underline{(x^2+y^2)}(x^4-x^2y^2+y^4)(x^{12}-x^6y^6+y^{12}) + 2x^9y^9 \\
 RS &= (x^9+y^9)^2 \\
 &= \underline{(x^9)^2} + 2\underline{x^9y^9} + \underline{(y^9)^2} \\
 &= \underline{x^{18}} + \underline{y^{18}} + 2x^9y^9 \\
 &= (x^6)^3 + (y^6)^3 + 2x^9y^9 \\
 &= \underline{(x^6+y^6)}(x^{12}-x^6y^6+y^{12}) + 2x^9y^9 \\
 &\quad (A+B)(A^2-AB+B^2) \\
 &= [(x^2)^3 + (y^2)^3] (\checkmark) + (\checkmark) \\
 &= (x^2+y^2)(x^4-x^2y^2+y^4)(\checkmark) + (\checkmark) \\
 LS &= RS \checkmark
 \end{aligned}$$

Sep 29-10:43 AM