

Given  $f(x) = 3x^4 - 5x^3 + 8x^2 - 7x + 10$

Find  $f(2)$

You can do this one of four ways:

1. Substitute 2 for  $x$  and evaluate
2. Synthetic Division.  
 $f(2)$  will be the remainder
3. Long Division with divisor of  $(x-2)$ .  
 $f(2)$  will be the remainder
4. Division with  $(x-2)$  using the "Box".  
 $f(2)$  will be the remainder.

$$\begin{array}{r} 2 \overline{) 3 - 5 \ 8 - 7 \ 10} \\ \underline{6 \ 2 \ 20 \ 26} \\ 3 \ 1 \ 18 \ 13 \ 36 \end{array} \rightarrow \text{Remainder} = 36$$

Given  $(x+2)$  &  $(x+3)$  are factors of  $x^4 + 2x^3 - 13x^2 - 38x - 24$ , use Synthetic Division to find the other two factors.

$$\begin{array}{r} -2 \overline{) 1 \ 2 \ -13 \ -38 \ -24} \\ \underline{-2 \ 0 \ 26 \ 24} \\ -3 \overline{) 1 \ 0 \ -13 \ -12} \\ \underline{-3 \ 9 \ 12} \\ 1 \ -3 \ -4 \ 0 \end{array}$$

The four factors are:

$$x^2 - 3x - 4 \rightarrow (x-4)(x+1)(x+2)(x+3)$$

Factor this Quadratic

$$\begin{array}{c} -4 \\ -4 \quad +1 \\ -3 \end{array}$$

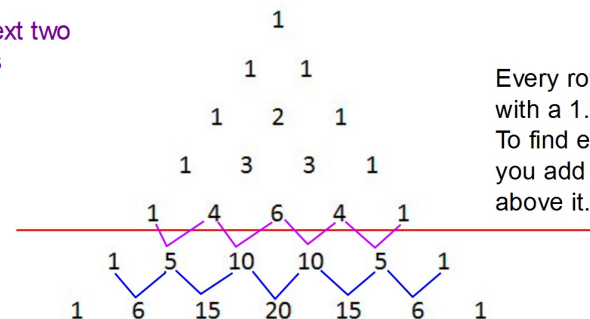
You can now finish Hwk #32: Sec 6-3

Pages 324

Problems 14, 15, 24, 26, 27, 50, 51

Due Tomorrow

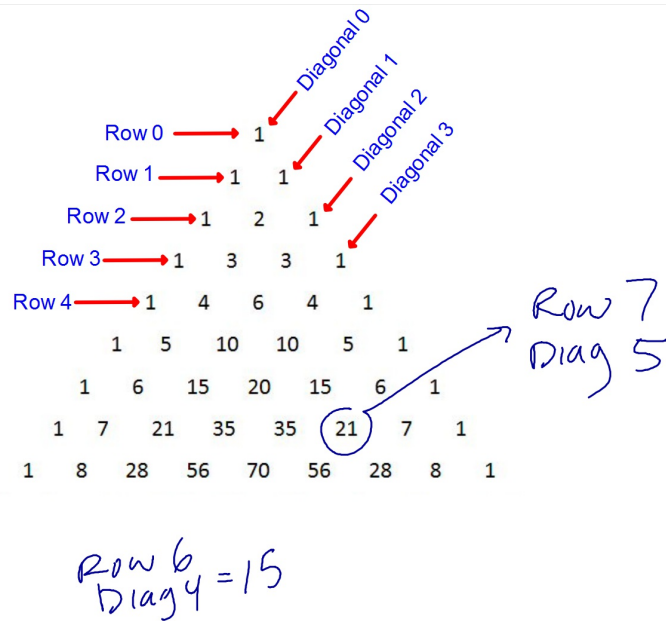
Find the next two rows of this pattern.



This is called  
Pascal's  
Triangle

Rows and  
Diagonals

The 2nd # in each  
row is the same  
as the row #.



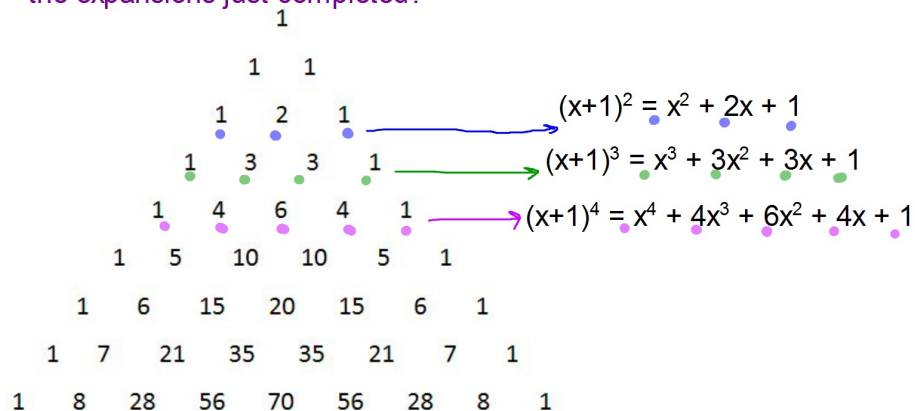
Expand each:

$$1. (x+1)^2 = x^2 + 2x + 1$$

$$2. (x+1)^3 = (x^2 + 2x + 1)(x+1) = x^3 + 3x^2 + 3x + 1$$

$$3. (x+1)^4 = (x^3 + 3x^2 + 3x + 1)(x+1) = x^4 + 4x^3 + 6x^2 + 4x + 1$$

Do you notice any relationship between Pascal's Triangle and the expansions just completed?



In general:  $(a+b)^n$

$n$  = Row # in Pascal's Triangle

$$(a+b)^n = \underline{a^n} + \underline{a^{n-1}b^1} + \underline{a^{n-2}b^2} + \dots + \underline{a^1b^{n-1}} + \underline{b^n}$$

These coefficients are the  
numbers in Row  $n$  of Pascal's Triangle

Expand using Pascal's Triangle.

$$(c + 2)^5$$

Go to Row 5 of Pascal's Triangle which has six #'s leading to six terms in the expanded form of this. The six #'s in Row 5 are the coefficients of the six terms (1 5 10 10 5 1)

$$\underline{1c^5} + \underline{5c^4 \cdot 2} + \underline{10c^3 \cdot 2^2} + \underline{10c^2 \cdot 2^3} + \underline{5c \cdot 2^4} + \underline{1 \cdot 2^5}$$

Below each term is a wavy line in a different color: purple, black, red, blue, green, and black.

$$c^5 + 10c^4 + 40c^3 + 80c^2 + 80c + 32$$