Panel 1 (Kickoff)

Lesson 2.9- Objective: SWBAT divide polynomials by long division.

Kickoff

Put your weekly quiz on your desk, and answer the following.

1) Put f(x) = 3x²-12x+15 in vertex form.
2) Put 6x²+12x+y+13=0 in modified vertex form.

$f(x)=a(x-h)^2+k$

① $\dfrac{f(x)}{3}\cdot\dfrac{15}{3}=\dfrac{3x^2}{3}\dfrac{12x}{3}$

$\dfrac{f(x)}{3}-5+4=x^2-4x+4$

✱ $\dfrac{f(x)}{3}-1=(x-2)^2+1$

$3\left(\dfrac{f(x)}{3}\right)=\left((x-2)^2+1\right)3$

$\boxed{f(x)=3(x-2)^2+3}$

② $6x^2+12x+y+13=0$
   $-y-13 = -y-13$

$\dfrac{6x^2}{6}+\dfrac{12x}{6}=\dfrac{-y}{6}-\dfrac{13}{6}$

$(x-h)^2=4x+y \quad x^2+2x+1=\dfrac{-y}{6}-\dfrac{13}{6}+1$

$(x+1)^2=\dfrac{-y}{6}-\dfrac{7}{6}$ ☆

$(x+1)^2=\dfrac{-1}{6}(y+7)$

Panel 2 (Try this)

Try this: 4,734 ÷ 21

quotient

        225
    21) 4,734
        -42 ↓
          53 ↓
         -42 ↓
          114
         -105
           R 9

divisor   dividend

$225\dfrac{9}{21}$

Panel 3 (Dividing Polynomials)

Dividing Polynomials Using Long Division

1) Looking at the first term of the dividend and the divisor, come up with what you have to multiply the first term of the divisor by to get the first term of the dividend.
2) Put that number above the second term of the dividend.
3) Multiply down.
4) Subtract ** use ( ) and distribute —
5) Bring down the next term in the dividend.
6) Repeat the process until you finish off the number in the dividend.
✱ 7) If you have a reminder, write ± $\dfrac{R}{divisor}$

Panel 4 (Examples)

Examples: must be in descending order

1) $(2x^3 - 18x + 36) \div (x - 6)$

$$\ 2x^2+12x+54$$
$$x-6\,)\,2x^3+0x^2-18x+36$$
$$\underline{-(-2x^3+12x^2)}\downarrow$$
$$12x^2-18x$$
$$\underline{-(-12x^2+72x)}\downarrow$$
$$54x+36$$
$$\underline{+(-54x+324)}$$
$$360$$

$\boxed{2x^2+12x+54+\dfrac{360}{x-6}}$

Panel 5 (Example 2)

2) $(35x^4 + 51x^3 + 34x^2 + 57x - 9) \div (7x - 1)$

$$\ 5x^3+8x^2+6x+9$$
$$7x-1\,)\,35x^4+51x^3+34x^2+57x-9$$
$$\underline{+(-35x^4+5x^3)}\downarrow$$
$$56x^3+34x^2$$
$$\underline{\pm(-56x^3+8x^2)}\downarrow$$
$$42x^2+57x$$
$$\underline{+(-42x^2+6x)}$$
$$63x-9$$
$$\underline{+(-63x+9)}$$
$$0$$

✱ If you have a remainder of zero, the divisor is a factor!

Panel 6 (Practice)

Complete each of the following on a separate sheet of paper. (or in your notebook)

3) $(m^2 - 7m - 11) \div (m - 8)$

$m+1-\dfrac{3}{m-8}$

4) $(a^2 - 28) \div (a - 5)$

$a+5-\dfrac{3}{a-5}$

5) $(x^3 - 4x^2 + 2x + 5) \div (x - 2)$

$$x^2 - 2x - 2 + \frac{1}{x-2}$$

6) $(2x^3 + 4x^2 - 5) \div (x + 3)$

$$2x^2 - 2x + 6 - \frac{23}{x-2}$$

7) $(11x + 2x^2 + 12x^3 + 2) \div (3x + 2)$

8) $(x^2 + 4) \div (x + 1)$

$$x + 1 + \frac{5}{x+1}$$

9) $(x^3 - 4x) \div (x + 2)$

$$x^2 - 2x$$

10) $(x^3 - 2x^2 - 75) \div (x - 5)$

$$x^2 + 3x + 15$$

11) $(x^2 + 9x - 7) \div (x - 3)$

$$x + 12 + \frac{29}{x-3}$$

12) $(2x^4 + 5x^3 + 5x^2 + 10x + 8) \div (x + 2)$

$$2x^3 - 5x^2 + 15x - 20 \; \frac{-32}{x+2}$$

13) $(x^3 - 2x^2 + 6x - 6) \div (x - 3)$

$$x^2 + x + 9 + \frac{21}{x-3}$$