Check homework with your neighbor.

Bring your smartphone to class if you have one on Monday.

Sep 10-3:18 PM

1-1 HWAnswer Key

1. $4x^3+6x^2-7x+5$, cubic, 4, 3
2. $3x^2-4x+5$, quadratic, 3, 2
3. $15x^3+4x^2-x+5$
4. $-15x^3+2x^2+5x+5$
5. $-3x^2-7x+14$
6. $-9x^2+3x-3$
7. $9x^2-3x+3$
8. $6x^4+27x^3-18x^2$
9. $-6x^5y-2x^3y^3+10x^3y^2-4x^2y^2$
10. $-y^4-2y^3z+x^2y^2+x^3-xy^2-2xyz$
11. $2y^2-32$
12. $21a^2-29ab-10b^2$
13. $-4x^3+23x^2-12x-15$
14. When multiplying two polynomials, multiply each term of the first with each term of the second.

Aug 13-12:39 PM

1. Write $6x^2+4x^3-7x+5$ in standard form.

   Standard form: $4x^3+6x^2-7x+5$

   Identify: name: cubic, leading coefficient: 4, degree: 3

2. Write $5+3x^2-4x$ in standard form.

   Standard form: $3x^2-4x+5$

   Identify: name: quadratic, leading coefficient: 3, degree: 2

Add or subtract. Write your answer in standard form.

3. $(3x^2+2x+5)+(15x^3+x^2-3x) = 15x^3+4x^2-x+5$

4. $(3x^2+2x+5)-(15x^3+x^2-3x) = 3x^2+2x+5-15x^3-x^2+3x$
   $= -15x^3+2x^2+5x+5$

5. $(4x^2-3x+9)+(-4x+5-7x^2) = -3x^2-7x+14$

6. Subtract $(2x^2-3x+9)$ from $(6-7x^2)$ $= (6-7x^2)-(2x^2-3x+9)$
   $= 6-7x^2-2x^2+3x-9$
   $= -9x^2+3x-3$

7. From $(2x^2-3x+9)$ subtract $(6-7x^2)$ $= (2x^2-3x+9)-(6-7x^2)$
   $= 2x^2-3x+9-6+7x^2$
   $= 9x^2-3x+3$

Multiply. Write your answer in standard form.

8. $3x^2(2x^2+9x-6) = 6x^4+27x^3-18x^2$

Sep 1-4:06 PM

9. $-2x^2y(3x^3+xy^2-5xy+2y) = -6x^5y-2x^3y^3+10x^3y^2-4x^2y^2$

10. $(x^2-2yz-y^2)(y^2+x) = y^2(x^2-2yz-y^2)+x(x^2-2yz-y^2)$
    $= x^2y^2-2y^3z-y^4+x^3-2xyz-xy^2$
    $= -y^4-2y^3z+x^2y^2+x^3-xy^2-2xyz$

11. $(2y-8)(y+4) = 2y^2+8y-8y-32 = 2y^2-32$

12. $(3a-5b)(7a+2b) = 21a^2+6ab-35ab-10b^2$
    $= 21a^2-29ab-10b^2$

13. $(3+3x-4x^2)(x-5) = x(3+3x-4x^2)-5(3+3x-4x^2)$
    $= 3x+3x^2-4x^3-15-15x+20x^2$
    $= -4x^3+23x^2-12x-15$

14. Explain double distribution.
Method used when multiplying two polynomials. Multiply each term of the first polynomial by each term of the second.

Sep 1-4:07 PM

1-2: Dividing Polynomials

Using Long Division to Divide Polynomials

- Polynomial Long Division is a method for dividing a polynomial by another polynomial of a lower degree.
- It is very similar to dividing numbers.

$\frac{2x^2}{x} = 2x$

Arithmetic Long Division	Polynomial Long Division
Divisor 12, Quotient 23, Dividend 277	Divisor $x+2$, Quotient $2x+3$, Dividend $2x^2+7x+7$

$$\begin{array}{r} 23 \\ 12\overline{)277} \\ -24\downarrow \\ \hline 37 \\ -36 \\ \hline 1 \leftarrow \text{remainder} \end{array}$$

$$\begin{array}{rr} & 2x+3 \\ & x+2\overline{)2x^2+7x+7} \\ 2x(x+2) \rightarrow & -(2x^2+4x) \\ & 3x+7 \\ 3(x+2) \rightarrow & -(3x+6) \\ & 1 \leftarrow \text{Remainder} \end{array}$$

Ans $= 2x+3+\frac{1}{x+2}$

We can think of long division as follows:

$F(x) \div G(x) = Q(x)$ with a remainder of $R(x)$

where $F(x)$ is the Dividend
$G(x)$ is the Divisor
$Q(x)$ is the Quotient
and $R(x)$ is the Remainder

$$\begin{array}{r} Q(x) \\ G(x)\overline{)F(x)} \\ \vdots \\ \hline R(x) \end{array}$$

$R(x)$ = remainder

Ans $= Q(x) + \frac{R(x)}{G(x)}$

How can you check your answer? Check both answers.

- multiply quotient and divisor together

Aug 13-2:03 PM

Example 1: $(2x^3 - 4x^2 + 2) \div (2x - 2)$

Step 1: Write the polynomial in standard form. Include missing terms with a zero coefficient.

Step 2: Write in long division format.

Step 3: Divide first terms. $\frac{2x^3}{2x} = x^2$

Step 4: Multiply.

Step 5: Subtract and bring down the next term.

Step 6: Repeat steps 3 – 5 as necessary.

Step 7: Check and write answer.

$$\begin{array}{rr} & x^2-x-1 \\ & 2x-2\overline{)2x^3-4x^2+0x+2} \\ x^2(2x-2) \rightarrow & -(2x^3-2x^2)\downarrow \\ & -2x^2+0x \\ -x(2x-2) \rightarrow & -(-2x^2+2x) \\ & -2x+2 \\ -1(2x-2) \rightarrow & -(-2x+2) \\ & 0 \end{array}$$

check

$(2x-2)(x^2-x-1)$

$= 2x(x^2-x-1)-2(x^2-x-1)$

$= 2x^3-2x^2-2x-2x^2+2x+2$

$= 2x^3-4x^2+2$

Example 2: $(x^2+6x+9) \div (x+3)$

$$\begin{array}{rr} & x+3 \\ & x+3\overline{)x^2+6x+9} \\ x(x+3) \rightarrow & -(x^2+3x)\downarrow \\ & 3x+9 \\ 3(x+3) \rightarrow & 3x+9 \\ & 0 \end{array}$$

Check

$(x+3)(x+3) = x^2+6x+9$ ✓

Aug 13-2:04 PM

Example 3: $(y^3 - 27) \div (y - 3)$

$$\begin{array}{r} y^2+3y+9 \\ y-3 \overline{) y^3+0y^2+0y-27} \\ -(y^3-3y^2) \\ \hline 3y^2+0y \\ -(3y^2-9y) \\ \hline 9y-27 \\ -(9y-27) \\ \hline 0 \end{array}$$

$y^2(y-3)$

$3y(y-3)$

$9(y-3)$

Check

Example 4: $(11y^2 - 1 + 6y^3 + 2y) \div (2y + 1)$

$$\begin{array}{r} 3y^2+4y-1 \\ 2y+1 \overline{) 6y^3+11y^2+2y-1} \\ -(6y^3+3y^2) \\ \hline 8y^2+2y \\ -(8y^2+4y) \\ \hline -2y-1 \\ -(-2y-1) \\ \hline 0 \end{array}$$

$3y^2(2y+1)$

$4y(2y+1)$

$-1(2y+1)$

Check

Aug 13-2:04 PM

Example 5: $(x^2 + 8x + 19) \div (x + 5)$

$$\begin{array}{r} x+3 \\ x+5 \overline{) x^2+8x+19} \\ -(x^2+5x) \\ \hline 3x+19 \\ -(3x+15) \\ \hline 4 \end{array}$$

4 = remainder

$x+3+\dfrac{4}{x+5}$

Ans

Example 6: $(5x^2 - 10 + 2x^3 + 5x) \div (2x - 1)$

$$\begin{array}{r} x^2 \\ 2x-1 \overline{) 2x^3+5x^2+5x-10} \\ -(2x^3-x^2) \\ \hline 6x^2+5x \\ -(6x^2-3x) \\ \hline 8x-10 \\ -(8x-4) \\ \hline -6 \end{array}$$

-6 = remainder

$x^2+3x+4-\dfrac{6}{2x-1}$

Sep 1-3:11 PM

Sep 3-8:46 PM