Check homework with your neighbor.

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

Sep 10-3:18 PM

1-1 HW Answer 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.

Arithmetic Long Division

Divisor 12, Quotient 23, Dividend 277

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

23R1 $23\frac{1}{12}$

Polynomial Long Division

Divisor $x+2$, Quotient $2x+3$, Dividend $2x^2+7x+7$, Remainder 1

$$\begin{array}{r} 2x+3 \\ x+2\overline{)2x^2+7x+7} \\ 2x^2+4x \\ \hline 3x+7 \\ 3x+6 \\ \hline 1 \end{array}$$

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

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

How can you check your answer? Check both answers.

Multiply your quotient with the divisor you should produce the dividend

Aug 13-2:03 PM

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

$2x^3-4x^2+0x+2$

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

Step 2: Write in long division format.

Step3: Divide first terms.

Step 4: Multiply.

Step5: Subtract and bring down the next term.

Step 6: Repeat steps 3 – 5 as necessary.

Step 7: Check and write answer.

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

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

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

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

$= 2x^3-4x^2+2$ ✓

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

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

(Ck)

$(x+3)(x+3)$

$x^2+3x+3x+9$

x^2+6x+9 ✓

Aug 13-2:04 PM

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

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

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

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

Aug 13-2:04 PM

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

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

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

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

$$\begin{array}{rr} & x^2+3x+4 \\ & 2x-1 \overline{) 2x^3 + 5x^2 + 5x - 10} \\ x^2(2x-1) & \underline{-2x^3 \pm x^2} \\ & 6x^2 + 5x \\ 3x(2x-1) & \underline{-6x^2 \pm 3x} \\ & 8x - 10 \\ 4(2x-1) & \underline{-8x \pm 4} \\ & -6 \end{array}$$

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

Sep 1-3:11 PM

Write a note to a friend explaining how to use long division to find the quotient below.

$(2x^2 - 3x - 5) \div (x + 1)$

Aug 13-2:05 PM

Sep 3-8:46 PM