Warm-Up
Take out your homework

Identify the leading coefficient, degree, and end behavior.

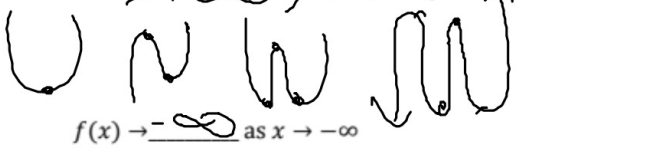
A. $Q(x) = -x^4 + 6x^3 - x + 9$

-1

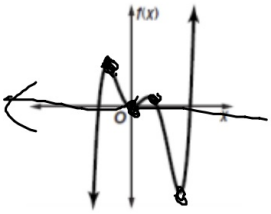
4

$x \to -\infty, f(x) \to -\infty$

$x \to +\infty, f(x) \to -\infty$



Complete the statements for the graph below.



$f(x) \to$ -∞ as $x \to -\infty$

$f(x) \to$ +∞ as $x \to +\infty$

Even or Odd Degree Even

Number of Turning Points 4

Degree 5

4)8728

Synthetic Division

$x-4\overline{)x^5-4x^5+8x^3+x+4}$

GUIDED NOTES – Lesson 3-3

Dividing Polynomials Name: _____ Period: ___

Objective: I can divide polynomial expressions.

Dividing polynomials is like undoing multiplication.

BASIC DIVISION: When dividing a polynomial expression by a single term, the process is quite simple. Divide each term by the monomial.

EXAMPLES:

$\frac{9x^2+12x-18}{3x}$ $3x+4-\frac{6}{x}$

$\frac{5a^2b-15ab^3+10a^3b^4}{5ab}$ $a-3b^2+2a^2b^3$

SYNTHETIC DIVISION: $(x+5)$ $x^4+x^3+x^2+x+2$

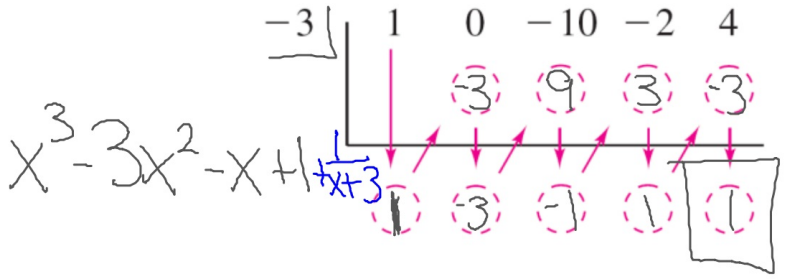
Steps for using Synthetic Division

1. Write the coefficients of the dividend so that the degrees of the terms are in descending order.
   a. (Make sure to put in 0 for a missing term.)
2. Write the constant 'r' of the divisor in the box for x – r.
3. Bring down the first coefficient.
4. Multiply the 1st coefficient by r and write the answer down under the 2nd coefficient.
5. Add those 2 together.
6. Repeat steps 4 and 5 until done.

Use synthetic division to divide $x^4 - 10x^2 - 2x + 4$ by $x + 3$.

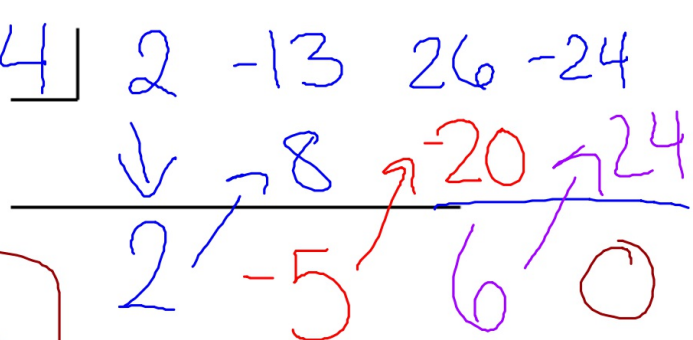
Solution:

You should set up the array as follows. Note that a zero is included for the missing x^3-term in the dividend.



EXAMPLE 1.:

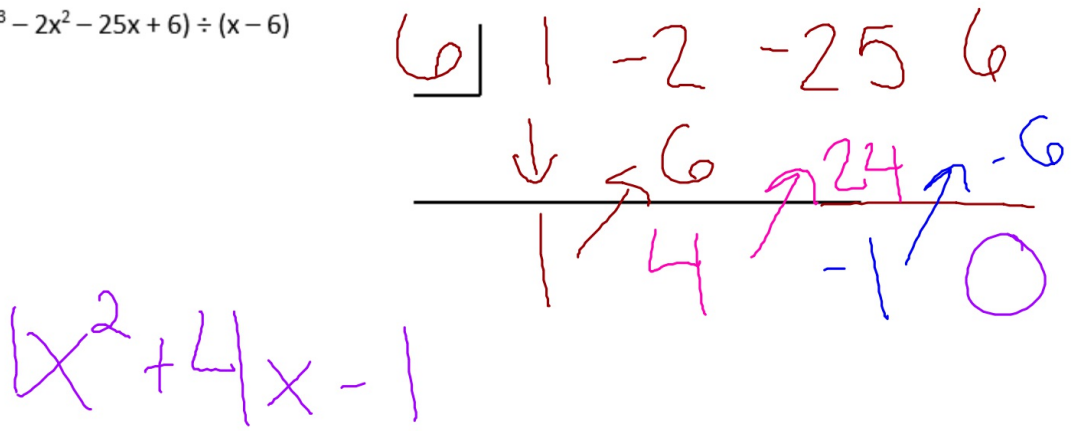
$(2x^3 - 13x^2 + 26x - 24) \div (x - 4)$



$2x^2 - 5x + 6$

EXAMPLE 2:

$(x^3 - 2x^2 - 25x + 6) \div (x - 6)$

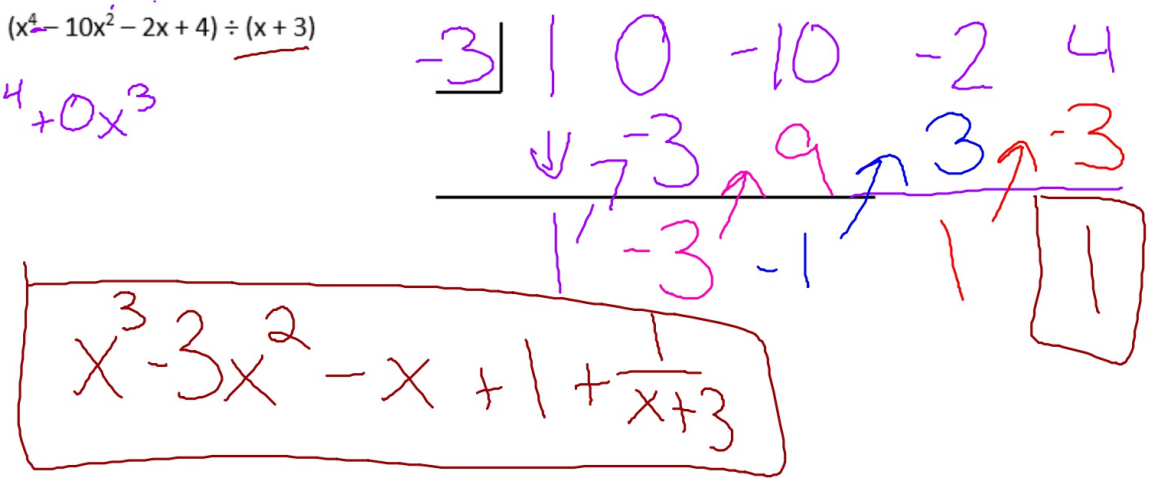


$x^2 + 4x - 1$

EXAMPLE 3:

$(x^4 - 10x^2 - 2x + 4) \div (x + 3)$

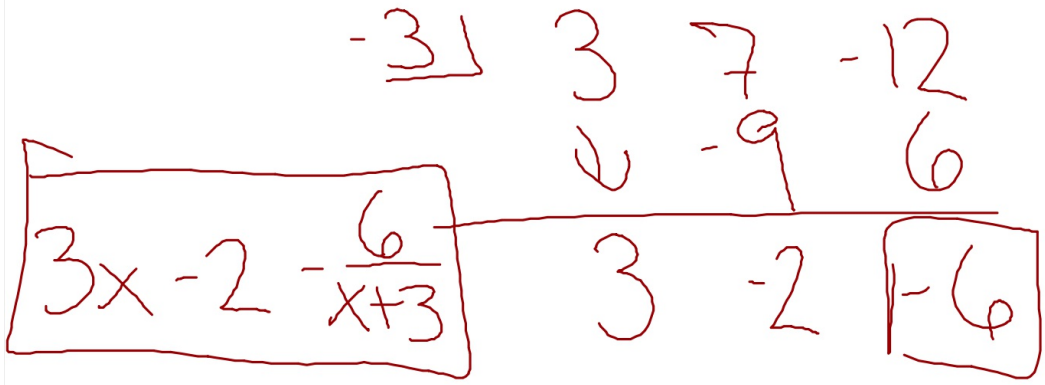
$x^4 + 0x^3$



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

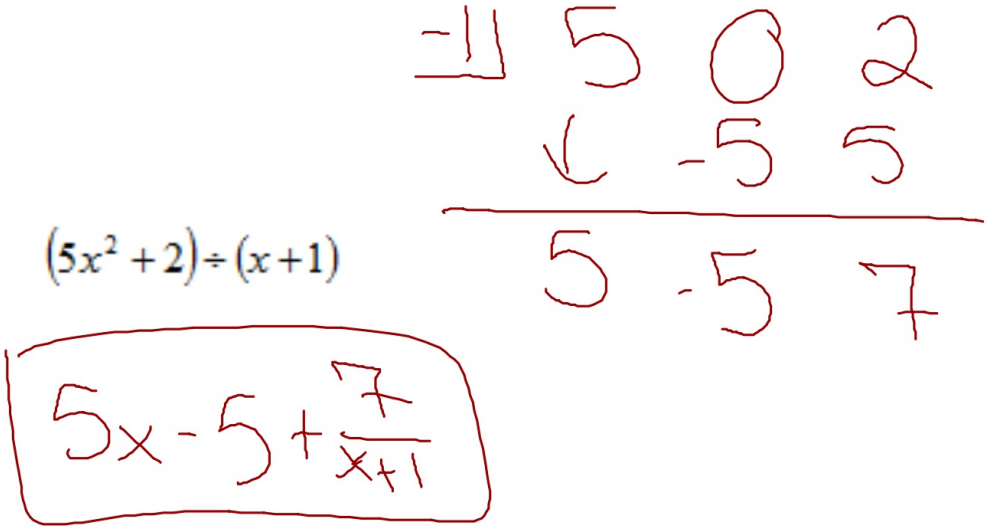
You do

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



YOU DO

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



1) $(m^2 - 7m - 11) \div (m - 8)$	2) $(n^2 - n - 29) \div (n - 6)$
3) $(n^3+7n^2+14n+3) \div (n + 2)$	4) $(x^2 - 74) \div (x - 8)$
5) $(2x^5-15x^3-9x^2+11x+12)\div(x+2)$	6) $(x^4-x^3-19x^2-3x-19)\div(x-5)$