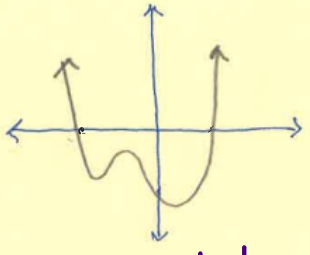
WARM UP

HW Assistance

Pick up the hand out
do both sides

Ch. 8 Test ..... Thursday June 8

① $f(x)$



degree 4

a) How many linear factors would $f(x)$ have? 2

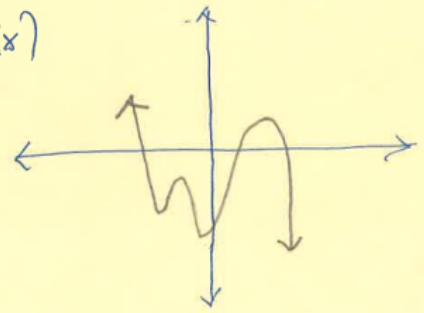
b) How many quadratic factors would $f(x)$ have? 1

c) How many real roots? 2

How many complex (non-real) roots? 2

$2+2i$ ↘
$2-2i$ ↗ $y =$ Quadratic Fo

(2) g(x)



a) How many linear factors? 3

b) How many quadratic factors? 1

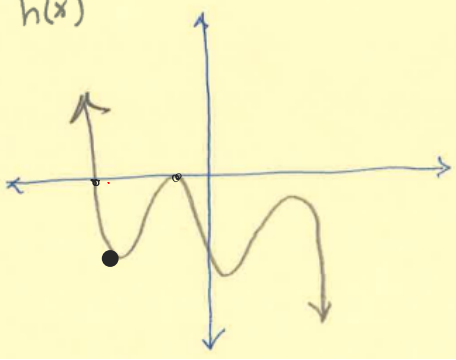
c) # real roots? 3

d) # complex roots 2

degree 5

$\pm\sqrt{-6}$ $y = x^2 + 6x + 14$ $3+4i$ $3-4i$

(3) h(x)



a) # linear factors 3

b) # quadratic factors 1

c) # real roots 1 single root, 1 double

d) # complex roots 2 complex

degree 5

4

Polydoku Craze Sweeping Nation!

(CPM) - Math enthusiasts around the nation have entered a new puzzle craze involving the multiplication of polynomials. The goal of the game, which enthusiasts have named Polydoku, is to fill in squares so that the multiplication of two polynomials will be completed.

	1	2	3	4	5
A	×	$2x^3$	$-x^2$	$+3x$	-1
B	$3x$	$6x^4$	$-3x^3$	$9x^2$	$-3x$
C	-2	$-4x^3$	$2x^2$	$-6x$	2
	$6x^4$	$-7x^3$	$+11x^2$	$-9x$	$+2$

Answer

The game shown right, for example, represents the multiplication of $(3x-2)(2x^3-x^2+3x-1) = 6x^4-7x^3+11x^2-9x+2$.

Most of the squares are blank at the start of the game. While the beginner level provides the factors (in the gray squares), some of the factors are missing in the more advanced levels.

a) Explain how the term $2x^2$ in cell C3 of the news article was generated. $(-2)(-x^2)$

b) What values were combined to get $-7x^3$ in the news article answer? $-3x^3 + -4x^3$

5

. Copy and complete the Polydoku puzzle below.

	1	2	3	4	5
A	×	$4x^3$	$+6x^2$	$-2x$	-5
B	$2x$				
C	-3				

← ANSWER

5. Copy and complete the Polydoku puzzle below.

	1	2	3	4	5
A	×	$4x^3$	$+6x^2$	$-2x$	-5
B	$2x$	$8x^4$	$12x^3$	$-4x^2$	$-10x$
C	-3	$-12x^3$	$-18x^2$	$6x$	15

$8x^4 + 0x^3 - 22x^2 - 4x + 15$ ← ANSWER

HW Questions

factors that look like:

$V(x) = (x-2)(3x-2)(\quad)$

$x-2=0$

$x=2$

$3x-2=0$

$3x=2$

$x=\frac{2}{3}$

$x=\frac{2}{3}$

112 Find intersection Can use substitution

$y = \frac{1}{2}$

$y = \frac{16}{x^2-4}$

$\frac{1}{2} = \frac{16}{x^2-4}$

$x^2 - 4 = 32$

$x^2 = 36$

$\sqrt{\quad} \quad \sqrt{\quad}$

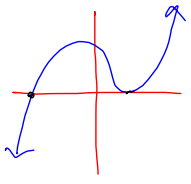
$x = \pm 6$

$(6, \quad) \quad (-6, \quad)$

$y = \frac{16}{6^2-4} = \frac{16}{32} = \frac{1}{2}$

$y = \frac{16}{(-6)^2-4} = \frac{16}{32} = \frac{1}{2}$

104 a)



degree 3

2 real roots
(one double, one single)

NO complex roots

1 linear factor
2 linear factor
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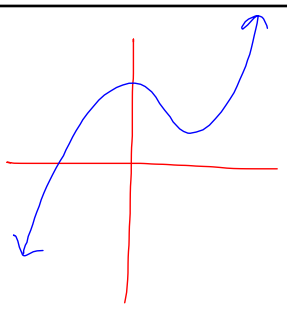
3 linear factors

(b)



degree
3

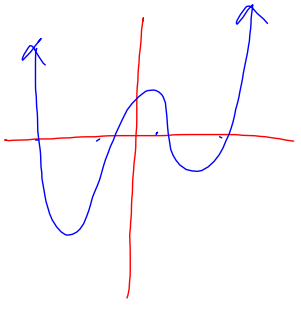
1 real root (single)

2 complex roots

1 linear factor

1 quadratic factors

(c)



degree
4

Roots

4 real roots

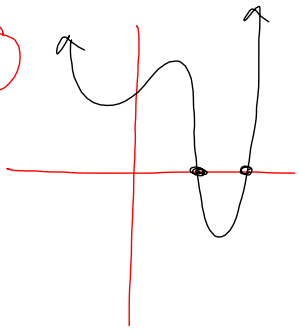
no complex roots

Factors

4 linear factors

No quadr. facts

d



degree 4

4th

ROOTS

2 real (single)

2 complex

Factors

2 linear factors

1 quadratic factor

11a $(i-3)^2$

$(i-3)(i-3)$

$i^2 - 3i - 3i + 9$

$-1 - 6i + 9$

$8 - 6i$

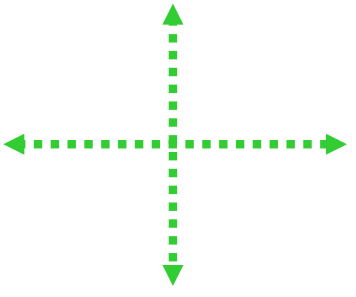
105 b

105 c

106 $y = x^3 - 9x$

a) roots

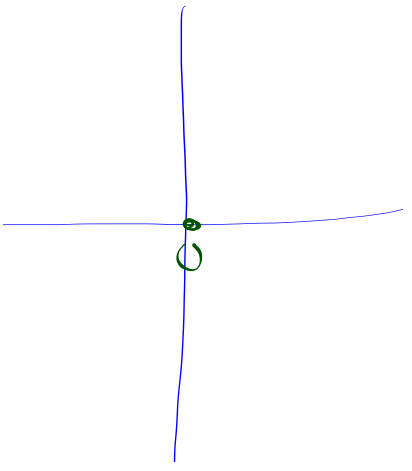
b) sketch



107 a

$y = x(2x+5)(2x-7)$

sketch



111 b. $(2i-1)(3i+1)$ c. $(3-2i)(2i+3)$

Coming Up Over the next week:

Starting Monday

Find all roots for higher degree polynomials

Remember problem 8-102 from last class ?

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

$$(x-2)(x^2 - x + 1) = 0$$

Aim today

Divide Polynomials

so we can.....

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

4

$$(x-2)(x^2 - x + 1) = 0$$

example 1

$$\frac{x^3 + 2x^2 - 7x - 2}{x - 2} = x^2 + 4x + 1$$

	x^2	$4x$	1
x	x^3	$4x^2$	x
-2	$-2x^2$	$-8x$	-2

from before

	1	2	3	4	5
A	×	$4x^3$	$+ 6x^2$	$- 2x$	$- 5$
B	$2x$	$8x^4$	$12x^3$	$-4x^2$	$-10x$
C	$- 3$	$-12x^3$	$-18x^2$	$6x$	15

$8x^4 + 0x^3 - 22x^2 - 4x + 15$

The leading term goes into the upper left

The next term is the sum of the first diagonal. Continue for additional terms.

Example 2

$$\frac{6x^3+7x^2-16x+10}{2x+5} = 3x^2-4x+2$$

$\frac{20}{5} = 4$

$\frac{20}{7} = 2\frac{6}{7}$

~~2R6~~

$3x^2$ $-4x$ 2

$2x$	$6x^3$	$-8x^2$	$4x$
5	$15x^2$	$-20x$	10

$6x^3+7x^2-16x+10$

$$\frac{6x^3+7x^2-16x+10}{2x+5} = 3x^2-4x+2$$

or

$6x^3+7x^2-16x+10 = (2x+5)(3x^2-4x+2)$

$2x+5$ $3x^2-4x+2$

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117

$$\frac{6x^3 + 7x^2 - 16x + \cancel{18}\ 18}{2x + 5} =$$

What if ?

	$3x^2$	$-4x$	$+2$
$2x$	$6x^3$	$-8x^2$	$4x$
5	$15x^2$	$-20x$	10

What should have got

We wrote did get

Remainder is $18 - 10 = 8$

$6x^3 + 7x^2 - 16x + \cancel{10}\ 18$

$$\frac{6x^3+7x^2-16x+\cancel{10}\ 18}{2x+5} = 3x^2-4x+2+\frac{8}{2x+5}$$

$$\frac{24}{7} = 3\frac{3}{7}$$

3R3

B.B.

2 practice Problems

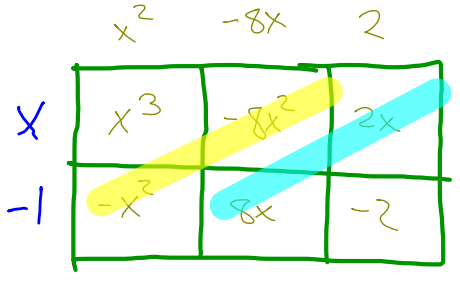
One will have a remainder

$$\frac{x^3 - 9x^2 + 10x - 2}{x - 1} =$$

$$(x^4 - 6x^3 + 18x - 5) \div (x - 2) =$$

$$\frac{x^3 - 9x^2 + 10x - 2}{x - 1} = x^2 - 8x + 2$$

NO remainder :)



$$x^3 - 9x^2 + 10x - 2$$

$(x^4 - 6x^3 + 18x - 5) \div (x-2) = x^3 - 4x^2 - 8x + 2 + \frac{-1}{x-2}$

$0x^2$

	x^3	$-4x^2$	$-8x$	2
x	x^4	$-4x^3$	$-8x^2$	$2x$
-2	$-2x^3$	$8x^2$	$16x$	-4

$x^4 - 6x^3 + 0x^2 + 18x - 5$

remainder

$-5 - -4$

$-5 + 4$

$= -1$

LCQ

Worksheet

"8.3.1 Day 1 Assignment"

Ch. 8 Test ..... Thursday June 8