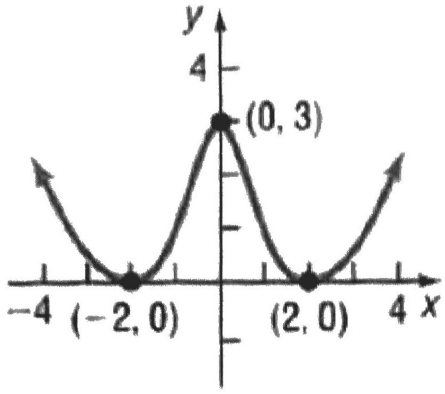
Math III

Unit 2 Polynomials – Study Guide (Standard)

Name: Key

Date: _____

Find the important information for the following graph.



Maximum point(s) (and is it relative or absolute?): (0,3), relative positive ∞

Minimum point(s) (and is it relative or absolute?): (-2,0) & (2,0) absolute

Real zeros: $x = -2$, $x = 2$

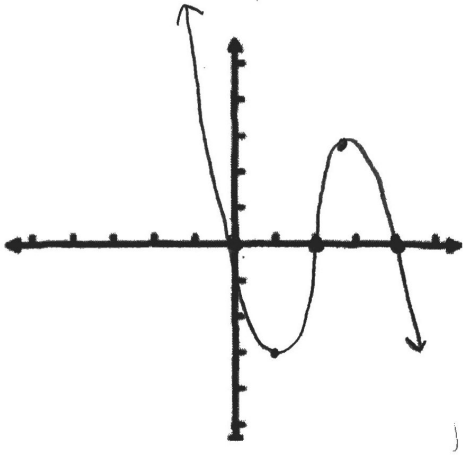
End behavior: $x \to -\infty$, $f(x) \to \infty$
$x \to \infty$, $f(x) \to \infty$

Domain: $(-\infty, \infty)$ Range: $[0, \infty)$

Intervals of increasing:
$(-2,0) \cup (2,\infty)$

Intervals of decreasing:
$(-\infty, -2) \cup (0, 2)$

Find the important information for the function $f(x) = -x^3 + 6x^2 - 8x$ and sketch the graph.



Maximum point(s) (and is it relative or absolute?): (3,3), relative absolute ∞

Minimum point(s) (and is it relative or absolute?): (1,-3) relative
$-\infty$ absolute

Real zeros: $x=0$, $x=2$, $x=4$

End behavior: $x \to -\infty$, $f(x) \to \infty$
$x \to \infty$, $f(x) \to -\infty$

Domain: $(-\infty, \infty)$ Range: $(-\infty, \infty)$

Divide using synthetic or long division. Then determine if the divisor is a factor (yes/no – circle one).

$(4x^3 + 2x^2 - 46x + 30) \div (2x - 6)$

Yes (No)

There is a remainder

$$2x-6\overline{)4x^3+2x^2-46x+30}$$

$$2x^2+7x-2+\frac{18}{2x-6}$$

$-4x^3+12x^2$

$14x^2-46x$

$-14x^2+42x$

$-4x+30$

$+4x-12$

18

$(x^4 - 7x^2 - 144) \div (x + 4)$

(Yes) No

no remainder

$$\begin{array}{c|ccccc} -4 & 1 & 0 & -7 & 0 & -144 \\ & \downarrow & -4 & 16 & -36 & 144 \\ \hline & 1 & -4 & 9 & -36 & 0 \end{array}$$

$1x^3 - 4x^2 + 9x - 36$

What is the remainder when we divide $f(x) = 2x^2 - 5x - 1$ by $(x - 4)$?

$$\begin{array}{c|ccc} 4 & 2 & -5 & -1 \\ & \downarrow & 8 & 6 \\ \hline & 2 & 3 & (5) \end{array}$$

Simplify $(3x^5 + 17x^3 - 1) + (-2x^5 - 6)$.

$2x^5 + 17x^3 - 7$

Simplify $(4 + k^3 - 8k) - (4k^2 - 6k + k^3)$.

$4 + k^3 - 8k - 4k^2 + 6k - k^3$

$-4k^2 - 2k + 4$

Simplify $(3k - 6)(5k + 5)$.

	$3k$	-6
$5k$	$15k^2$	$-30k$
5	$15k$	-30

$15k^2 - 15k - 30$

Simplify $(7x - 5)(5x - 8)$.

	$7x$	-5
$5x$	$35x^2$	$-25x$
-8	$-56x$	40

$35x^2 - 81x + 40$

Simplify $(6n + 4)(6n^2 - 2n - 3)$.

	$6n^2$	$-2n$	-3
$6n$	$36n^3$	$-12n^2$	$-18n$
$+4$	$24n^2$	$-8n$	-12

$36n^3 + 12n^2 - 26n - 12$

Simplify $(2x^2 + 8x - 1)(2x - 5)$.

	$2x^2$	$+8x$	-1
$2x$	$4x^3$	$16x^2$	$-2x$
-5	$-10x^2$	$-40x$	5

$4x^3 + 6x^2 - 42x + 5$

Name each polynomial by degree (constant, linear, quadratic, cubic, quartic, quantic, etc.) and by number of terms (monomial, binomial, trinomial, etc.)

$8x^3 - 7x^4 + 4x^5$

quintic trinomial

$-10 + 9x^1$

linear binomial

-5

constant monomial

$3 - p^2$

quadratic binomial

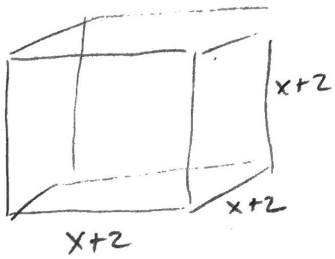
$4n^2 - 6n$

quadratic binomial

$-7n^1$

linear monomial

Find the volume of a cube with side length $(x + 2)$ inches.



$(x+2)(x+2)(x+2)$

$(x^2+4x+4)(x+2)$

$x^3+6x^2+12x+8$

	x	$+2$
x	x^2	$2x$
$+2$	$2x$	4

	x^2	$+4x$	$+4$
x	x^3	$4x^2$	$4x$
$+2$	$2x^2$	$8x$	8