Algebra 2 Name _____ ID: 1

Unit 3B Polynomial Division Quiz Review

Date _____ Period ____

Use long division to divide.

1) $(p^3 - 12p^2 + 16p + 1) \div (p - 2)$

$p^2 - 10p - 4 - \frac{7}{p-2}$

$p-2 \overline{)\, p^3 - 12p^2 + 16p + 1}$

$-p^3 + 2p^2$

$-10p^2 + 16p$

$+10p^2 - 20p$

$-4p + 1$

$+4p - 8$

-7

$\frac{p^3}{p} = p^2$

$\frac{-10p^2}{p} = -10p$

$\frac{-4p}{p} = -4$

2) $(x^3 - 25x + 9) \div (x + 5)$

missing x^2

$x^2 - 5x + \frac{9}{x+5}$

$x+5 \overline{)\, x^3 + 0x^2 - 25x + 9}$

$-x^3 - 5x^2$

$-5x^2 - 25x$

$+5x^2 + 25x$

$0x + 9$

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

$\frac{-5x^2}{x} = -5x$

3) $(v^3 - 4v^2 - 17v - 12) \div (v + 2)$

$v^2 - 6v - 5 - \frac{2}{v+2}$

$v+2 \overline{)\, v^3 - 4v^2 - 17v - 12}$

$-v^3 - 2v^2$

$-6v^2 - 17v$

$+6v^2 + 12v$

$-5v - 12$

$+5v + 10$

-2

$\frac{v^3}{v} = v^2$

$\frac{-6v^2}{v} = -6v$

$\frac{-5v}{v} = -5$

4) $(6x^3 - 31x^2 + 12x - 27) \div (x - 5)$

$6x^2 - x + 7 + \frac{8}{x-5}$

$x-5 \overline{)\, 6x^3 - 31x^2 + 12x - 27}$

$-6x^3 + 30x^2$

$-x^2 + 12x$

$+x^2 - 5x$

$7x - 27$

$-7x + 35$

8

$\frac{6x^3}{x} = 6x^2$

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

$\frac{7x}{x} = 7$

Use synthetic division to divide.

5) $(x^4 + 17x^3 + 74x^2 + 16x - 23) \div (x + 9)$

$-9 \mid 1 \;\; 17 \;\; 74 \;\; 16 \;\; -23$

$\quad\quad -9 \;\; -72 \;\; -18 \;\; 18$

$1 \;\; 8 \;\; 2 \;\; -2 \;\; \boxed{-5}$

$x^3 + 8x^2 + 2x - 2 - \frac{5}{x+9}$

6) $(n^5 - 10n^4 + 4n^3 - 5n^2 + 5n + 11) \div (n - 1)$

$1 \mid 1 \;\; -10 \;\; 4 \;\; -5 \;\; 5 \;\; 11$

$\quad\quad 1 \;\; -9 \;\; -5 \;\; -10 \;\; -5$

$1 \;\; -9 \;\; -5 \;\; -10 \;\; -5 \;\; \boxed{6}$

$n^4 - 9n^3 - 5n^2 - 10n - 5 + \frac{6}{n-1}$

7) $(n^3 - 107n + 73) \div (n - 10)$

$10 \mid 1 \;\; 0 \;\; -107 \;\; 73$

$\quad\quad 10 \;\; 100 \;\; -70$

$1 \;\; 10 \;\; -7 \;\; \boxed{3}$

$n^2 + 10n - 7 + \frac{3}{n-10}$

8) $(p^5 - 2p^4 + 7p^2 - 20p + 10) \div (p - 2)$

$2 \mid 1 \;\; -2 \;\; 0 \;\; 7 \;\; -20 \;\; 10$

$\quad\quad 2 \;\; 0 \;\; 0 \;\; 14 \;\; -12$

$1 \;\; 0 \;\; 0 \;\; 7 \;\; -6 \;\; \boxed{-2}$

$p^4 + 7p - 6 - \frac{2}{p-2}$

Factor each. One factor has been given.

9) $f(x) = 3x^3 + 8x^2 - 13x - 30$; $x + 3$

$-3 \mid 3 \quad 8 \quad -13 \quad -30$

$\quad\quad -9 \quad 3 \quad 30$

$3 \quad -1 \quad -10 \quad 0$

$3x^2 - 1x - 10$

-30, -6, -1, 5

	$3x$	-6
x	$3x^2$	$-6x$
5	$5x$	-10

$(3x+5)(x-2)(x+3)$

10) $f(x) = 3x^3 - 2x^2 - 7x - 2$; $x - 2$

$2 \mid 3 \quad -2 \quad -7 \quad -2$

$\quad\quad 6 \quad 8 \quad 2$

$3 \quad 4 \quad 1 \quad 0$

$3x^2 + 4x + 1$

	$3x$	1
3	$3x^2$	$3x$
1	x	1

$(3x+1)(x+1)(x-2)$

11) $f(x) = 2x^3 + 21x^2 + 70x + 75$; $x + 3$

$-3 \mid 2 \quad 21 \quad 70 \quad 75$

$\quad\quad -6 \quad -45 \quad -75$

$2 \quad 15 \quad 25 \quad 0$

$2x^2 + 15x + 25 = 0$

50, 5, 10, 15

	$2x$	5
x	$2x^2$	$5x$
5	$10x$	25

$(2x+5)(x+5)(x+3)$

12) $f(x) = 2x^4 + 13x^3 + 21x^2 + 39x + 45$; $x + 5$

$-5 \mid 2 \quad 13 \quad 21 \quad 39 \quad 45$

$\quad\quad -10 \quad -15 \quad -30 \quad -45$

$2 \quad 3 \quad 6 \quad 9 \quad 0$

$2x^3 + 3x^2 + 6x + 9$

	$2x$	3
x^2	$2x^3$	$3x^2$
3	$6x$	9

$(x^2+3)(2x+3)(x+5)$

Find all zeros. One zero has been given.

13) $f(x) = 2x^3 - 3x^2 - 18x + 27$; -3

$-3 \mid 2 \quad -3 \quad -18 \quad 27$

$\quad\quad -6 \quad 27 \quad -27$

$2 \quad -9 \quad 9 \quad 0$

Roots: $-3, \frac{3}{2}, 3$

$2x^2 - 9x + 9 = 0$

18, -6, -3, -9

	$2x$	-3
x	$2x^2$	$-3x$
-3	$-6x$	9

$(2x-3)(x-3) = 0$

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

14) $f(x) = 2x^4 - x^3 - 17x^2 + x + 15$; 3

$3 \mid 2 \quad -1 \quad -17 \quad 1 \quad 15$

$\quad\quad 6 \quad 15 \quad -6 \quad -15$

$2 \quad 5 \quad -2 \quad -5 \quad 0$

Roots: $-5, \frac{1}{2}, 3, \pm 1$

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

	$2x$	5
x^2	$2x^3$	$5x^2$
-1	$-2x$	-5

$(2x+5)(x^2-1) = 0$

$x = -\frac{5}{2}$ $x = \pm 1$

15) $f(x) = 5x^3 + 13x^2 - 34x - 24$; 2

$2 \mid 5 \quad 13 \quad -34 \quad -24$

$\quad\quad 10 \quad 46 \quad 24$

$5 \quad 23 \quad 12 \quad 0$

Roots: $-4, -\frac{3}{5}, 2$

$5x^2 + 23x + 12 = 0$

60, 23, 3, 20

	$5x$	4
x	$5x^2$	$20x$
3	$3x$	12

$(5x+3)(x+4) = 0$

$x = -\frac{3}{5}$ $x = -4$

16) $f(x) = 3x^3 + 5x^2 - 42x + 40$; 2

$2 \mid 3 \quad 5 \quad -42 \quad 40$

$\quad\quad 6 \quad 22 \quad -40$

$3 \quad 11 \quad -20 \quad 0$

Roots: $-5, \frac{4}{3}, 2$

$3x^2 + 11x - 20 = 0$

-60, -4, 15, 11

	$3x$	-4
x	$3x^2$	$-4x$
5	$15x$	-20

$(3x-4)(x+5) = 0$

$x = \frac{4}{3}$ $x = -5$