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Date _____
Algebra 2

Dividing Polynomials Without $(x + a)$

Divide each of the following polynomials

1. $\frac{6x^3 + 19x^2 + 11x - 6}{3x - 1}$

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

$2x^2$	$7x$	6	
$6x^3$	$14x^2$	$18x$	$3x$
$-2x^2$	$-7x$	-6	-1

$6x^3 + 19x^2 + 11x - 6$

$2x^2 + 7x + 6$

2. $\frac{4x^4 + 10x^3 - 2x^2 + x + 2}{2x + 1}$

$\frac{4x^4}{2x} = 2x^3$

$2x^3$	$4x^2$	$3x$	1	
$4x^4$	$8x^3$	$+10x^2$	$-2x$	$2x$
$+2x^3$	$4x^2$	$3x$	1	$+1$

$4x^4 + 10x^3 - 2x^2 + x + 2$

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

3. $\frac{4x^3 + 10x^2 + 10x - 1}{2x - 3}$

$\frac{4x^3}{2x} = 2x^2$

4. $\frac{x^3 - x^2 - 5x + 3}{2x - 1}$

$\frac{x^3}{2x} = \frac{1}{2}x^2$

$2x^2$	$8x$	17	
$4x^3$	$+16x^2$	$34x$	$2x$
$-6x^2$	$-24x$	-51	-3

$4x^3 + 10x^2 + 10x - 1$

$2x^2 + 8x + 17 + \frac{50}{2x-3}$

$\frac{1}{2}x^2$	$-\frac{1}{4}x$	$-\frac{21}{8}$	
x^3	$-\frac{1}{2}x^2$	$-\frac{21}{4}$	$2x$
$-\frac{1}{2}x^2$	$\frac{1}{4}x$	$+\frac{21}{8}$	-1

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

$\frac{1}{2}x^2 - \frac{1}{4}x - \frac{21}{8} + \frac{3}{2x-1}$

$$5. \frac{2x^3 + 13x^2 + 9x - 4}{2x + 3} = 2x + 3 - 3 + \frac{5}{2x + 3}$$

$$2x + 3 \overline{) 2x^3 + 13x^2 + 9x - 4}$$

$$\underline{-(2x^3 + 3x^2)}$$

$$10x^2 + 9x$$

$$\underline{-(10x^2 + 15x)}$$

$$-6x - 4$$

$$\underline{+6x + 9}$$

$$5$$

$$6. \frac{6x^3 - 4x^2 - 12x + 11}{3x - 2} = 2x^2 + 10x - 4 + \frac{3}{3x - 2}$$

$$3x - 2 \overline{) 6x^3 - 4x^2 - 12x + 11}$$

$$\underline{-(6x^3 + 4x^2)}$$

$$0x^2 - 12x$$

$$\underline{+(0x^2 + 10x)}$$

$$-12x + 11$$

$$\underline{+(12x + 8)}$$

$$3$$

divide
multiply
subtract
bring down

Keep
change
change

$$7. \frac{15x^3 + 29x^2 - 23x - 21}{5x + 3} = 3x^2 + 4x - 7$$

$$5x + 3 \overline{) 15x^3 + 29x^2 - 23x - 21}$$

$$\underline{-(15x^3 + 15x^2)}$$

$$20x^2 - 23x$$

$$\underline{-(20x^2 + 12x)}$$

$$-35x - 21$$

$$\underline{+35x + 21}$$

$$0$$

$$8. \frac{8x^4 - 14x^3 + 23x^2 - 13x + 10}{4x - 1} = 2x^3 - 3x^2 + 5x - 2 + \frac{8}{4x - 1}$$

$$4x - 1 \overline{) 8x^4 - 14x^3 + 23x^2 - 13x + 10}$$

$$\underline{-(8x^4 - 2x^3)}$$

$$-12x^3 + 23x^2$$

$$\underline{+(12x^3 + 3x^2)}$$

$$20x^2 - 13x$$

$$\underline{-(20x^2 + 5x)}$$

$$-8x + 10$$

$$\underline{+(8x + 2)}$$

$$8$$

$$9. \frac{6x^4 - 8x^3 - 12x^2 + 13x + 7}{3x - 4} = 2x^3 + 10x^2 - 4x - 1 + \frac{3}{3x - 4}$$

$$3x - 4 \overline{) 6x^4 - 8x^3 - 12x^2 + 13x + 7}$$

$$\underline{-(6x^4 - 8x^3)}$$

$$0x^3 - 12x^2$$

$$\underline{+(0x^3 + 10x^2)}$$

$$-12x^2 + 13x$$

$$\underline{+(12x^2 + 16x)}$$

$$-3x + 7$$

$$\underline{+(3x + 4)}$$

$$3$$

$$10. \frac{-12x^4 + 2x^3 + 16x - 5}{x^2 + 2x - 1} = -12x^2 + 26x - 64 + \frac{170x - 69}{x^2 + 2x - 1}$$

$$x^2 + 2x - 1 \overline{) -12x^4 + 2x^3 + 0x^2 + 16x - 5}$$

$$\underline{+12x^4 + 24x^3 - 12x^2}$$

$$26x^3 - 12x^2 + 16x$$

$$\underline{-(26x^3 + 52x^2 - 26x)}$$

$$-64x^2 + 42x - 5$$

$$\underline{+(64x^2 + 128x + 64)}$$

$$170x - 69$$