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Date \_\_\_\_\_  
Algebra 2

## Operations with Polynomials

1. Express  $(x^2 - 5x - 2) + (-6x^2 - 7x - 3)$  in simplest terms.

$$-x^2 - 12x - 5$$

2. Express  $(3x^2 - 8x + 1) + (2x^2 - 3x + 5)$  in simplest terms.

$$5x^2 - 11x + 6$$

3. Express  $(-2x^2 + 5x - 7) - (7x^2 - 3x + 2)$  in simplest terms.

$$-2x^2 + 5x - 7 - 7x^2 + 3x - 2$$
$$-9x^2 + 8x - 9$$

4. Express  $(7x^2 + 2x + 1) - (2x^2 - 3x - 5)$  in simplest terms.

$$7x^2 + 2x + 1 - 2x^2 + 3x + 5$$
$$5x^2 + 5x + 6$$

5. What is the result when  $5m^2 + 3m - 1$  is subtracted from  $7m^2 - 5m + 1$ ?

$$(7m^2 - 5m + 1) - (5m^2 + 3m - 1)$$
$$7m^2 - 5m + 1 - 5m^2 - 3m + 1$$
$$2m^2 - 8m + 2$$

6. What is the result when  $7xy + 5y - 2x$  is subtracted from  $9xy - 5y + 3x$ ?

$$(9xy - 5y + 3x) - (7xy + 5y - 2x)$$

$$9xy - 5y + 3x - 7xy - 5y + 2x$$

$$2xy - 10y + 5x$$

Express the following in simplest terms

7.  $\frac{12x^3 - 6x^2 + 2x}{2x}$

$$6x^2 - 3x + 1$$

8.  $\frac{8x^5 - 2x^4 + 4x^3 - 6x^2}{2x^2}$

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

9.  $-3x(x-4) - 2x(x+3)$

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

$$-5x^2 + 6x$$

10.  $-3x^2y(5xy^2 + xy)$

$$-15x^3y^3 - 3x^3y^2$$

11.  $(x-4)(x+6)$

	$x$	$-4$
$x$	$x^2$	$-4x$
$+6$	$6x$	$-24$

$$x^2 + 2x - 24$$

12.  $(2x-3)(3x+1)$

	$2x$	$-3$
$3x$	$6x^2$	$-4x$
$+1$	$3x$	$-3$

$$6x^2 - 7x - 3$$

13.  $(x^2 + 2x - 4)(x + 3)$

	$x^2$	$+2x$	$-4$
$x$	$x^3$	$+2x^2$	$-4x$
$+3$	$3x^2$	$+6x$	$-12$

$$x^3 + 5x^2 + 2x - 12$$

14.  $(2x^2 + 3x - 2)(x - 2)$

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

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

15.  $(3x^2 + x - 5)(x - 4)$

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

$3x^3 - 11x^2 - 9x + 20$

16.  $(2y^2 - 3y - 1)(y + 7)$

	$2y^2$	$-3y$	$-1$
$y$	$2y^3$	$-3y^2$	$-y$
$+7$	$14y^2$	$-21y$	$-7$

$2y^3 + 11y^2 - 22y - 7$

17.  $(4x^2 + 2x + 3)(x - 2)$

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

$4x^3 - 6x^2 - x - 6$

18.  $(-5x^2 - 4x + 1)(2x + 5)$

	$-5x^2$	$-4x$	$+1$
$2x$	$-10x^3$	$-8x^2$	$+2x$
$+5$	$-25x^2$	$-20x$	$+5$

$-10x^3 - 33x^2 - 18x + 5$

19.  $(m + 7)^2$

	$m$	$+7$
$m$	$m^2$	$+7m$
$+7$	$+7m$	$+49$

$m^2 + 14m + 49$

20.  $(y - 4)^2$

$(y - 4)(y - 4)$      $y^2 - 8y + 16$

	$y$	$-4$
$y$	$y^2$	$-4y$
$-4$	$-4y$	$+16$

21.  $(x - 9)^2$

$(x - 9)(x - 9)$

	$x$	$-9$
$x$	$x^2$	$-9x$
$-9$	$-9x$	$+81$

$x^2 - 18x + 81$

22.  $(z + 2)^2$

$(z + 2)(z + 2)$

	$z$	$+2$
$z$	$z^2$	$+2z$
$+2$	$+2z$	$+4$

$z^2 + 4z + 4$

23.  $(2x - 3)^2$

$(2x - 3)(2x - 3)$

	$2x$	$-3$
$2x$	$4x^2$	$-6x$
$-3$	$-6x$	$+9$

$4x^2 - 12x + 9$

24.  $(4x + 2)^2$

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

	$4x$	$+2$
$4x$	$16x^2$	$8x$
$+2$	$8x$	$+4$

$16x^2 + 16x + 4$

$$\text{Profit} = \text{revenue} - \text{cost}$$

25. Mr. Schlansky's tutoring revenue can be represented by  $r(x) = 25x^2 - 90x + 14$  and his costs can be represented by  $c(x) = 12x^2 + 21x + 10$ . If his profit can be determined using  $p(x) = r(x) - c(x)$ , write a polynomial function what would represent  $p(x)$ .

$$P(x) = (25x^2 - 90x + 14) - (12x^2 + 21x + 10)$$

$$P(x) = \underline{25x^2} - \underline{90x} + \underline{14} - \underline{12x^2} - \underline{21x} - \underline{10}$$

$$P(x) = 13x^2 - 111x + 4$$

26. Stone Manufacturing has developed a cost model,  $C(x) = 0.18x^3 + 0.02x^2 + 4x + 180$ , where  $x$  is the number of sprockets sold, in thousands. The sales price can be modeled by  $S(x) = 95.4 - 6x$  and the company's revenue by  $R(x) = x \cdot S(x)$ . Express the company's profits,  $R(x) - C(x)$ .

$$P(x) = x(95.4 - 6x) - (.18x^3 + .02x^2 + 4x + 180)$$

$$P(x) = \underline{95.4x} - \underline{6x^2} - .18x^3 - .02x^2 - \underline{4x} - \underline{180}$$

$$P(x) = -.18x^3 - 6.02x^2 + 91.4x - 180$$

27. A manufacturing company has developed a cost model,  $C(x) = 0.15x^3 + 0.01x^2 + 2x + 120$ , where  $x$  is the number of items sold, in thousands. The sales price can be modeled by  $S(x) = 30 - 0.01x$ . Therefore, revenue is modeled by  $R(x) = x \cdot S(x)$ . Express the company's profit,  $P(x) = R(x) - C(x)$ .

$$P(x) = x(30 - 0.01x) - (.15x^3 + .01x^2 + 2x + 120)$$

$$P(x) = \underline{30x} - \underline{.01x^2} - .15x^3 - \underline{.01x^2} - \underline{2x} - \underline{120}$$

$$P(x) = -.15x^3 - .02x^2 + 28x - 120$$