

5.3/39

$$(x+5)(x^3-3x+4)$$

$$\begin{array}{r} x^4 \quad -3x^2 + 4x \\ 5x^3 \quad -15x + 20 \end{array}$$

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$$x^4 + 5x^3 - 3x^2 - 11x + 20$$

43.  $(x+2)^3 = (x+2)(x+2)(x+2)$

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

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

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

$$2x^2 + 8x + 8$$

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

$$38. (x + 3)(x^2 + 5x - 8)$$

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

$$3x^2 + 15x - 24$$

---


$$x^3 + 8x^2 + 7x - 24$$

$$42. (3 + b)(2 - 5b - 3b^2)$$

$$6 - 5b - 9b^2$$

$$2b - 5b^2 - 3b^3$$

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$$6 - 13b - 14b^2 - 3b^3$$

$$44. (y-1)^3 = \underbrace{(y-1)(y-1)}_{\text{green}} (y-1)$$

$$(y^2 - y - y + 1)(y-1)$$

$$\begin{array}{cccccccc} y^3 & - & y^2 & - & y^2 & + & y & - & y^2 & + & y & + & y & - & 1 \\ \hline & & & & & & & & & & & & & & \end{array}$$

$$y^3 - 3y^2 + 3y - 1$$

$$46. (3x + 4)^3 = (3x+4) \overbrace{(3x+4)(3x+4)}^{\text{blue}} \underbrace{\hspace{1.5cm}}_{\text{green}}$$

$$(3x+4) (9x^2 + 12x + 12x + 16)$$

$$\overbrace{(3x+4) (9x^2 + 24x + 16)}^{\text{blue}} \underbrace{\hspace{1.5cm}}_{\text{green}}$$

$$27x^3 + 72x^2 + 48x$$

$$36x^2 + 96x + 64$$

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$$27x^3 + 108x^2 + 144x + 64$$

50.  $(4x - 5)(8x^2 + 2x - 4)$

$$\begin{array}{r} 32x^3 + 8x^2 - 16x \\ - 40x^2 - 10x + 20 \end{array}$$

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$$32x^3 - 32x^2 - 26x + 20$$

$$52. (3x^2 - x + 2)(x^2 + 2x + 1)$$

56.  $-5x(x^2 - 3x + 10)$

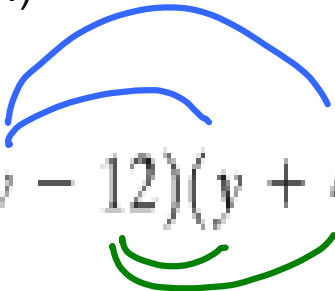
60.  $\left(m + \frac{2}{9}\right)\left(m - \frac{1}{9}\right)$

68.  $(5x + 4)(x^2 - x + 4)$

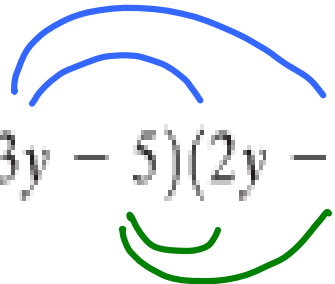
70.  $(a^2 + 3a - 2)(2a^2 - 5a - 1)$

## 5.4: Special Products

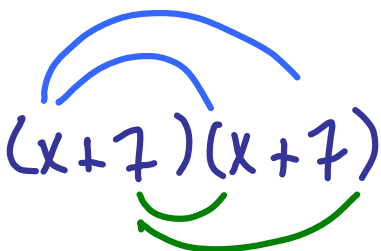
Ex: (p 334)

$$4. (y - 12)(y + 4)$$


$$y^2 + 4y - 12y - 48$$
$$y^2 - 8y - 48$$

$$6. (3y - 5)(2y - 7)$$


$$6y^2 - 21y - 10y + 35$$
$$6y^2 - 31y + 35$$

$$12. (x + 7)^2 = (x + 7)(x + 7)$$


$$x^2 + 7x + 7x + 49$$

$$x^2 + 14x + 49$$

$$24. (4x - 5)(4x + 5)$$

$$16x^2 + 20x - 20x - 25$$

$$16x^2 - 25$$

$$26. \left(\frac{10x}{7} + \frac{2}{7}\right)\left(\frac{10x}{7} - \frac{2}{7}\right)$$

$$100x^2 - \frac{20}{7}x + \frac{20}{7}x - \frac{4}{49}$$

$$100x^2 - \frac{4}{49}$$

$$28. (2x - y)(2x + y)$$

$$4x^2 + 2xy - 2xy - y^2$$

$$4x^2 - y^2$$

**36.**  $(6a + 7)(6a + 5)$

**38.**  $(x - 10)(x + 10)$

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

44.  $(x - 2)(x^2 - 4x + 2)$

48.  $(11x - 7y)(11x + 7y)$

54.  $(x^5 + 5)(x^2 - 8)$

62.  $\left(\frac{2}{3}a - b^2\right)\left(\frac{2}{3}a - b^2\right)$

70.  $(3x + 5)(3x - 5)$

74.  $\left(\frac{a}{2} + 4y\right)\left(\frac{a}{2} - 4y\right)$

78.  $(b + 3)(2b^2 + b - 3)$

$$82. \frac{x^3 y^6}{x y^2} = x^2 y^4$$

$$84. \frac{-6a^8 y}{3a^4 y} = -2a^4 (1)$$

$$\frac{48}{32} = \frac{6}{4}$$
$$= \frac{3}{2}$$

$$86. \frac{-48ab^6}{32ab^3} = -\frac{3}{2}b^3$$

## 5.5: Negative Exponents & Scientific Notation

Look at division

### Negative Exponents

If  $a$  is a real number other than 0 and  $n$  is an integer, then

$$a^{-n} = \frac{1}{a^n}$$

### Negative Exponents

If  $a$  is a real number other than 0 and  $n$  is an integer, then

$$a^{-n} = \frac{1}{a^n} \quad \text{and} \quad \frac{1}{a^{-n}} = a^n$$

Ex: (p 343)

2.  $6^{-2}$

8.  $\left(\frac{1}{8}\right)^{-2}$

16.  $\frac{r^{-5}}{s^{-2}}$

22.  $4^{-2} - 4^{-3}$

24.  $\frac{-1}{y^{-6}}$

### Summary of Exponent Rules

If  $m$  and  $n$  are integers and  $a$ ,  $b$ , and  $c$  are real numbers, then:

Product rule for exponents:  $a^m \cdot a^n = a^{m+n}$

Power rule for exponents:  $(a^m)^n = a^{m \cdot n}$

Power of a product:  $(ab)^n = a^n b^n$

Power of a quotient:  $\left(\frac{a}{c}\right)^n = \frac{a^n}{c^n}$ ,  $c \neq 0$

Quotient rule for exponents:  $\frac{a^m}{a^n} = a^{m-n}$ ,  $a \neq 0$

Zero exponent:  $a^0 = 1$ ,  $a \neq 0$

Negative exponent:  $a^{-n} = \frac{1}{a^n}$ ,  $a \neq 0$

Ex: (p 343)

$$46. \frac{-5x^4y^5}{15x^4y^2}$$

$$48. (-5a^4b^{-7})(-a^{-4}b^3)$$

$$52. \left(\frac{a^5b}{a^7b^{-2}}\right)^{-3}$$

$$56. \frac{5^{-1}z^7}{5^{-2}z^9}$$

$$58. \frac{6^{-5}x^{-1}y^2}{6^{-2}x^{-4}y^4}$$

$$60. \left(\frac{r^{-2}s^{-3}}{r^{-4}s^{-3}}\right)^{-3}$$

$$68. \frac{(a^6b^{-2})^4}{(4a^{-3}b^{-3})^3}$$

## 5.6: Dividing Polynomials

### Dividing a Polynomial By a Monomial

Divide each term of the polynomial by the monomial.

$$\frac{a + b}{c} = \frac{a}{c} + \frac{b}{c}, \quad c \neq 0$$

Ex: (p 350)

2.  $\frac{15x^2 - 9x^5}{x}$

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

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

34.  $\frac{m^3n^2 - mn^4}{mn}$

