Test

12. $\frac{5}{6}x^2 - \frac{1}{4}x^3 + x^2 - \frac{2 \cdot 1}{2 \cdot 2}x^3 + 20$

$1\frac{5}{6}x^2 - \frac{1}{4}x^3 - \frac{2}{4}x^3 + 20$

$\frac{11}{6}x^2 - \frac{3}{4}x^3 + 20$

20. $\frac{1}{2}x^2(8x^2 - 4x + 1)$

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

10. $2^0 + 2^5 = 1 + 32 = 33$

16. Subtract $(2y^2-6y-7)$ from the sum of $(6y^2+8)$ & $(5y+6)$.

$$[(6y^2+8)+(5y+6)]-(2y^2-6y-7)$$

$$6y^2+5y+14 \quad -2y^2+6y+7$$

$$4y^2+11y+21$$

11. $$\left(\frac{3m^3}{6n^4}\right)^5 = \left(\frac{m^3}{2n^4}\right)^5$$

$$\frac{m^{15}}{2^5 n^{20}}$$

24. $(6y+2)^2 = (6y+2)(6y+2)$

$36y^2 + 12y + 12y + 4$

$36y^2 + 24y + 4$

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

84. $\dfrac{-6a^8y}{3a^4y} = -2a^4$

86. $\dfrac{-48ab^6}{32ab^3} = -\dfrac{6}{4} = -\dfrac{3b^3}{2}$

$-\frac{3}{2}b^3$

5.5: Negative Exponents & Scientific Notation

Look at division

EX: $\frac{x^6}{x^2} = x^4$ $\qquad \frac{w^3}{w^3} = w^{3-3} = w^0 = 1$

$\frac{x^2}{x^6} =$ → $x^{2-6} = x^{-4}$

→ $\frac{\cancel{x}\,\cancel{x}}{\cancel{x}\cancel{x}xxxx} = \frac{1}{x^4}$

Def: $x^{-n} = \frac{1}{x^n}$

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: $\dfrac{1}{x^{-3}} = \dfrac{1}{\frac{1}{x^3}} = \dfrac{1}{1} \cdot \dfrac{x^3}{1} = x^3$

$\dfrac{x^2 y^{-3}}{z^{-4}} = \dfrac{x^2 z^4}{y^3}$

Ex: (p 343)

2. $6^{-2} = \frac{1}{6^2} = \frac{1}{36}$

8. $\left(\frac{1}{8}\right)^{-2} = \frac{1}{\left(\frac{1}{8}\right)^2} = \frac{1}{\frac{1}{64}}$

$= \frac{1}{1} \cdot \frac{64}{1} = 64$

$\left(\frac{8}{1}\right)^2 = 64$

$\frac{1^{-2}}{8^{-2}} = \frac{1}{8^{-2}} = 8^2$

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

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

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

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

Ex: (p 343)

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

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

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

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

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

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

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

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

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

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

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