ASSIGNMENT 7

DYLAN ZWICK'S MATH

Section 5.1

In Exercises 1-20, use the rules of exponents to simplify the expression.

5.1.1: (a) $-3x^3 \cdot x^5$ (b) $(-3x)^2 \cdot x^5$

5.1.2: (a) $5^2y^4 \cdot y^2$ (b) $(5y)^2 \cdot y^4$

5.1.5: (a) $(u^3v)(2v^2)$ (b) $(-4u^4)(u^5v)$

5.1.8: (a) $(3y)^3(2y^2)$ (b) $3y^3 \cdot 2y^2$

5.1.11: (a)$\frac{27m^5n^6}{9mn^3}$ (b)$\frac{-18m^3n^6}{-6mn^3}$

5.1.13: (a) $(\frac{3x}{4y})^2$ (b) $(\frac{5u}{3v})^3$

5.1.15: (a)$-\frac{(-2x^2y)^3}{9x^2y^2}$ (b) $-\frac{(-2xy^3)^2}{6y^2}$

5.1.17: (a) $[\frac{(-5u^3v)^2}{10u^2v}]^2$ (b) $[\frac{-5(u^3v)^2}{10u^2v}]^2$

5.1.19: (a) $\frac{x^{2n+4}y^{4n}}{x^5y^{2n+1}}$ (b) $\frac{x^{6n}y^{n-7}}{x^{4n+2}y^5}$

In Exercises 21-50, evaluate the expression.

5.1.21: 5^{-2}
5.1.27: $\frac{1}{4^{-3}}$
5.1.30: $-\frac{1}{6^{-2}}$
5.1.38: $\frac{5^{-1}}{5^2}$
5.1.39: $\frac{10^3}{10^{-2}}$
5.1.44: $\frac{10^{-5}}{10^{-6}}$
5.1.50: $(32+4^{-3})^0$

In Exercises 51-90, rewrite the expression using only positive exponents, and simplify.

5.1.51: $y^4 \cdot y^{-2}$

5.1.55: $7x^{-4}$

5.1.63: $\frac{(4t)^0}{t^{-2}}$

5.1.67: $(-3x^{-3}y^2)(4x^2y^{-5})$

5.1.69: $(3x^2y^{-2})^{-2}$

5.1.73: $\frac{6x^3y^{-3}}{12x^{-2}y}$

5.1.75: $(\frac{3u^2v^{-1}}{3^3u^{-1}v^3})^{-2}$

5.1.78: $(\frac{a^{-3}}{b^{-3}})(\frac{a}{b})^3$

5.1.80: $(ab)^{-2}(a^2b^2)^{-1}$

5.1.87: $(u + v^{-2})^{-1}$

5.1.90: $\frac{u^{-1}-v^{-1}}{u^{-1}+v^{-1}}$

In Excercise 91, evaluate the expression when $x = -3, y = -4$

5.1.91: $x^2 \cdot x^{-3} \cdot x \cdot y$

In Exercises 101-114, write the number in scientific notation.

5.1.101: 3,600,000
5.1.105: 0.00031
5.1.108: 0.0000000000692

In Exercise 115, write the number in decimal notation.

5.1.115: 7.2×10^8

In Exercise 133, evaluate the expression

5.1.133: $\frac{64{,}000{,}000}{0.00004}$

5.1.144: A studey by Australian astronomers estimated the number of stars within range of modern telescopes to be $70,000,000,000,000,000,000,000$. Write this number in scientific notation.

5.1.145: A cube of copper with an edge of 1 centimeter has approximately 8.483×10^{22} free electrons. Write this real number in decimal notation.

5.1.151: In 2005, the redident population of the United States was about 296 million people, and it would have cost each resident about $26,600 to pay off the federal debt. Use these two numbers to approximate the federal debt in 2005.

Section 5.2

In Exercises 1-12, write the plynomial in standard form, and find its degree and leading coefiiicient.

5.2.1: $4y + 16$

5.2.3: $2x + x^2 - 6$

5.2.7: $4 - 14t^4 + t^5 - 20t$

5.2.11: $v_0 t - 16t^2 (v_0$ is constant.)

In Exercises 13-18, determine whether the polynomial is a monomial , a binomial , or a trinomial.

5.2.13: $12 - 5y^2$

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

5.2.16: t^3

In Exercises 19-22, give an example of a polynomial in x that satisfies the conditions.

5.2.19: A monomial of degree 2

5.2.22: A monomial of degree 0

In Ecercises 23-26, state why the expression is not a polynomial.

5.2.23: $y^{-3} - 2$

5.2.1: $6 - \sqrt{n}$

In Exercises 27-42, use a horizontal format to find the sum.

5.2.29: $(2x^2 - 3) + (5x^2 + 6)$

5.2.31: $(5y + 6) + (4y^2 - 6y - 3)$

5.2.34: $(z^3 + 6z - 2) + (3z^2 - 6z)$

5.2.40: $(2 - \frac{1}{4}y^2 + y^4) + (\frac{1}{3}y^4 + 7x - \frac{1}{2}x^3)$

In Exercises 43-50, use a vertical format to find the sum.

5.2.43:

$$\begin{array}{rr} 5x^2 - 3x & +4 \\ -3x^2 & 4 \\ \hline \end{array}$$

5.2.47: $(5p^2 - 4p + 2) + (-3p^2 + 2p - 7)$

5.2.53: $(3x^2 - 2x + 1) - (2x^2 + x - 1)$

5.2.61: Substract $3x^3 - (x^2 + 5x)$ from $x^3 - 3x$

5.2.63:

$$\begin{array}{rr} x^2- & x+3 \\ -(& x-2) \\ \hline \end{array}$$

5.2.69: $-(2x^3 - 3) + (4x^3 - 2x)$

5.2.71: $(4x^5 - 10x^3 + 6x) - (8x^5 - 3x^3 + 11) + (4x^5 + 5x^3 - x^2)$

5.2.75: $(8x^3 - 4x^2 + 3x) - [(x^3 - 4x + 5) + (x - 5)]$

5.2.86: $(6x^{2r} - 5x^r + 4) + (2x^{2r} + 2x^r + 3)$

5.2.97: Find the height in feet of a free-falling object at the specified times using the position function $h(t) = -16t^2 + 64$. Then describe the vertical path of the object.
(a) $t = 0$ (b) $t = \frac{1}{2}$
(c) $t = 1$ (d) $t = 2$

5.2.97: An object is dropped from a hot-air balloon that is 200 feet above the ground. Use the position fuction $h(t) = -16t^2 + 200$ to find the heights of the object when $t = 1, 2, 3$

Section 5.3

In Exercises 1-14, perform the indicated multiplications.

5.3.1: $(-2a^2)(-8a)$

5.3.3: $2y(5 - y)$

5.3.5: $4x(2x^2 - 3x + 5)$

5.3.7: $-2m^2(7 - 4m + 2m^2)$

5.3.10: $-y^4(7y^3 - 4y^2 + y - 4)$

5.3.12: $-7t(2t)(6 - 3t)$

In Exercises 15-32, multiply using the FOIL Method.

5.3.15: $(x + 2)(x + 4)$

5.3.17: $(x - 4)(x + 4)$

5.3.20: $(x - 6)(x + 6)$

5.3.23: $(5x - 2)(2x - 6)$

5.3.24: $(4x + 7)(3x + 7)$

5.3.28: $(3z - \frac{3}{4})(4z - 8)$

5.3.30: $(2x - y)(3x - 2y)$

In Exercises 33, 41, use a horizontal format to find the product.

5.3.33: $(x - 1)(x^2 - 4x + 6)$

5.3.41: $(5x^2+2)(x^2+4x-1)$

In Exercises 45, 50 , use a vertical format to find the product.

5.3.45:

$$\begin{array}{lr} 7x^2- & 14x+9 \\ \times & 2x+1) \\ \hline \end{array}$$

5.3.50: $(2s^2-5s+6)(3s-4)$

In Exercises 53-82, use a special product formula to find the product.

5.3.53: $(x+2)(x-2)$

5.3.61: $(2a+5b)(2a-5b)$

5.3.69: $(x+5)^2$

5.3.100: A closed rectangular box has sides of lengths $2n-2, 2n+2, 2n$ inches.
(a) Write a polynomial function $V(n)$ that represents the volume of the box.

(b)What is the volume if the length of the sortest side is 4 inches?

(c)Write a polynomial function $A(n)$ taht represents the area of the base of the box.

(d)Write a polynomial function for the area of the base if the length and width increase by 3. Show that the area of the base is not $A(n+4)$.