ASSIGNMENT 9

DYLAN ZWICK'S MATH 1010 CLASS

1. SECTION 6.2

In Exercises 1, 2, fill in the missing factor.

6.2.1: $\dfrac{7x^2}{3y(\quad)} = \dfrac{7}{3y}, x \neq 0$

6.2.2: $\dfrac{14x(x-3)^2}{(x-3)(\quad)} = \dfrac{2x}{x-3}$

In Exercises 9-36, multiply and simplify. See Examples 1-5.

6.2.9: $4x \cdot \dfrac{7}{12x}$

6.2.11: $\dfrac{8s^3}{9s} \cdot \dfrac{6s^2}{32s}$

6.2.15: $\dfrac{8}{3+4x} \cdot (9+12x)$

6.2.17: $\dfrac{8u^2v}{3u+v} \cdot \dfrac{u+v}{12u}$

6.2.23: $\dfrac{4r-12}{r-2} \cdot \dfrac{r^2-4}{r-3}$

6.2.25: $\dfrac{2t^2-t-15}{t+2} \cdot \dfrac{t^2-t-6}{t^2-6t+9}$

6.2.27: $(4y^2-x^2) \cdot \dfrac{xy}{(x-2y)^2}$

6.2.29: $\dfrac{x^2+2xy-3y^2}{(x+y)^2} \cdot \dfrac{x^2-y^2}{x+3y}$

6.2.31: $\dfrac{x+5}{x-5} \cdot \dfrac{2x^2-9x-5}{3x^2+x-2} \cdot \dfrac{x^2-1}{x^2+7x+10}$

In Exercises 37-52, divide and simplify. See Examples 6-8.

6.2.37: $\dfrac{x}{x+2} \div \dfrac{3}{x+1}$

6.2.41: $\dfrac{2x}{5} \div \dfrac{x^2}{15}$

6.2.47: $\dfrac{4x}{3x-3} \div \dfrac{x^2+2x}{x^+x-2}$

6.2.51: $\dfrac{x^2+2x-15}{x^2+11x+30} \div \dfrac{x^2-8x+15}{x^2+2x-24}$

6.2.69: The number of jobs J (in millions) in Florida, and the population P (in millions) of Florida, for the years 2001 through 2006 can be modeled by

$$J = \tfrac{-0.696t+8.94}{-0.092t+1}, 1 \leq t \leq 6 \text{ and}$$
$$P = 0.352t + 15.97, 1 \leq t \leq 6$$

where t represents the year, with $t = 1$ corresponding to 2001. Find a model Y for the number of jobs per person during these years.

2. SECTION 6.3

In Exercises 1-22, combind and simplify. See Examples 1-3.

6.3.1: $\dfrac{5x}{6} + \dfrac{4x}{6}$

6.3.2: $\dfrac{7y}{12} + \dfrac{9y}{12}$

6.3.7: $\dfrac{z^2}{3} + \dfrac{z^2-2}{3}$

6.3.15: $\dfrac{w}{w^2-4}+\dfrac{2}{w^2-4}$

6.3.2: $\dfrac{c}{c^2+3c-4}-\dfrac{1}{c^2+3c-4}$

In Exercises 23, 29, 32, find the least common multiple of the expressions. See Example 4.

6.3.23: $5x^2, 20x^3$

6.3.29: $63z^2(z+1), 14(z+1)^2$

6.3.32: $6(x^2-4), 2x(x+2)$

In Exercises 41, 47, find the least common denominator of the two fractions and rewrite each fraction using the least common denominator.

6.3.41: $\dfrac{n+8}{3n-12}, \dfrac{10}{6n^2}$

6.3.47: $\dfrac{x-8}{x^2-25}, \dfrac{9x}{x^2-10x+25}$

In Exercises 49-82, combine and simplify. See Examples 5-9.

6.3.51: $\dfrac{7}{a}+\dfrac{14}{a^2}$

6.3.55: $\dfrac{20}{x-4}+\dfrac{20}{4-x}$

6.3.62: $\dfrac{3}{y-1}+\dfrac{5}{4y}$

6.3.63: $\dfrac{x}{x+3}-\dfrac{5}{x-2}$

6.3.65: $\dfrac{12}{x^2-9} - \dfrac{2}{x-3}$

6.3.69: $\dfrac{4}{x^2} - \dfrac{4}{x^2+1}$

6.3.71: $\dfrac{x}{x^2-x-30} - \dfrac{1}{x+5}$

6.3.77: $\dfrac{4}{x} - \dfrac{2}{x^2} + \dfrac{4}{x+3}$

3. SECTION 6.4

In Exercises 1-22, simplify the complex fraction. See Examples 1-4.

6.4.1: $\dfrac{\left(\frac{3}{16}\right)}{\left(\frac{9}{12}\right)}$

6.4.3: $\dfrac{\left(\frac{8x^2y}{3z^2}\right)}{\left(\frac{4xy}{9z^5}\right)}$

6.4.5: $\dfrac{\left(\frac{6x^3}{(5y)^2}\right)}{\left(\frac{(3x)^2}{15y^4}\right)}$

6.4.7: $\dfrac{\left(\frac{y}{3-y}\right)}{\left(\frac{y^2}{y-3}\right)}$

6.4.10: $\dfrac{\left(\frac{5x}{x+7}\right)}{\left(\frac{10}{x^2+8x+7}\right)}$

6.4.11: $\dfrac{\left(\frac{x^2+3x-10}{x+4}\right)}{3x+6}$

6.4.15: $\frac{(\frac{6x^2-17x+5}{3x^2+3x})}{(\frac{3x-1}{3x+1})}$

6.4.20: $\frac{t^3+t^2-9t-9}{t^2-5t+6} \div \frac{t^2+6t+9}{t-2}$

In Exercises 25-44, simplify the complex fraction. See Examples 5 and 6.

6.4.25: $\frac{(\frac{4}{x}+3)}{(\frac{4}{x}-3)}$

6.4.28: $\frac{(1-\frac{2}{x})}{(\frac{x}{2})}$

6.4.39: $\frac{(\frac{10}{x+1})}{(\frac{1}{2x+2}+\frac{3}{x+1})}$

6.4.41: $\frac{(\frac{1}{x}-\frac{1}{x+1})}{(\frac{1}{x+1})}$

In Exercise 45, simplify the expression. See Example 7.

6.4.45: $\frac{2y-y^{-1}}{10-y^{-2}}$

6.4.55: Determine the average of two real numbers $\frac{x}{5}$ and $\frac{x}{6}$

4. SECTION 6.5

In Exercises 1-14, perform the division.

6.5.1: $(7x^3-2x^2) \div x$

6.5.4: $(5y^3 + 6y^2 - 3y) \div (-y)$

6.5.5: $(m^4 + 2m^2 - 7) \div m$

6.5.7: $\dfrac{50z^3 + 30z}{-5z}$

6.5.10: $\dfrac{6x^4 + 8x^3 - 18x^2}{3x^2}$

In Exercise 15, use the long division algorithm to perform the division. See Example 2.

6.5.15: Divide 1013 by 9.

In Exercises 19-56, perform the division. See Examples 3-6.

6.5.19: $\dfrac{x^2 - 8x + 15}{x - 3}$

6.5.22: $(y^2 - 6y - 16) \div (y + 2)$

6.5.25: $(21 - 4x - x^2) \div (3 - x)$

6.5.27: $\dfrac{5x^2 + 2x + 3}{x + 2} = 5x - 8 + \dfrac{19}{x + 2}$

6.5.35: $\dfrac{x^3 - 2x^2 + 4x - 8}{x - 2}$

6.5.41: $\dfrac{x^2 + 16}{x + 4}$

6.5.49: $(x^3 + 4x^2 + 7x + 7) \div (x^2 + 2x + 3)$

6.5.50: $(2x^3 + 2x^2 - 2x - 15) \div (2x^2 + 4x + 5)$

6.5.52: $(8x^5 + 6x^4 - x^3 + 1) \div (2x^3 - x^2 - 3)$

6.5.53: Divide $x^4 - 1$ by $x - 1$

6.5.54: Divide $x^6 - 1$ by $x - 1$

In Exercises 61-72, use synthetic division to divide. See Example 7.

6.5.61: $(x^2 + x - 6) \div (x - 2)$

6.5.62: $(x^2 + 5x - 6) \div (x + 6)$

6.5.65: $\dfrac{x^4 - 4x^3 + x + 10}{x - 2}$

6.5.69: $\dfrac{10x^4 - 50x^3 - 800}{x - 6}$

In Exercises 73, completely factor the polynomial given one of its factors. See Example 8.

6.5.73: $x^3 - x^2 - 14x + 24$ Factor is $x - 3$.