ASSIGNMENT 8

DYLAN ZWICK'S MATH 1010 CLASS

5.4 Factoring by Grouping and Special Forms

Write the number as a product of prime factors.

5.4.1: 6

5.4.4: 12

5.4.5: 30

5.4.8: 54

Find the greatest common factor of the expressions.

5.4.9: 16,24

5.4.13: x^3, x^4

5.4.15: $3x^2, 12x$

5.4.18: $9x^3y, 24xy^2$

Factor out the greatest common monomial factor.(some of the polynomials have no common monomial factors.)

5.4.21: $4x + 4$

5.4.25: $24t^2 - 36$

5.4.28: $y^2 - 5y$

5.4.31: $11u^2 + 9$

Factor a negative real number out of the polynomial and then write the polynomial factor in standard form.

5.4.41: $7 - 14x$

Factor the expression by factoring out the common binomial factor.

5.4.55: $2y(y-4)+5(y-4)$

5.4.59: $2(7a+6)-3a^2(7a+6)$

5.4.64: $(3x+7)(2x-1)+(x-6)(2x-1)$

Factor the polynomial by grouping.

5.4.65: $x^2+25x+x+25$

5.4.67: $y^2-6y+2y-12$

5.4.69: x^3+2x^2+x+2

5.4.71: $3a^3-12a^2-2a+8$

5.4.75: $5x^3-10x^2y+7xy^2-14y^3$

Factor the difference of two squares.

5.4.77: x^2-9

5.4.79: $1-a^2$

5.4.80: $16 - b^2$

5.4.82: $9z^2 - 36$

5.4.85: $4z^2 - y^2$

5.4.93: $(x-1)^2 - 16$

5.4.95: $81 - (z+5)^2$

Factor the sum or difference of cubes.

5.4.99: $x^3 - 8$

5.4.103: $8t^3 - 27$

Factor the polynomial completely.

5.4.111: $8 - 50x^2$

5.4.115: $y^4 - 81$

5.4.136: *Chemical Reaction* The rate of change of a chemical reaction is given by $kQx - kx^2$, where Q is the amount of the original substance, x is the amount of substance formed, and k is a constant of the proportionality. Factor this expression.

5.4.138: *Farming* A farmer has enough fencing to construct a rectanglular pig pen that encloses an area given by $32w - w^2$, where w is the width(in feet) of the pen. Use factoring to find the length of the pen in terms of w.

5.5 Factoring Trinomials

Factor the perfect square trinomial.

5.5.1: $x^2 + 4x + 4$

5.5.5: $25y^2 - 10y + 1$

5.5.10: $x^2 - 14xy + 49y^2$

5.5.13: $5x^2 + 30x + 45$

Find two real numbers b, or one real number c such that the expressions is a perfect square trinomial.

5.5.21: $x^2 + bx + 81$

5.5.25: $x^2 + 8x + c$

5.5.28: $z^2 - 20z + c$

Factor the trinomial.

5.5.37: $x^2 + 6x + 5$

5.5.38: $x^2 + 7x + 10$

5.5.40: $x^2 - 10x + 24$

5.5.41: $y^2 + 7y - 30$

5.5.42: $m^2 - 3m - 10$

5.5.44: $x^2 + 4x - 12$

5.5.45: $x^2 - 20x + 96$

5.5.49: $x^2 + 30xy + 216y^2$

Factor the trinomial, if possible.(Note: Some of the trinomials may be prime.)

5.5.67: $6x^2 - 5x - 25$

5.5.69: $10y^2 - 7y - 12$

5.5.70: $6x^2 - x - 15$

5.5.75: $2t^2 - 7t - 4$

5.5.77: $6b^2 + 19b - 7$

5.5.79: $-2x^2 - x + 6$

5.5.85: $4w^2 - 3w + 8$

5.5.87: $60y^3 + 35y^2 - 50y$

Factor the trinomial by grouping.

5.5.93: $3x^2 + 10x + 8$

5.5.96: $7x^2 - 13x - 2$

Factor the expression completely.

5.5.99: $3x^3 - 3x$

5.5.102: $16z^3 - 56z^2 + 49z$

5.5.132: *Number Problem* Let n be an integer.

(a) Factor $8n^3 + 12n^2 - 2n - 3$ so as to verify that it represents the product of three consecutive odd integers.

(b) If $n = 15$, what are the three integers?

6.1 Rational Expressions and Functions

Find the domain of the rational function.

6.1.1: $f(x) = \dfrac{x^2+9}{4}$

6.1.3: $f(x) = \dfrac{4}{x-3}$

6.1.4: $g(x) = \dfrac{-2}{x-7}$

6.1.10: $h(x) = \dfrac{4x}{x^2+16}$

6.1.15: $f(t) = \dfrac{5t}{t^2-16}$

6.1.17: $g(y) = \dfrac{y+5}{y^2-3y}$

Evaluate the rational function as indicated, and simplify.If not possible, state the reason.

6.1.23: $f(x) = \dfrac{4x}{x+3}$

(a) $f(1)$

(b) $f(-2)$

(c) $f(-3)$

(d) $f(0)$

6.1.27: $h(s) = \dfrac{s^2}{s^2-s-2}$

(a) $h(10)$

(b) $h(0)$

(c) $h(-1)$

(d) $h(2)$

Describe the domain.

6.1.30: *Cost* The cost C in millions of dollars for the goverment to seize $p\%$ of an illegal drug as it enters the country is given by

$$C = \frac{528p}{100-p}.$$

6.1.31: *Inventory Cost* The inventory cost I when x units of a product are ordered from a supplier is given by

$$I = \frac{0.25x + 200}{x}.$$

Simplify the rational expression.

6.1.43: $\dfrac{5x}{25}$

6.1.45: $\dfrac{12x^2}{12x}$

6.1.51: $\dfrac{x^2(x-8)}{x(x-8)}$

6.1.52: $\dfrac{a^2b(b-3)}{b^3(b-3)^2}$

6.1.55: $\dfrac{y^2-49}{2y-14}$

6.1.58: $\dfrac{u^2-12u+36}{u-6}$

6.1.60: $\dfrac{z^2+22z+121}{3z+33}$

6.1.65: $\dfrac{3x^2-7x-20}{12+x-x^2}$

6.1.71: $\dfrac{3xy^2}{xy^2+x}$

6.1.73: $\dfrac{y^2-64x^2}{5(3y+24x)}$

6.1.75: $\dfrac{5xy+3x^2y^2}{xy^3}$

6.1.78: $\dfrac{x^2+4xy}{x^2-16y^2}$

6.1.87: *Average Cost* A machine shop has a setup cost of \$2500 for the production of a new product. The cost of labor and material for producing each unit is \$9.25.

(a) Write the total cost C as a function of x,the number of units produced.

(b) Write the average cost per unit $\overline{C} = C/x$ as a function of x, the number of units produced.

(c) Determine the domain of the function in part (b).

6.1.88: *Average Cost* A greeting card company has an initial investement of \$60,000. The cost of producing one dozen card is \$6.50.

(a) Write the total cost C as a function of x, the number of dozens of cards produced.

(b) Write the average cost per dozen $\overline{C} = C/x$ as a function of x, the number of dozens of cards produced.

(c) Determine the domain of the funciton in part (b).

(d) Find the value of $\overline{C}(11,000)$.