



Algebra 1 Workbook

Factoring

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MATH

GREATEST COMMON FACTOR OF TRINOMIALS

- 1. Factor out the greatest common factor.

$$3x^2y^3 + 12x^3y^2 - 9x^4y^4$$

- 2. Fill in the blank with the correct term.

$$4a^3b - 10ab^2 + \underline{\hspace{2cm}} = 2ab(2a^2 - 5b + 3a^2b^2)$$

- 3. What went wrong in the following factoring?

$$10x^3y^4 - 5x^4y^2 - 20x^6y^3$$

$$x^3y^2(10y^2 - 5x - 20x^3y)$$

- 4. Factor out the greatest common factor.

$$2x + 8xy^2 - 16bx^2$$

- 5. Fill in the blank with the correct term.

$$6axy + \underline{\hspace{2cm}} - 2abx^2y = ax(6y + 3ab - 2bxy)$$



■ 6. Give an example of a trinomial in the variable x .

■ 7. Factor out the greatest common factor.

$$16ab^2c^3 + 8a^3b^3c - 12a^2b^3c^2$$



GREATEST COMMON FACTOR OF POLYNOMIALS

- 1. Factor the expression.

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

- 2. Fill in the blank with the correct term.

$$\frac{3x^3 - 12x}{3x} = x^2 - \underline{\hspace{2cm}}$$

- 3. What is the greatest common factor of the polynomial?

$$9s^3t^2 + 15s^2t^5 - 24s^5t + 6s^4t^2$$

- 4. What is the difference between a trinomial and a polynomial?

- 5. Factor the expression.

$$\frac{4x^4 - 8x^3 - 32x^2}{4x^2}$$



■ 6. What went wrong in the following factoring.

$$3x^3 - 3x^2 - 6x$$

$$x(3x^2 - 3x - 6)$$

$$x(3x + 3)(x - 2)$$



FACTORIZING QUADRATIC POLYNOMIALS

- 1. Factor the quadratic expression.

$$2x^2 + x - 3$$

- 2. What went wrong in the following factoring?

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

$$(x - 3)(x + 1)$$

- 3. Factor the quadratic expression.

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

- 4. Factor the quadratic expression.

$$x^2 - 9x + 18$$

- 5. Fill in the blank with the correct term.

$$2x^2 - \underline{\hspace{1cm}} - 4 = (2x + 1)(x - 4)$$



■ 6. Factor the quadratic expression.

$$x^2 - x - 2$$



FACTORING THE DIFFERENCE OF TWO SQUARES

- 1. Factor the expression.

$$4y^2 - 36$$

- 2. What went wrong in the following set of steps?

$$9a^4 - 25b^2$$

$$(9a^2 - 25b)(9a^2 + 25b)$$

- 3. Factor the expression.

$$49x^6y^2 - 36z^4$$

- 4. Fill in the blank with the correct term.

$$\underline{\hspace{2cm}} - 25y^2 = (2xz^2 - 5y)(2xz^2 + 5y)$$



COMPLETING THE SQUARE

- 1. Solve for x by completing the square.

$$x^2 - 6x + 5 = 0$$

- 2. Fill in the blank with the correct term.

$$x^2 - \underline{\hspace{2cm}} + \frac{9}{4} = -2 + \frac{9}{4}$$

- 3. Complete the square in the following expression, but do not solve.

$$3y^2 - 12y + 3 = 0$$

- 4. Solve for a by completing the square.

$$2a^2 + 8a = -4$$

- 5. What is your first and second step in solving the problem by completing the square?

$$4x^2 - 16x + 28 = 0$$



■ 6. Explain when and why completing the square is used for factoring.

■ 7. Solve for y by completing the square.

$$3y^2 + 9y = 3$$

■ 8. Fill in the blank with the correct term.

$$\underline{\hspace{2cm}} - 4x = 6$$

$$\left(x - \frac{2}{3}\right)^2 = \frac{22}{9}$$



COMPLETING THE SQUARE WITH COMPLEX ROOTS

- 1. Solve for x by completing the square.

$$x^2 + 6x + 11 = 0$$

- 2. What went wrong in the following set of steps toward completing the square?

$$3x^2 - 12x - 7 = 0$$

$$3x^2 - 12x + 36 = 7 + 36$$

- 3. Fill in the blank with the correct term.

$$-2y^2 - 12y = 9$$

$$y^2 + 6y + \underline{\hspace{1cm}} = -\frac{9}{2} + \underline{\hspace{1cm}}$$

- 4. Solve for x by completing the square.

$$2x^2 + 8x + 35 = 0$$

- 5. Complete the square but do not solve.



$$x^2 + 12x + 20 = 0$$

■ 6. What is the difference in the problem when completing the square with complex roots compared to real roots?

■ 7. Solve for z by completing the square.

$$z^2 - 8z + 25 = 0$$

■ 8. Fill in the blank with the correct term.

$$z^2 + \underline{\hspace{1cm}}z + \frac{25}{4} = -7 + \frac{25}{4}$$

■ 9. Give an example of a quadratic equation that would have complex roots.

■ 10. Solve for z .

$$z^2 - 4z = -5$$



QUADRATIC FORMULA

- 1. Solve for x using the quadratic formula.

$$4x^2 - 8x - 15 = 0$$

- 2. Write the quadratic formula for the following quadratic equation.

$$x^2 - 5x - 24 = 0$$

- 3. What went wrong in the way the quadratic formula was applied?

$$3x^2 - 5x + 10 = 0$$

$$x = \frac{-5 \pm \sqrt{(-5)^2 - 4(3)(10)}}{2(3)}$$

- 4. Solve for z using the quadratic formula.

$$z^2 = z + 3$$

- 5. Fill in the blank with the correct term if the quadratic formula below was built from the quadratic equation.



$$\underline{\hspace{1cm}} x^2 + 3x - 5 = 0$$

$$x = \frac{-3 \pm \sqrt{(3)^2 - 4(-2)(-5)}}{2(-2)}$$

- 6. Simplify the expression.

$$\frac{-(-8) \pm \sqrt{(-8)^2 - 4(1)(14)}}{2(1)}$$

- 7. What are two ways to solve a quadratic equation when you cannot easily factor?

- 8. What went wrong if the quadratic formula below was built from the quadratic equation?

$$x^2 + 2x = 7$$

$$x = \frac{-2 \pm \sqrt{(2)^2 - 4(1)(7)}}{2(1)}$$

- 9. Solve for t using the quadratic formula.

$$4t^2 - 1 = -8t$$



FACTORING TO FIND A COMMON DENOMINATOR

- 1. Simplify the expression by combining the two fractions.

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

- 2. What is the one thing you need in order to add or subtract rational expressions?

- 3. What is the common denominator of the rational expressions?

$$\frac{x^2-1}{x^2-4} \text{ and } \frac{x+1}{3x^2-3x-6}$$

- 4. Simplify the expression by combining the two fractions.

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

- 5. What went wrong in the following simplification?

$$\frac{1}{x+1} + \frac{3x-1}{(2x-2)(x+1)}$$



$$\frac{1}{(x+1)(2x-2)} + \frac{3x-1}{(2x-2)(x+1)}$$

- 6. Fill in the blank with the correct term.

$$\frac{2}{\underline{\hspace{2cm}}} - \frac{x-2}{x^2-9} = \frac{2(x-3) - 4(x-2)}{4(x-3)(x+3)}$$

- 7. Simplify the expression by combining the two fractions.

$$\frac{4}{(x+1)(x-3)} - \frac{1}{(x+4)(x+1)}$$

- 8. What went wrong in the following simplification?

$$\frac{3}{x^2-25} - \frac{1}{x+5}$$

$$\frac{3-x-5}{(x-5)(x+5)}$$



