

Review Guide for Algebra (Elementary)

I) Linear Equations in one variable. Solve.

- 1) $6x - 48 = 6$
- 2) $(\frac{2}{3})x - 5 = x - 3$
- 3) $-8x - 45 = 7x$
- 4) $(50 - x) - (3x + 2) = 0$
- 5) $8 - 4(x - 1) = 2 + 3(4 - x)$
- 6) One number is 8 more than a second number. Three times the smaller number plus twice the larger is equal to 26. What are the numbers?
- 7) The length of a rectangle is 14 meters more than the width. The perimeter of the rectangle is 264 meters. What are the dimensions of the rectangle?

II) Linear inequalities in one variable. Solve and graph on a number line.

- 1) $2x - 7 \geq 3$
- 2) $-5(2x + 3) < 2x - 3$

III) Exponents and polynomials. Simplify. Write answers with positive exponents.

- 1) $(3x^2 - 5x - 6) + (4x + 5x^2 + 4)$
- 2) $(3x^0y^5z^6)(-2xy^3z^6)$
- 3) $(3x^3 - 7x) \cdot (x - 1)$
- 4)
$$\frac{24x^5 - 36x^4 + 12x^2}{8x^3}$$
- 5) $(2a - 5)(3a + 8)$
- 6) $(3a - 7)(3a + 7)$

$$7) \quad (5a + 6)^2$$

$$8) \quad (4x - 5y)(3x - 7y)$$

IV) Factoring. Factor completely.

$$1) \quad 26x^4y^7 - 34x^3y^4 + 12x^8y$$

$$2) \quad 64x^4 - 4y^4$$

$$3) \quad 18a^2 - 15a - 18$$

$$4) \quad 5a^3 - 30a^2 - 80a$$

$$5) \quad a^2 - ac + ab - bc$$

$$6) \quad a^2 + 12a + 32$$

$$7) \quad 4x^2 - 20x + 25$$

V) Radicals. Simplify. All variables represent positive real numbers.

$$1) \quad (3\sqrt{200})(4\sqrt{32})$$

$$2) \quad \sqrt{\frac{4}{3}}$$

$$3) \quad \sqrt{24p^3q^6}$$

$$4) \quad 2\sqrt{18} - 5\sqrt{32} + 7\sqrt{162}$$

$$5) \quad (3 + \sqrt{8})(3 - \sqrt{8})$$

VI) Quadratic equations. Solve.

1) $4a^2 + 9a + 2 = 0$

2) $x^2 + 3x = 4$

3) $9x^2 - 81 = 0$

4) $(3x + 2)^2 = 16$

VII) Rational Expressions.

1) At what values are these expressions undefined?

a)

$$\frac{8m + 4}{2m + 2}$$

b)

$$\frac{x + 4}{x - 5}$$

2) What is the least common denominator for these groups of rational expressions?

a)

$$\frac{4}{3a^2} \quad \frac{13}{8a^3b} \quad \frac{15}{2ab^2}$$

b)

$$\frac{14}{a^2 - 9} \quad \frac{6}{a^2 - 6a + 9} \quad \frac{20}{a^2 - 2a - 15}$$

3) Simplify.

a)

$$\frac{4}{2a - 2} + \frac{3a}{a - a^2}$$

b)

$$\frac{(4x^2y^3)^2}{3xy} \div \frac{8x^3y^5}{12x^5y^7}$$

c)

$$\frac{2a^2 - 5a - 12}{a^2 - 10a + 24} \cdot \frac{a^2 - 9a + 18}{4a^2 - 9}$$

4) Solve.

a)

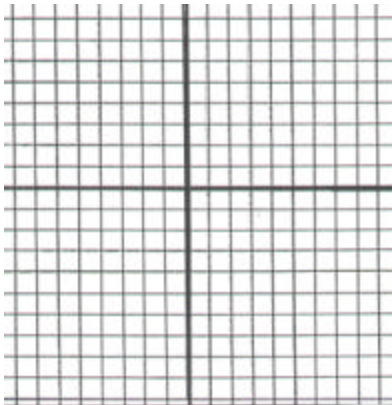
$$\frac{5-a}{a} + \frac{3}{4} = \frac{7}{a}$$

b)

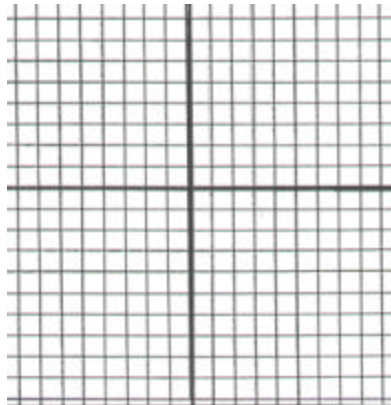
$$\frac{2}{k-3} - \frac{3}{k+3} = \frac{12}{k^2-9}$$

VIII) Graphing linear equations. Graph on the coordinate system.

1) $3x - 2y = 6$



2) $x = 3$



3) $y = -2$

