Review Guide for Algebra

(Intermediate)

I) Linear equations and inequalities in one variable.

1) Solve for x: $x-1-(x+2)-(x-3)=x$

2) If five times the smaller of two consecutive integers is added to three times the larger, the result is 59. Find the integers.

3) Solve for x; graph the solution on a number line:

$$-5(2x+3)<2x-3$$

4) Solve for x; graph the solution on a number line:

$$-3<2x-5<5$$

II) Exponents and polynomials.

1) Simplify; write the answer with positive exponents:

$$\frac{(2a^{-5}b^4c^3)^{-2}}{(3a^3b^{-7}c^3)^2}$$

2) Simplify; write the answer with positive exponents:

$$(4x^2y^6z)^2(-x^5y^7z^8)^6$$

3) Simplify; write the answer with positive exponents:

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

III) Factoring.

1) Factor completely: $49x^2-25y^2$

2) Factor completely: $a^2-ac+ab-bc$

3) Factor completely: $49a^2+42a+36$

IV) Radicals. All variables represent positive real numbers.

1) Simplify: $\dfrac{\sqrt{3}}{5-\sqrt{3}}$

2) Simplify; all variables represent positive numbers:

$$(\sqrt{28x^2y^3z})(\sqrt{14xy^4z^3})$$

3) Simplify; all variables represent positive numbers:

$$\sqrt[4]{8a^2b} \cdot \sqrt[4]{4a^3b^3}$$

4) Solve for x: $\sqrt{x+1} = 3$

V) Complex Numbers.

1) Simplify: i^{53}

2) Simplify: $-\sqrt{-20}$

3) Simplify: $(2+3i)^2$

4) Simplify: $\sqrt{-25} \cdot \sqrt{-81}$

VI) Quadratic Equations.

1) Solve for x: $2x^2 - 3x = 40$

2) Solve for x: $(3x+2)^2 = -16$

VII) Rational Expressions

1) For what value(s) of a is this rational expression undefined?

$$\frac{a^2+2a-3}{3a^2+11a+6}$$

2) What is the lowest common denominator for the following rational expressions?

$$\frac{3}{y}, \quad \frac{-4}{2y}, \quad \frac{3}{y^2+2y}$$

3) Simplify: $\frac{3}{x^2-1} - \frac{4}{x^2+3x+2}$

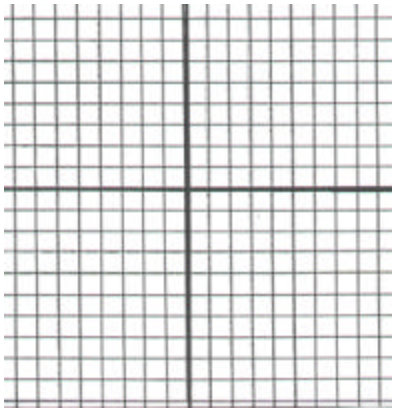
4) Simplify: $\frac{6a-18}{3a^2+2a-8} \cdot \frac{12a-16}{4a-12}$

5) Solve for p: $\dfrac{3p}{p^2+5p+6} = \dfrac{5p}{p^2+2p-3} - \dfrac{2}{p^2+p-2}$

VIII) Equations and inequalities in two variables.

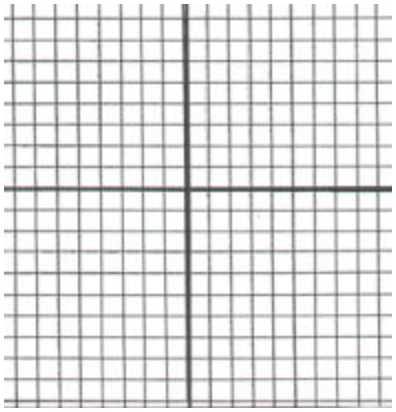
1) Graph on the axes shown; identify the intercepts (if any):

$4x - y = 0$



2) Graph on the axes shown; identify the vertex and any intercepts:

$y = 2x^2 - 4$



3) Find the distance between, and the slope of the line passing through, the points (2,5) and (-3,7).

4) Write the slope-intercept form of the equation of the line passing through the point (-2,1) and perpendicular to the line $6x + 3y = 4$.

5) Solve for x and y: $2x + 4y = 4$

$x - 2y = 0$

6) Solve. $|4x - 3| \leq 5$

7) Solve. $|(2/3)x + 1| > 3$

8) Graph the solution on the axes shown:

$2x \geq 3y + 6$