REVIEW ISSUES

1. Rounding numbers:

    A. Less than 5 - round to next lowest number; greater than or equal to 5 - round to next highest number.

    B. Rounding to the nearest whole number: if the digit after the decimal is less than 5 - just drop it; if it is greater than or equal to 5 - increase the number to the left of the decimal by 1.

    C. Rounding to the nearest tenth or hundredth: same rules apply. (Remember - 10th equals 1 decimal place to the right; 100th equals 2 decimal places to the right).

2. Operations with negative numbers:

    A. Adding a negative number is the same as subtraction
$$3 + (-2) = 3 - 2 = 1$$

    B. Subtraction changes the sign of a negative number
$$3 - (-2) = 3 + 2 = 5$$

    C. For multiplication and division:
A negative number times a negative number = a positive number
$$-3 \times -3 = 9$$
A Negative number times a positive number = a negative number
$$-3 \times 3 = -9$$
A negative number divided by a negative number = a positive number
$$-9 / -3 = 3$$
A negative number divided by a positive number = a negative number
$$-9 / 3 = -3$$

    D. A negative number does not have a square root because multiplying a negative number by itself cannot result in a negative value. Squaring a negative number always results in a positive value.

3. Order of operations:
    A. First, find all squares and square roots
    B. Then do all multiplication and division
    C. Finally, complete all addition and subtraction
$$8 + 2 \times 2^2/2$$
$$8 + 2 \times 4/2$$
$$8 + 8/2$$
$$8 + 4$$
$$12$$
    D. If equation contains parentheses or brackets, complete operations within parentheses or brackets first, then follow order of operations.

E. Formulas with denominators of fractions that themselves contain fractions. In this case, solve the fraction in the denominator first and then complete the division

$$\frac{15 - 9}{6/2}$$

$$\frac{15 - 9}{3}$$

$$\frac{6}{3}$$

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F. If equation is a fraction with numerator and denominator as fractions, first solve the numerator fraction, then the denominator fraction, then the final division.

4. Fractions:

    A. To add and subtract fractions:
        1. Convert the fractions to ones with common denominators, add or subtract the numerators, and place the result over the common denominator.
    B. To multiply:
        1. Multiply the numerators together to get the numerator of the answer, then multiply the denominators together to get the denominator of the answer.
    C. To divide:
        1. Invert the divisor and follow the rule for multiplication.
    D. To convert a fraction to a decimal:
        1. Divide the numerator by the denominator.
    E. To convert a fraction to a percent:
        1. Divide the numerator by the denominator.
        2. Multiply the result by 100.

5. Proportions and percent

    A. To convert a proportion to a percent (per one hundred) multiply by 100.
        .37 x 100 = 37%
    B. To convert a percent to a proportion - express the percent in hundredths
        37% ~ .37
    C. If you know a proportion (or percent) and the size of the original whole, you can find the number that the proportion represents by multiplying the proportion by the whole.
        25% of a class of 100 received an A on the exam, therefore:
            .25 x 100 = 25 students received an A on the exam.

6. Absolute value

    A. The absolute value of a number ignores the sign of the number. Thus, the absolute values of -6 is 6. This is expressed with symbols as $|-6| = 6$. It is expressed verbally as "the absolute value of -6 is 6." In a similar way, the absolute value of 4 - 7 is 3; that is, $|4 - 7| = |-3| = 3$.

7. Exponents and square roots

    A. In statistics you will primarily be using the square of a number expressed exponentially as 4^2 or 7^2, etc. When a number is said to be 'squared' it is simply that number multiplied by itself.

    B. You are not expected to calculate square roots without a calculator. However, on this readiness test, it is expected that you know the basic square roots (square root of 9 = 3; square root of 16 = 4, etc.).

8. Complex expressions

    A. Perform the operations in parentheses, then brackets.

    B. Perform operations in numerator separately from those in denominator and, finally, carry out the division.

9. Simple Algebra

    A. Simple algebra problem: isolate the unknown on one side of the equal side and combine the numbers on the other side. To do this, remember that you can multiply or divide both sides of the equation by the same number without affecting the value of the unknown.

$$\frac{x}{6} = 9 \qquad\qquad 11x = 30 \qquad\qquad \frac{3}{x} = 14$$

$$(6)\left(\frac{x}{6}\right) = (6)(9) \qquad \frac{11x}{11} = \frac{30}{11} \qquad (x)\left(\frac{3}{x}\right) = (14)(x)$$

$$x = 54 \qquad\qquad x = 2.73 \qquad\qquad 3 = 14x$$

$$\frac{3}{14} = \frac{14x}{14}$$

$$0.21 = x$$

10. Algebra

    A. FOIL (First-Outer-Inner-Last)

$$(2a + 3b)(2a - b) = 4a^2 - 2ab + 6ab - 3b^2 = 4a^2 + 4ab - 3b^2$$