**STUDENT STANDARDS AND TARGETS FOR MIDDLE LEVEL MATHEMATICS**

**GRADE: 8**

**OUTCOME: PR2**

**Model and solve problems using linear equations of the form:**

*ax = b; * = *b* , *a ≠ 0; ax + b = c;* **+ *b* = *c a* ≠ 0*;*  *a(x + b) = c*

**concretely, pictorially and symbolically, where *a*, *b*and *c* are integers.**

**WHAT WE WANT STUDENTS TO LEARN:**

1. Model a given problem with a linear equation and solve the equation using concrete models, e.g., counters, integer tiles.
2. Verify the solution to a given linear equation using a variety of methods, including concrete materials, diagrams and substitution. Draw a visual representation of the steps used to solve a given linear equation and record each step symbolically.
3. Solve a given linear equation symbolically.
4. Identify and correct an error in a given incorrect solution of a linear equation.
5. Apply the distributive property to solve a given linear equation, e.g., 2(*x* + 3) = 5; 2*x* + 6 = 5;…
6. Solve a given problem using a linear equation and record the process.

**NOTE:**

Students have previously solved **one-** and **two-step** **equations** in Grade 7, but these were limited to whole numbers.

Instruction should start with concrete materials and pictorial models, and then move to the symbolic, with the goal that students can solve one- and two-step equations symbolically.

**STANDARD ACHIEVEMENT TARGETS**

**Basic:**

PR2 ii

1) What is the solution to the equation modeled below?

**Legend**

 +1 +x

 -1 -x

(a) x = $-6$ (b) x = $-3$ (c) x = $+3$ (d) x = $+6$

PR2 ii

2) Solve the equation using a model. Include a legend.

 4x – 3 = 5

3) John solved the equation -2x + 4 = 6 and found x = 1. Verify his solution.

PR2 ii

PR2 vi

4) Uncle Joe is three years more than 8 times the age of cousin Bobby.

 If Uncle Joe is 27 years old, how old is cousin Bobby?

 Write the equation that corresponds to this problem and solve. Show all your work.

5) For which equation does ***x*** have the greatest value?

PR2 iii

1. 3*x* – 4 = 8 (b) – 5 = -7 (c) -6 + 5*x* = 9 (d) 2 + = 4

PR2 v

6) Apply the distributive property to solve 3(2x + 5) = 27. You may draw an area model.

**Mid Range:**

1) Using a model, solve 4 – x = 8. Verify your solution and include a legend.

PR2 ii

2) Solve the equation - 4 = -16 and verify your solution.

PR2 iii

3) Jamie solved – (2*n* – 1) = 9 and found that *n*=−5. Claudine’s solution to this equation was *n*=−4. Which solution is correct? Explain where the other person erred.

PR2 iv

4) The length of the school’s rectangular playground is 5 metres more than double its

PR2 vi

 width. Its perimeter is 190 metres. If the width if this field is represented by the

 algebraic variable *w*, write the equation that represents the perimeter and solve for *w*.

5) The admission to the town fair is $5 and it costs $3 per ride. If Joey only has $20, how many rides can he go on? Write the equation that you would use to solve this problem.

PR2 vi

6) Deidra has a basket with chocolate eggs. First she gave 10 to her sister, then she

PR2 vi

 shared the rest fairly with her 19 classmates. Each person got 4 eggs. How many

 were in the basket at the beginning?

**High:**

1) Ann-Marie uses the equation *x* + 2 = 12. What could the problem be?

PR2 vi

 Solve and verify.

2. (a) Explain how to apply the distributive property − (-11 − b + 6).

PR2 v

1. If this expression is equivalent to -10, what is the value of b?

PR2 iii

PR2 ii

3) Explain why –x = -5 results in the solution of x = 5.