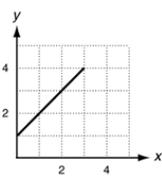


# Algebra I Standards Guide

| Graded Standard   | Aligned Content Standards                  | Sample Problem  |   |   |   |   |   |   |   |   |   |   |   |   |
|---|--|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <b>Expressions and Equations</b>  |  |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 1) Be able to translate between verbal narrative (words) and mathematical language. | A.SSE.1, A.CED.2., A.CED.1                 | Give two ways to write the expression below:<br>$100 - x$<br><br>Write an algebraic expression from the words below:<br>"8 less than n"   |   |   |   |   |   |   |   |   |   |   |   |   |
| 2) Be able to solve linear and absolute value equations                             | A.CED.1; A.REI.1, A.REI.3, HS.M            | Solve each equation below:<br>a) $17 = 5y - 3$<br>b) $\frac{7}{9} = 2n + \frac{1}{9}$<br>c) $ x + 3  = 10$<br>d) $5 +  x  = 14$   |   |   |   |   |   |   |   |   |   |   |   |   |
| 3) Be able to rearrange equations to solve for a variable of interest.              | A.CED.4                                    | Solve each equation below for the indicated variable:<br>a) $n - 6m = 8$ for $n$<br>b) $\frac{a}{b} = c$ for $b$<br>c) $\frac{h-4}{j} = k$ for $j$  |   |   |   |   |   |   |   |   |   |   |   |   |
| <b>Inequalities</b>   |  |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 4) Be able to solve linear, compound, and absolute value inequalities               | A.CED.1; A.REI.1, A.REI.3, A.REI. 12, HS.M | For each inequality below solve and graph the solutions:<br>a) $-3a + 10 < -11$<br>b) $-\frac{1}{5}z + \frac{2}{3} \leq 2$<br>c) $-15 < x - 8 < -4$<br>d) $x - 3 < -3$ OR $x - 3 \geq 3$<br>e) $ x + 1  + 5 < 7$  |   |   |   |   |   |   |   |   |   |   |   |   |
| <b>Functions</b>  |  |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 5) Be able to identify the domain and range of a function                           | F.IF.1, F.IF.5                             | For each relation below, find Domain and Range, and state whether it is a function:<br>a)<br><table border="1" style="display: inline-table; margin-left: 20px;"> <tr> <td>x</td> <td>8</td> <td>6</td> <td>4</td> <td>2</td> <td>0</td> </tr> <tr> <td>y</td> <td>8</td> <td>6</td> <td>4</td> <td>6</td> <td>8</td> </tr> </table><br>b)<br> | x | 8 | 6 | 4 | 2 | 0 | y | 8 | 6 | 4 | 6 | 8 |
| x   | 8  | 6   | 4 | 2 | 0 |   |   |   |   |   |   |   |   |   |
| y   | 8  | 6   | 4 | 6 | 8 |   |   |   |   |   |   |   |   |   |
| 6) Be able to determine and evaluate functions                                      | F.IF.2                                     | For the function:<br>$f(x) = 5x + 1$<br>a) Evaluate when $x=2$<br>b) Find $f(3)$  |   |   |   |   |   |   |   |   |   |   |   |   |

|   |                              |   |
|---|------------------------------|---|
|   |                              | c) Explain why $f(0)$ cannot equal both one and negative one  |
| <b>Linear Functions</b>   |                              |   |
| 7) Be able to calculate slope of a line   | F.IF.6, A.CED.2, A.CED.3     | Find the slope of line containing the points:<br>a) (0, 2) and (-2, 4)<br>b) (3, 1) and (5, 5)<br>c) (4, 2) and (6, 2)<br>d) (2, 4) and (2, 6)  |
| 8) Be able to express and evaluate linear relationships                                     | F.BF.1, F.LE.2, F.IF.8, HS.M | Given the two points (2, -3) and (5, -4), write an equation for the line containing these two points in:<br>a) Point-Slope form<br>b) Slope-Intercept form<br>c) Standard form  |
| 9) Be able to graph and transform linear functions including accurate slope and intercepts. | F.BF.3, F.IF.7, A.REI.10     | Graph each function below including accurate slope and intercepts:<br>a) $3x + 2y = -6$<br>b) $y + 4 = \frac{4}{3}x$<br>c) $y = -4x + 2$  |
| <b>Systems of Equations</b>   |                              |   |
| 10) Be able to solve systems of linear equations  | A.REI.6, A.REI.5, HS.M       | Solve each system below using either graphing, elimination, or substitution. Check your answers in each case.<br>a) $\begin{cases} y = x + 4 \\ y = -2x + 1 \end{cases}$<br>b) $\begin{cases} x + 3y = -7 \\ -x + 2y = -8 \end{cases}$          |
| 11) Be able to solve systems of linear inequalities   | A.REI.12, A.CED.3, A.REI.6   | Graph the solution to the system of linear inequalities. Give an example of 1 coordinate that is a solution and 1 coordinate that is not a solution.<br>$\begin{cases} y \leq \frac{1}{2}x + 1 \\ x + y < 3 \end{cases}$                        |
| <b>Exponents and Rational Expressions</b>   |                              |   |
| 12) Be able to use the properties of exponents to simplify and expand expressions           | N.RN.1, N.RN.2, A.SSE.3      | Simplify each expression below:<br>a) $\frac{x^{-3}y^2z^2}{z^{-4}x^2}$<br>b) $a^3b^{-2}c^0 \times a^{-1}c^2b^2$<br>c) $(3x^{-2}y)^{-2}$<br>Convert each expression to either radical or rational<br>d) $81^{\frac{1}{2}}$<br>e) $\sqrt[3]{r^9}$ |

| <b>Polynomials</b>   |  |  |
|--|--|--|
| 13) Be able to do mathematical operations with polynomials   | A.SSE.1, A.APR.1, F.BF.1,                                      | Simplify each expression using polynomial operations:<br>a) $(4x^3 - x^2 + 4x) + (x^3 - x^2 - 4x)$<br>b) $(12d^2 + 3dx + x) - (-4d^2 + 2dx - 8x)$<br>c) $(2x - 5)(4x^2 - 3x + 1)$  |
| 14) Be able to factor polynomials  | A.SSE.1, A.SSE.2   | Factor each polynomial completely:<br>a) $2x^2 + 13x + 15$<br>b) $6x^2 - 23x + 20$<br>c) $18x^3 + 15x^2 + 24x + 20$<br>d) $44a^2 + 11a$  |
| <b>Quadratics</b>  |  |  |
| 15) Be able to graph quadratic functions including important data (intercepts, maxima/minima)          | F.IF.4, F.BF.3, F.IF.7, F.IF.7.A                               | Given the function:<br>$f(x) = -2x^2 - 8x + 10$<br>a) Identify the axis of symmetry<br>b) Identify the vertex<br>c) Graph including two additional points other than the vertex  |
| 16) Be able to solve quadratic equations   | A.CED.1, A.REI.4, HS.M   | Solve each quadratic using any method:<br>a) $x^2 - 3x = 0$<br>b) $x^2 - 12x + 11 = 0$<br>c) $2x^2 - 3x - 5 = 0$   |
| <b>Intro to Exponential Functions</b>  |  |  |
| 17) Be able to graph exponential functions showing important data (intercepts and end behavior)        | F.BF.3, F.LE.2, F.IF.7.E                                       | Graph each function including accurate y-intercept and end-behavior direction:<br>a) $y = 5(2)^x$<br>b) $y = -2(3)^x$<br>c) $y = 3\left(\frac{1}{2}\right)^x$  |
| 18) Be able to evaluate and solve exponential Growth and Decay situations and interpret within context | F.IF.7, F.LE.1, F.LE.1B, F.LE.1C, F.LE.2, F.LE.5, HS.M         | Write an equation to model each situation and determine if it is exponential growth or decay:<br>a) You have a principal of \$1500 invested at a rate of 3.5% compounded quarterly for 10 years<br>b) The population of town is 2500 and is decreasing at a rate of 3% over 5 years                  |
| <b>Modeling with Functions</b>   |  |  |
| 19) Be able to identify linear, quadratic and exponential functions, equations, graphs and models.     | A.REI.11, S.ID.6, S.ID.6.A, S.ID.6.B, S.ID.6.C, F.LE.1, F.LE.3 | Look for a pattern in each set of coordinates and determine what type of function can best be modeled:<br>a) $\{(-5, 9), (-4, 0), (-3, -7), (-2, -12)\}$<br>b) $\{(-2, 9), (-1, 13), (0, 17), (1, 21)\}$<br>c) $\{(1, 4), (2, 6), (3, 9), (4, 13.5)\}$<br>d) $\{(0, 4), (2, 12), (4, 36), (6, 76)\}$ |

| <b>Statistics and Probability</b>                                  |                                |  |          |                    |              |     |             |      |                    |    |       |     |
|--|--------------------------------|--|----------|--------------------|--------------|-----|-------------|------|--------------------|----|-------|-----|
| 20) Be able to accurately represent data visually                  | S.ID.1, S.ID.5                 | <p>Use this data to make a graph. Explain why you chose that type of graph.</p> <p style="text-align: center;"><b>Mother Tongues for the Population of Quebec, 2001</b></p> <table border="1" data-bbox="1101 468 1414 758"> <thead> <tr> <th>Language</th> <th>People (thousands)</th> </tr> </thead> <tbody> <tr> <td>English only</td> <td>572</td> </tr> <tr> <td>French only</td> <td>5789</td> </tr> <tr> <td>English and French</td> <td>55</td> </tr> <tr> <td>Other</td> <td>709</td> </tr> </tbody> </table> | Language | People (thousands) | English only | 572 | French only | 5789 | English and French | 55 | Other | 709 |
| Language   | People (thousands)             |  |          |                    |              |     |             |      |                    |    |       |     |
| English only   | 572                            |  |          |                    |              |     |             |      |                    |    |       |     |
| French only  | 5789                           |  |          |                    |              |     |             |      |                    |    |       |     |
| English and French   | 55                             |  |          |                    |              |     |             |      |                    |    |       |     |
| Other  | 709                            |  |          |                    |              |     |             |      |                    |    |       |     |
| 21) Be able to identify shape, center, spread and outliers of data | S.ID.2, S.ID.3                 | <p>Use the data below to create a box-and-whisker plot and identify any outliers<br/> { 22, 45, 30, 18, 25, 47, 33}</p>  |          |                    |              |     |             |      |                    |    |       |     |
| 22) Be able to calculate probability of events                     | S.CP.1, S.CP.2, S.CP.8, S.MD.7 | <p>What is the probability of drawing a Red Card from a standard deck followed by a King without replacing the cards?</p>  |          |                    |              |     |             |      |                    |    |       |     |