1. Solve the system, show work algebraically.
   \[ \begin{align*}
   \text{a)} & \quad 3x + 5y = -1 \\
   \text{b)} & \quad 2x + 10y = -2 \\
   \text{c)} & \quad -6x + 10y = -30 \\
   \text{d)} & \quad 10y = -32
   \end{align*} \]
   
   Check: 
   \[ \begin{align*}
   -2(3) + 2(-2) &= -10 \\
   -6(-2) + (-2) &= 10
   \end{align*} \]

2. Find \( m \) and \( c \) so that the system:
   \[ \begin{align*}
   3x - 10 &= -10 \\
   3x - 4y &= -10 \\
   7x - 12 &= -30 \\
   9x + my &= c
   \end{align*} \]

   has
   a) no solution
   b) infinite solutions

3. Solve, show work algebraically.
   a) \[ \frac{x + 3}{x} = \frac{28}{7} \]
   \[ \begin{align*}
   & x + 3 = 28 \\
   & x = 25
   \end{align*} \]
   b) \[ x(x + 8) = -7 \]
   \[ \begin{align*}
   & x^2 + 8x + 7 = 0 \\
   & (x + 7)(x + 1) = 0 \\
   & x = -7 \quad x = -1
   \end{align*} \]

4. Find \( k \) for which \( 2x^2 + kx + 2 = 0 \)
   has
   a) one real solution
   \[ \begin{align*}
   & b^2 - 4ac = 0 \\
   & k^2 - 4(2)(2) = 0 \\
   & k^2 = 16 \quad k = \pm 4
   \end{align*} \]
   b) 2 real solutions
   \[ k > 4 \]
   c) no real solution
   \[ k < -4 \]
5. Put in turning point form and hence find the vertex.

\[ y = 3x^2 + 12x + 17 \]

\[ 3(x^2 + 4x + 1) = -17 + 12 \]

\[ 3(x+2)^2 + 5 \]

5. \[ y = 3(x+2)^2 + 5 \]
   vertex: \((-2, 5)\)

6. Find the equation of the parabola with x-intercepts at -4 and 3 and y-intercept at -6.

\[ -6 = a(0+4)(0-3)(x+4)(x-3) \]

\[ -6 = a(-12) \]

\[ a = \frac{1}{4} \]

6. \[ y = \frac{1}{4}x^2 + x - 12 \]

7. Solve. Express answer in interval notation.

\[ 2x^2 + x - 1 = 0 \]

\[ (2x-1)(x+1) = 0 \]

\[ \text{interval notation: } (-1, \frac{1}{2}) \]

7. \((-1, \frac{1}{2})\)

8. Graph the functions on the same set of axes, then solve: \( f(x) < g(x) \).

\[ f(x) = x - 5 \]

\[ g(x) = x^2 - 6x + 5 \]

\[ f(x) = 2 - 5 \]

\[ g(x) = (x-3)^2 - 4 \]

\[ q(2) = (2-5)(2-1) \]

\[ = (-3)(1) \]

\[ = -3 \]

8. solution: \( x < 2 \) \( \cup \) \( x > 5 \)

9. Find \( m \) so that the line is tangent to the parabola.

\[ y = 2x + m \]

\[ y = x^2 + 3x - 5 \]

\[ x^2 + 3x - 5 = 2x + m \]

\[ x^2 + x - 5 - m = 0 \]

\[ B^2 - 4AC = 0 \]

\[ \text{difference of functions} \]

\[ 4m = -21 \]

\[ m = -\frac{21}{4} \]