SOLUCION

1. Resuelva las siguientes ecuaciones.
   a. \[(x - \frac{1}{2}) + (2x - 1) = 2(x - \frac{1}{2}) + (1 - x)\]
      \[x - \frac{1}{2} + 2x - 1 = 2x - 1 + 1 - x\]
      \[3x - \frac{3}{2} = x\]
      \[3x - x = \frac{3}{2}\]
      \[2x = \frac{3}{2}\]
      \[x = \frac{3}{4}\]
   b. \[(t + 1)(t - 4) = (t - 2)^2\]
      \[t^2 - 4t + t - 4 = t^2 - 4t + 4\]
      \[t^2 - 3t - t^2 + 4t = 4 + 4\]
      \[t = 8\]

2. Resuelva por la variable indicada.
   a. \[P = a + art\] por \(t\)
      \[P = a + art\]
      \[p - a = art\]
      \[\frac{p - a}{ar} = t\]
   b. \[d = V_0 + \frac{at^2}{2}\] por \(a\)
      \[d = V_0 + \frac{at^2}{2}\]
      \[d - V_0 = \frac{at^2}{2}\]
      \[2(d - V_0) = at^2\]
      \[\frac{2(d - V_0)}{t^2} = a\]

3. Resuelva las siguientes ecuaciones por factorización.
   a. \[10u^2 = 13u - 4\]
      \[10u^2 - 13u + 4 = 0\]
      \[(2u - 1)(5u - 4) = 0\]
      \[2u - 1 = 0\]
      \[5u - 4 = 0\]
      \[u = 1/2\] o \(u = 4/5\)
   b. \[2x^2 - 12x + 16 = 4x - 8\]
      \[2x^2 - 12x - 4x + 16 + 8 = 0\]
      \[2x^2 - 16x + 24 = 0\]
      \[2(x^2 - 8x + 12) = 0\]
      \[2(x - 6)(x - 2) = 0\]
      \[x - 6\] o \(x - 2 = 0\]
      \[x = 6\] o \(x = 2\)
4. Resuelva las siguientes ecuaciones completando el cuadrado.
   a. \( x^2 + 10x + 19 = 0 \)
      
      \[
      x^2 + 10x + 5^2 = -19 + 5^2 \\
      (x + 5)^2 = 6 \\
      x + 5 = \pm \sqrt{6} \\
      x = \pm \sqrt{6} - 5 \\
      x = \sqrt{6} - 5 \quad o \quad x = -\sqrt{6} - 5
      \]

   b. \( 3x^2 + 18x = -13 \)
      
      \[
      3(x^2 + 6x) = -13 \\
      x^2 + 6x = -\frac{13}{3} \\
      x^2 + 6x + 3^2 = -\frac{13}{3} + 3^2 \\
      (x + 3)^2 = \frac{14}{3} \\
      x + 3 = \pm \sqrt{\frac{14}{3}} \\
      x = \pm \sqrt{\frac{14}{3}} - 3 \\
      x = \sqrt{\frac{14}{3}} - 3 \quad o \quad x = -\sqrt{\frac{14}{3}} - 3
      \]

5. Encuentre todas las soluciones reales de la ecuación cuadrática Use la fórmula cuadrática.
   a. \( 4x^2 + 3 = 16x \)
      
      \[
      4x^2 - 16x + 3 = 0 \\
      a = 4 \quad b = -16 \quad c = 3 \\
      x = \frac{16 \pm \sqrt{256 - 4(4)(3)}}{2(4)} \\
      x = \frac{16 \pm 4\sqrt{13}}{8} \\
      x = 2 + \frac{\sqrt{13}}{2} \quad o \quad x = 2 - \frac{\sqrt{13}}{2}
      \]

   b. \( 17x - 30 = 2x^2 \)
      
      \[
      -2x^2 + 17x - 30 = 0 \\
      2x^2 - 17x + 30 = 0 \\
      a = 2 \quad b = -17 \quad c = 30 \\
      x = \frac{17 \pm \sqrt{289 - 4(2)(30)}}{2(2)} \\
      x = \frac{17 \pm \sqrt{49}}{4} = 17 \pm \frac{7}{4} \\
      x = \frac{17 \pm 7}{4} \\
      x = \frac{17 + 7}{4} = 6 \quad o \quad x = \frac{17 - 7}{4} = \frac{5}{2}
      \]
6. Encuentre todas las soluciones reales de la ecuación.

a. \[ \frac{3}{x^2 - 1} - \frac{x + 2}{1 - x} = \frac{x}{x + 1} \]
\[
3 \left( \frac{1}{(x-1)(x+1)} \right) \left[ \frac{3}{(1-x)(x+1)} + \frac{x+2}{x+1} \right] = (x-1)(x+1) \frac{x}{x+1}
\]
\[
3 + (x+2)(x+1) = x(x-1)
\]
\[
x^2 + 3x + 2 = x^2 - x
\]
\[
x^2 + 3x - x^2 + x = -5
\]
\[
4x = -5
\]
\[
x = -\frac{5}{4}
\]

b. \[ \frac{1}{x-6} + \frac{x}{x-2} = \frac{4}{x^2 - 8x + 12} \]
\[
1 \quad \frac{x}{x-2} = \frac{4}{(x-6)(x-2)}
\]
\[
(x-6)(x-2) \left( \frac{1}{x-6} + \frac{x}{x-2} \right) = (x-6)(x-2) \frac{4}{(x-6)(x-2)}
\]
\[
x - 2 + x(x-6) = 4
\]
\[
x - 2 + x^2 - 6x = 4
\]
\[
x^2 - 5x - 6 = 0
\]
\[
(x-6)(x+1) = 0
\]
\[
x = 6 \quad o \quad x = -1
\]

pero \( x = 6 \) no es solución, entonces \( x = -1 \)

Comprobación:
\[
\frac{1}{-1-6} + \frac{1}{-1-2} = \frac{4}{(-1)^2 - 8(-1) + 12}
\]
\[
\frac{1}{-7} + \frac{1}{-3} = \frac{4}{-1 + 8 + 12}
\]
\[
\frac{1}{-7} + \frac{1}{-3} = \frac{4}{1 + 8 + 12}
\]
\[
\frac{4}{-21} = \frac{4}{21}
\]

c. \[ 2|3x-1| - 4 = 8 \]
\[
2|3x-1| = 8 + 4
\]
\[
2|3x-1| = 12
\]
\[
|3x-1| = 6
\]
\[
3x - 1 = 6 \quad o \quad 3x - 1 = -6
\]
\[
3x = 7 \quad o \quad 3x = -5
\]
\[
x = \frac{7}{3} \quad o \quad x = -\frac{5}{3}
\]

d. \[ |2x-2| = x + 1 \]

Como la función valor absoluto es no negativa
\[
x + 1 \geq 0 \Rightarrow x \geq -1. \quad \text{Además},
\]
\[
2x - 2 = x + 1 \quad o \quad 2x - 2 = -x - 1
\]
\[
2x - x = 2 + 1 \quad o \quad 2x + x = 2 - 1
\]
\[
x = 3 \quad o \quad x = -\frac{1}{3}
\]

Como ambos son mayores que -1, entonces las dos son soluciones de la ecuación.
e. \[ \sqrt{2x-3} - x = -1 \]
\[ \sqrt{2x-3} = x + 1 \]
\[ (\sqrt{2x-3})^2 = (x + 1)^2 \]
\[ 2x - 3 = +1 \]
\[ -x^2 + 2x + 2x - 3 + 1 = 0 \]
\[ -x^2 + 4x - 4 = 0 \]
\[ x^2 - 4x + 4 = 0 \]
\[ (x - 2)^2 = 0 \]
\[ x = 2 \]
Comprobación:
\[ \sqrt{2(2)-3} - 2 \]
\[ = \sqrt{1} - 2 \]
\[ = 1 - 2 \]
\[ = -1 \]

f. \[ \sqrt{x} + \sqrt{x-4} = 2 \]
\[ \sqrt{x} = 2 - \sqrt{x-4} \]
\[ (\sqrt{x})^2 = (2 - \sqrt{x})^2 \]
\[ x = 4 - 2(2)\sqrt{x} + (\sqrt{x})^2 \]
\[ x = 4 - 4\sqrt{x} + x \]
\[ x + 4\sqrt{x} - x = 4 + 4 \]
\[ 4\sqrt{x} = 8 \]
\[ \sqrt{x} = 2 \]
\[ x = 4 \]
Comprobación:
\[ \sqrt{4} + \sqrt{4-4} \]
\[ = 2 + 0 \]
\[ = 2 \]