To simplify $\frac{2}{3}(\frac{3}{4}-\frac{1}{2})$, note that $\frac{1}{2} = \frac{2}{4}$, so
\[
\frac{2}{3}(\frac{3}{4}-\frac{1}{2}) = \frac{2}{3}(\frac{3}{4}-\frac{2}{4}) = \frac{2}{3}(\frac{1}{4}) = \frac{2}{12}.
\]

To graph $4x-2y+12=0$, first we can solve for $y$: $4x+12 = 2y$ and $y = \frac{4x+12}{2} = 2x+6$. This is an equation of a line with slope 2 and a $y$-intercept of 6.

To solve for $x$ in $9xy+z=3w$, first subtract $z$, then divide by $9y$:
\[
x = \frac{3w-z}{9y}.
\]

To solve $-14 < -3x+1 \leq 7$, first subtract 1:
\[-15 < -3x \leq 6.
\]
Second, divide by $-3$, remembering that dividing by a negative number "flips" the inequality:
\[-2 \leq x < 5.
\]
To solve $5x^2 - 2(x-1) = 4x^2 + 6x - 13$ for $x$:

Distributive law: $5x^2 - 2x + 2 = 4x^2 + 6x - 13$.

Subtract $4x^2 + 6x - 13$:

$x^2 - 8x + 15 = 0$.

Quadratic Formula:

$x = \frac{8 \pm \sqrt{8^2 - 4(15)}}{2} = \frac{8 \pm \sqrt{4}}{2} = 4 \pm 1$.

So: $x = 5$ or $x = 3$.

To solve $2^{(x+7)} = 8$ for $x$, note that

$x + 7 = \log_2 (2^{(x+7)}) = \log_2 (8) = \log_2 (2^3) = 3$.

Subtract 7, to find that $x = 3 - 7 = -4$.

For the system of equations $-3x + y = -1$ and $x + y = 7$, we can solve the second equation for $x$: $x = 7 - y$. Next, substitute this value for $x$ into the first equation:

$-3(7-y) + y = -1$, which simplifies to $-21 + 4y = -1$. Hence, $4y = 20$, so $y = 5$.

Since, $x = 7 - y$, we have that $x = 2$. 
To solve for $x$ in $f(3x-7) = 2$, apply the inverse function to see that $3x - 7 = f^{-1}(2)$. Since we were told that $f^{-1}(2) = 11$, we have $3x - 7 = 11$, so $3x = 18$, and $x = 6$.

To solve for $x$ in $\log_3(x) + \log_3(x-2) = 1$, recall that

$$\log_3(x) + \log_3(x-2) = \log_3(x(x-2)) = \log_3(x^2 - 2x)$$

so $\log_3(x^2 - 2x) = 1$, and thus, $x^2 - 2x = 3^1 = 3$. Hence, $x^2 - 2x - 3 = 0$. By the quadratic formula, $x = 3$ or $x = -1$.

Notice that $x = -1$ cannot be a solution to our original equation, since if $x = -1$, then $\log_3(x-2) = \log_3(-3)$ and we cannot take a logarithm of a negative number. Therefore, $x = 3$ is the only solution.
To find the roots of $x^3-2x^2-3x+6$, we know from the hint that 2 is a root, so $x-2$ divides $x^3-2x^2-3x+6$.

Using long division,

\[
\begin{array}{c|cc cc}
& x^2 & -3 \\
\hline
x-2 & x^3 & -2x^2 & -3x & +6 \\
\hline 
 & x^3 & -2x^2 \\
\hline 
 & 0 & 0 & 0 & 0
\end{array}
\]

That is, $(x-2)(x^2-3) = x^3-2x^2-3x+6$.
The root of $(x-2)$ is 2.
The roots of $x^2-3$ are $\sqrt{3}$ and $-\sqrt{3}$.
Therefore, the roots of $x^3-2x^2-3x+6$ are 2, $\sqrt{3}$, and $-\sqrt{3}$. 

Solutions to MATH 1060 Sample Problems

- Tangent is opposite divided by adjacent, so
  \[
  \tan(\alpha) = \frac{15}{8}.
  \]

- Sine is opposite divided by hypotenuse, so
  \[
  \sin(\frac{\pi}{6}) = \frac{x}{5}. \text{ Thus,} \quad x = 5 \sin(\frac{\pi}{6}) = 5 \cdot \frac{1}{2} = \frac{5}{2}.
  \]

- \(\sin^2 \theta + \cos^2 \theta = 1\).