SECTION 1.1 (Let me know if you see any typos and I'll correct them. –RH)

2. The equation $3x - 4xy = 0$ is **NOT LINEAR** because the term $4xy$ has two variables multiplied together.

   Note. A few people divided both sides by x to get $3 + 4y = 0$, or $4y = -3$, which is linear. However, this is a different equation from what we started out with. For example, note that $x = 0, y = 5$ is a solution to $3x + 4xy = 0$, but not to $4y = -3$. The illegal move was dividing by x, which is potentially 0. Moral: *Never divide both sides of an equation by a variable expression unless you are sure that expression cannot equal 0.*

6. The equation $(\sin 2)x - y = 14$ is **LINEAR** because $\sin 2$ is a constant.

14. $$\begin{cases} x - y = 4 \\ 2y + z = 6 \\ 3z = 6 \end{cases}$$

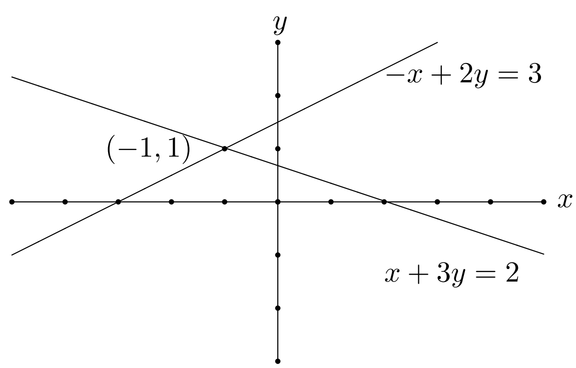
    Back-substitution gives $\boxed{x = 6, y = 2, z = 2}$, and this checks back.

16. $$\begin{cases} x_1 + x_2 + x_3 = 0 \\ x_2 = 0 \end{cases}$$

    Back-substitution gives $x_2 = 0$ and $x_1 = -x_3$, so solution is $\boxed{x_1 = -t, x_2 = 0, x_3 = t}$, which checks back.

18. $$\begin{cases} x + 3y = 2 \\ -x + 2y = 3 \end{cases}$$

    Adding the two equations gives $5y = 5$, or $y = 1$. Plugging this back into either of the equations in the system gives $x = -1$, so the solution is $\boxed{x = -1, y = 1}$, which checks back.



In graphing the two equations in the system, we get two lines which intersect at the point $(-1, 1)$. Since this point is on both lines, it has to be a solution to both equations, so $(x, y) = (-1, 1)$ is the solution of the system, which agrees with the work done above.