Practice test 1

1. **Solving equations.** Solve the following systems of equations:

   - $\begin{cases} x + y = 6 \\ -x + y = 0 \end{cases}$,

   - $\begin{cases} w + z = 4 \\ 2w + z = 5 \end{cases}$,

   - $\begin{cases} x + y + z = 4 \\ x - 2y - z = 1 \\ 2x - y - 2z = -1 \end{cases}$,

   - $\begin{cases} x + 2y + z = 7 \\ 2x + y + 3z = 13 \\ 3x + 3y + 2z = 16 \end{cases}$,

   - $\begin{cases} x + y + 2z = 1 \\ 2x - y - z = 4 \\ 3x + 2y + 5z = 3 \end{cases}$,

   - $\begin{cases} 2u + v - 3w = 1 \\ 5u + 2v - 6w = 5 \\ 3u - v - 4w = 7 \end{cases}$,

   - $\begin{cases} u + w = 0 \\ 2u + v = 1 \\ v + 2w = 1 \end{cases}$.

2. **Inverse functions.**

   - Let $f(x) = 1 + x^2$ on $[0, 2]$. Find a formula for the inverse function and the domain on which it is valid.
   - Let $f(t) = t^3$ on $[0, 1]$. Find a formula for the inverse function and the domain on which it is valid.
   - Let $f(x) = 1/x$ on $[1, 3]$. Find a formula for the inverse function and the domain on which it is valid.
   - Let $f(x) = 1 - x$ on $[-2, 0]$. Find a formula for the inverse function and the domain on which it is valid.
   - Let $f(x) = \sqrt{x}$ on $[4, 9]$. Find a formula for the inverse function and the domain on which it is valid.

3. **Pythagorean theorem.**

4. **Word problems.** 3.2.1 - 3.2.54

5. **Units.**

   - Convert 3 gallons to quarts.
   - Convert 7920 yards to miles.
   - Which is faster, going 80 miles an hour, or going 40 meters per second?
   - Suppose an object is moving at 66 ft/sec. How fast would you have to drive a car to keep pace with this object?
   - You are mixing some concrete for a home project, and you've calculated according to the directions that you need six gallons of water for your mix. But your bucket isn't calibrated, so you don't know how much it holds. On the other hand, you just finished a two-liter bottle of soda. If you use the bottle to measure your water, how many times will you need to fill it?
   - You find out that the average household in Mesa, Arizona uses about 0.86 acre-feet of water every year. You get your drinking water home-delivered in those big five-gallon bottles for the water dispenser. How many of these water bottles would have to be stacked in your driveway to equal 0.86 acre-feet of water?
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- You've been watching a highway construction project that you pass on the way home from work. They've been moving an incredible amount of dirt. You call up the information line, and find out that, when all eighty trucks are running with full crews, the project moves about nine thousand cubic yards of dirt each day. You think back to the allegedly "good old days" when work was all done manually, and wonder how many wheelbarrowsful of dirt would be equivalent to nine thousand cubic yards of dirt. You go to your garage, and see that your wheelbarrow is labeled on its side as holding six cubic feet. Since people wouldn't want to overfill their barrows, spill their load, and then have to start over, you assume that this stated capacity is a good measurement. How many wheelbarrow loads would it take to move the same amount of dirt as those eighty trucks?

6. **Function notation.**

    - Given $f(x) = x^2 + 2x - 1$, find $f(2)$.
    - Given $f(x) = x^2 + 2x - 1$, find $f(-3)$.
    - Given that $f(x) = 3x^2 + 2x$, find $f(h)$.
    - Given that $f(x) = 3x^2 + 2x$, find $f(x + h)$.
    - Given that $f(x) = 3x^2 + 2x$, find $f(x + h) - f(h)$.
    - Given that $f(x) = 3x^2 + 2x$, find $[f(x + h) - f(x)]/h$