1. (2 points) Graph the following function. Make sure to include in your plot the x-intercept, y-intercept, and one other point.

\[ g(x) = -2\sqrt{x - 1} \]

Solution: We should recall the graph of \( f(x) = \sqrt{x} \) as seen in Figure 1a. \( f_1(x) = f(x - 1) = \sqrt{x - 1} \) shifts the graph \( f(x) \) to the right by 1 unit as seen in Figure 1b. \( f_2(x) = 2f_1(x) = 2\sqrt{x - 1} \) stretches the graph \( f_1(x) \) by a factor of 2 as seen in Figure 1c. \( f_3(x) = -f_2(x) = -2\sqrt{x - 1} \) reflects the graph \( f_2(x) \) about the x-axis as seen in Figure 1d. We see that \( g(x) = f_3(x) \), so our solution is Figure 1d.

![Figure 1](image-url)
the denominator can never be zero. That is we have to have \( x - 1 \geq 0 \) and \( x^2 - 4x + 4 \neq 0 \). 
\( x - 1 \geq 0 \) implies \( x \geq 1 \). \( x^2 - 4x + 4 \) factors to \((x - 2)^2\). This is zero only when \( x = 2 \). So our two restrictions are \( x \geq 1 \) and \( x \neq 2 \). Hence our domain is \([1, 2) \cup (2, \infty)\).

3. (2 points) Is the following function even, odd, or neither?

\[ h(x) = (\sin(5x) + 7x^3)^4 \]

Solution: We know \( \sin(x) \) and \( x^3 \) are odd functions. So let us evaluate \( h(-x) \).
\[
h(-x) = (\sin(-5x) + 7(-x^3))^4 = (-\sin(5x) - 7x^3)^4 = ((-1)(\sin(5x) + 7x^3))^4 = (-1)^4(\sin(5x) + 7x^3)^4 = (\sin(5x) + 7x^3)^4 = h(x).
\]

So \( h(-x) = h(x) \). Therefore \( h(x) \) is even.

4. (2 points each) Solve and evaluate the following quantities.

(a) \( \tan(x) = \frac{1}{\sqrt{3}} \) (You could have solved for any \( x \) that works.)

Solutions: Recalling that \( \tan(x) = \frac{\text{opposite}}{\text{adjacent}} \), we can construct the diagram in Figure 2. This diagram is the so called 30-60-90 triangle from geometry. So we see that \( x = 30^\circ \). Now we need to convert to radians. \( 30^\circ = \frac{180^\circ}{6} = \pi/6 \). So \( x = \pi/6 \)

(b) \( \sin^2(5\pi/4) \) (Evaluate)

Solution: We can use the identity that \( \sin(\pi + x) = -\sin(x) \).
\[
\sin(5\pi/4) = \sin(\pi + \pi/4) = -\sin(\pi/4) = -\frac{\sqrt{2}}{2}.
\]
We are asked to find \( \sin^2(5\pi/4) \), so we square our result to get the answer. \(-\frac{\sqrt{2}}{2}\)^2 = 2/4 = 1/2.