1. Sketch graphs for the following functions. For this question only you do not need to give any explanation beyond an answer.

(a) $|3x + 2|$
(b) $|x + 1| - |x - 1|$
(c) $x^2 - 3x + 2$
(d) $\frac{2x + 1}{x - 1}$
(e) $\sin^2 x$

2. (Exercise 1.3.55) Prove that if $0 \leq a \leq b$ then $\frac{a}{1 + a} \leq \frac{b}{1 + b}$.

3. Find the number(s) $x$ in the interval $[0, 2\pi]$ which satisfy each of the following equations:

(a) (Exercise 1.6.32) $\cos x = -1/2$
(b) (Exercise 1.6.33) $\tan x/2 = 1$
(c) (Exercise 1.6.34) $\sqrt{\sin^2 x} = 1$
(d) (Exercise 1.6.38) $\tan = -\sqrt{3}$

4. In each of the following cases, determine $f + g$, $f - g$, $f \cdot g$ and $f/g$, and give the domain of each:

(a) (Exercise 1.7.10) $f(x) = x^2 - 1$, $g(x) = x + \frac{1}{x}$
(b) (Exercise 1.7.12) $f(x) = \sin^2 x$, $g(x) = \cos 2x$
5. Form the composition $f \circ g$ and give the domain when:

(a) (Exercise 1.7.23) $f(x) = 2x + 5, \ g(x) = x^2$
(b) (Exercise 1.7.25) $f(x) = \sqrt{x}, \ g(x) = x^2 + 5$
(c) $f(x) = x^2 + 5, \ g(x) = \sqrt{x}$
(d) (Exercise 1.7.30) $f(x) = \sqrt{1 - x}, \ g(x) = 2\cos x$ for $x \in [0, 2\pi]$

6. We say that a function $f$ is even if $f(-x) = f(x)$ for all $x \in \text{dom}(f)$. We say that $f$ is odd if $f(-x) = -f(x)$ for all $x \in \text{dom}(f)$.

(a) (Exercise 1.7.57) Given that $f$ is defined for all real numbers, show that the function $g(x) = f(x) + f(-x)$ is an even function.
(b) (Exercise 1.7.58) Given that $f$ is defined for all real numbers, show that the function $h(x) = f(x) - f(-x)$ is an odd function.
(c) (Exercise 1.7.59) Show that every function defined for all real numbers can be written as the sum of an even function and an odd function.

7. Give an $\varepsilon, \delta$ proof for the following statements:

(a) (Exercise 2.2.36) $\lim_{x \to 2} (3x - 1) = 5$
(b) (Exercise 2.2.38) $\lim_{x \to 0} (2 - 5x) = 2$
(c) (Exercise 2.2.50) $\lim_{x \to 2} x^2 = 4$