Section 3: The modulus function

Exercise level 1

1. Sketch the graphs of each of the following functions.
   - (i) $y = |x|$
   - (ii) $y = |x - 2|$
   - (iii) $y = |2x + 1|$
   - (iv) $y = 2|x| + 1$
   - (v) $y = |3x - 1| + 1$
   - (vi) $y = 1 - |x|$

2. By sketching a graph, or otherwise, find the solution(s) to each of the following equations.
   - (i) $|3x - 2| = 1$
   - (ii) $|2x + 3| = 1 - x$
   - (iii) $|x - 3| = 2x + 1$

3. Solve the following inequalities:
   - (i) $|x + 2| < 4$
   - (ii) $|3x + 1| \geq 2$
   - (iii) $|x - 2| \leq 1$
   - (iv) $|2x - 5| > 3$

4. Express each of the following inequalities in the form $|x - a| < b$.
   - (i) $1 < x < 9$
   - (ii) $-4 < x < 6$
   - (iii) $-3 < x < 8$
   - (iv) $2 < x < 11$