Show all work. Answers given with incomplete reasoning will not receive full credit.

Question 1 (3 points) Let

\[ A = \left\{ 2, \pi, \frac{3}{1000}, 0.5, -100, -\frac{1}{3}, \sqrt{2}, \sqrt{-4}, 0.3210293\ldots \right\} \]

Classify the subsets of A which are:

(a): Integers
(b): Rational numbers
(c): Irrational numbers
(d): Real numbers

a) Integers = \{ 2, -100 \}

b) Rationals = \{ 2, \frac{3}{1000}, 0.5, -100, -\frac{1}{3} \}

c) Irrationals = \{ \pi, \sqrt{2}, 0.3210293\ldots \}

d) Reals = \{ 2, \pi, \frac{3}{1000}, 0.5, -100, -\frac{1}{3}, \sqrt{2}, 0.3210293\ldots \}

Question 2 (2 points) Use interval and inequality notation to describe all numbers \( x \) such that \( x \) is less than 3 but no less than -10.

Interval: \([-10, 3)\)

Inequality: \(-10 \leq x < 3\)
Question 3 (2 points) Split the absolute value and write as a piecewise expression:

\[ |5x - 31| \]

\[ 15x - 31 = \begin{cases} 
5x - 31 & \text{if } 5x - 31 \geq 0 \\
-(5x - 31) & \text{if } 5x - 31 < 0 
\end{cases} \]