1 Step Functions

1. This mock test will help you master the concept of step functions.
2. This is a 30-minute, 8-question test. The highest possible score is 11 points.
3. Answer all questions without any notes, resources, calculators, etc.

1.1 Problems

Problem 1.1 (1 point). ASN: If a is an integer and b is a real number, then $\lfloor a+b \rfloor = a+\lfloor b \rfloor$.

For the next four items, consider $f(x) = \lfloor 3x - 5 \rfloor$, $g(x) = 2\lceil x + 4 \rceil$, and $h(x) = \text{sgn}(2x) - 4$.

Problem 1.2 (1 point). Evaluate $f(5) - f(2.5)$.

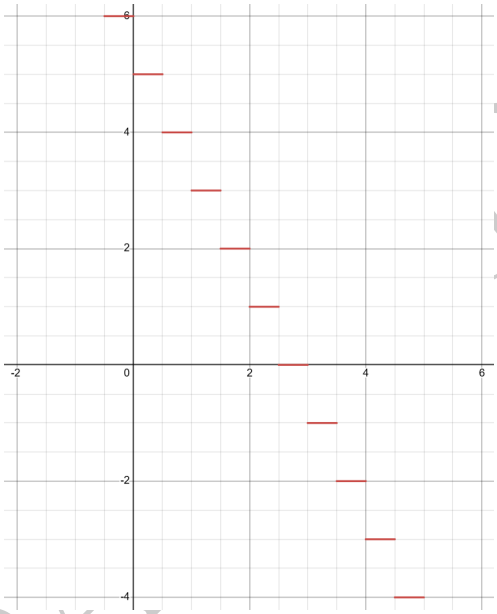
Problem 1.3 (1 point). Evaluate $g(-8.2)$.

Problem 1.4 (2 points). What is the largest possible value of $h(x)$ for any real number x?

Problem 1.5 (2 points). True or false: 2 is in the range of $g(x)$.

Problem 1.6 (1 point)**.** State in interval notation the set of all possible values of x where $\lfloor 2x + 1 \rfloor = 5$.

For the next two items, refer to the graph of the **ceiling** function below.



Problem 1.7 (2 points)**.** Suppose that $p(x) = a\lceil bx + h \rceil + k$. Find $a + b + h + k$.

Problem 1.8 (1 point)**.** Find the value of $p(50) + p\left(-\dfrac{25}{2}\right)$.