Limits of Functions Worksheet - Answer Key
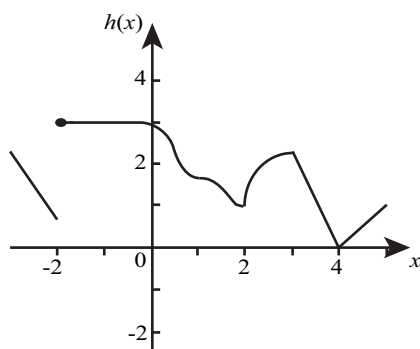
x	$g(x)$
-2	4
-1.5	3.5
-1.009	3.14321
-1.00001	3.14122
-0.9994	3.14035
0	2

1. From the graph above find $\lim\limits_{x \to 2} h(x)$.

   1

2. From the graph above find $\lim\limits_{x \to -2} h(x)$.

   The limit does not exist.

3. From the graph above find $\lim\limits_{x \to 4} h(x)$.

   0

4. From the graph above find $\lim\limits_{x \to -2^+} h(x)$.

   3

5. From the graph above find $\lim\limits_{x \to 0^-} h(x)$.

   3

6. From the table above estimate $\lim\limits_{x \to -2^+} h(x)$.

   3.14

7. Find $\lim\limits_{x \to \frac{\pi}{2}} \frac{x \sin(2x)}{\cos(x)}$.

   $\lim\limits_{x \to \frac{\pi}{2}} \frac{2x \sin(x) \cos(x)}{\cos(x)} = \pi$

8. Find $\lim\limits_{x \to 0} \frac{\ln(3^x)}{x} - 5x$.

   $\lim\limits_{x \to 0} \frac{x \ln(3)}{x} - 5x = ln3$

9. Find $\lim\limits_{y \to 1} \frac{y^3 - 1}{y - 1}$.

   $\lim\limits_{y \to 1} \frac{(y-1)(y^2 + y + 1)}{y - 1} = 3$

10. For $f(x) = \begin{cases} x - 2 & \text{if } x < -1; \\ ax^2 - 3 & \text{if } x \geq -1. \end{cases}$, find the value of a such that $\lim\limits_{x \to -1} f(x)$ exists.

    $a - 3 = -3 \implies a = 0$