

Review for Calculus I

Function Evaluations:

1. Evaluate the following (give exact answers/do not round) or state that it is undefined:

(a) $f(2)$ where $f(x) = \sqrt{6x + 52}$

(b) $g(-1)$ where $g(x) = 9x^3 + 2$

(c) $h(0)$ if $h(x) = \frac{4}{x}$

(d) $f(-5)$ if $f(x) = \sqrt{x}$

(e) $g(\frac{\pi}{2})$ given $g(x) = \sin x$

(f) $h(0)$ given $h(x) = e^{8x} + \ln(4 + x)$

(g) $f(-9)$ and $f(0)$ given $f(x) = \begin{cases} x^2 + 3x & \text{if } x < 0 \\ -x & \text{if } x \geq 0 \end{cases}$

2. Simplify your answers for the following:

(a) What is $f(2 + h)$ when $f(x) = x^2$?

(b) What is $g(5 + h)$ when $g(x) = x^2 + 7x$?

(c) What is $f(1 + h)$ when $f(x) = e^{4x}$?

(d) What is $f(x_k)$ given $x_k = 2 + k$ and $f(x) = 5x + 9$?

(e) What is $g(5 + h) - g(5)$ given $g(x) = x^3 + 7$?

3. Use the table below to evaluate the following composed functions:

x	$f(x)$	$g(x)$
0	-1	4
2	4	-2
4	9	3

(a) $f \circ g(0)$

(b) $g(f(2))$

Domains:

4. Write the domain of $f(x)$ in interval notation where $f(x) = \frac{6 - x}{x^2 + x}$.

5. Write the domain of $g(x)$ in interval notation where $g(x) = \sqrt{x + 8}$.

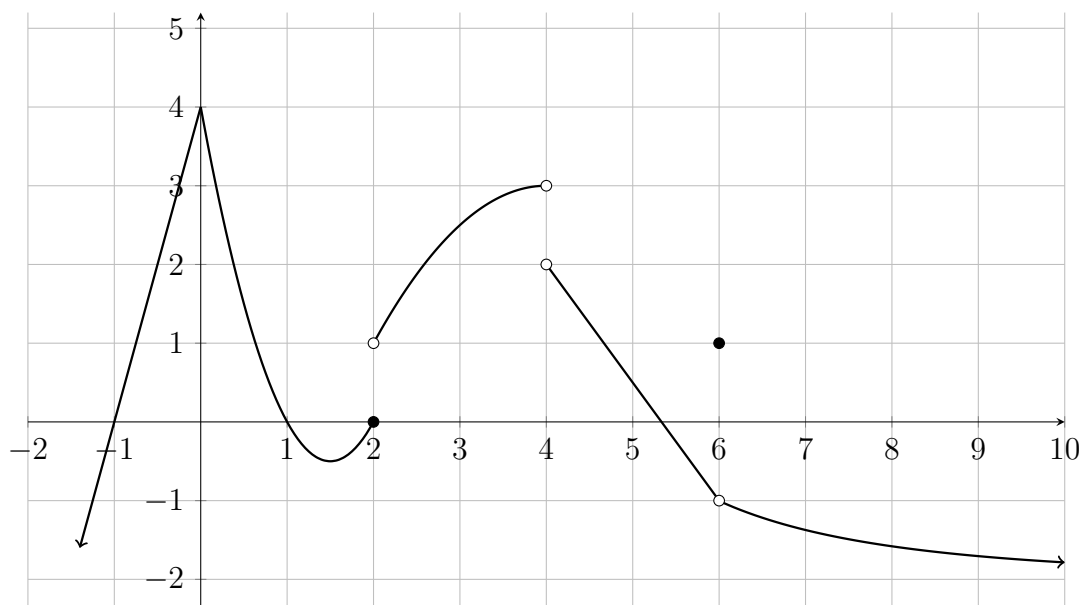
6. Write the domain of $h(x)$ in interval notation where $h(x) = \ln(x)$.

7. Fill in the following piecewise function:

$$f(x) = |x - 8| = \begin{cases} & \text{if } x > 8 \\ & \text{if } x \leq 8 \end{cases}$$

Graphs:

The graph of $f(x)$ is given below. Use this graph to answer the following questions.



8. What is $f(2)$?
9. What is $f(4)$?
10. What is $f(6)$?
11. Draw the tangent line to the graph at the point $x = 1.5$.
12. Draw the secant line between $x = -1$ and $x = 0$.
13. Is $f(x) > 0$ or $f(x) < 0$ on the interval $(-1, 1)$?
14. Where is $f(x) = 0$?
15. Is $f(x) > 0$ or $f(x) < 0$ on the interval $(7, \infty)$?
16. What is the equation of the line shown on the graph between points $x = -1$ and $x = 0$?

Algebraic Manipulations:

17. Simplify the following into one fraction: $\frac{2x}{6x+9} + \frac{5}{x^2}$.
18. Simplify the following so that there is no square root in the denominator: $\frac{3+x}{\sqrt{x}-9}$.
19. Simplify the following so that there is no square root in the denominator: $\frac{4+x}{8-\sqrt{x}}$.
20. Factor the following: $x^2 - 6x - 16$
21. Factor the following: $x^2 - 25$.
22. Solve for x when $3x^2 + 2x = 0$.
23. Solve for x when $x^2 + x = 12$.
24. Solve for x when $x^2 - 2 = 0$.
25. Solve for x (in terms of y) when $3x + 5y = 6 - 4x$.
26. Simplify the following: $7(x+8)^2$.