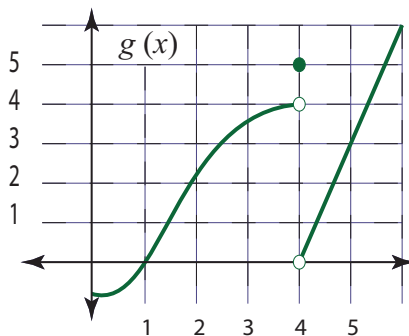
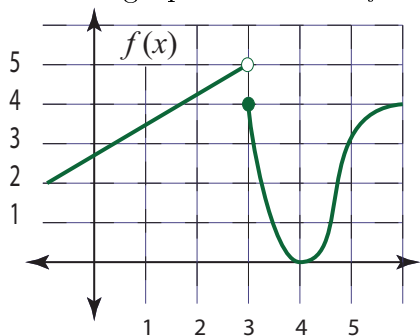


Calculus I. Fall 19 Test 1 Review.

Make sure you also study all the quizzes, then notes and homework examples!

1. Use the graphs shown for f and g to evaluate each function value or limit (or answer DNE).



a) $f(3) = ?$

b) $g(4) = ?$

c) $\lim_{x \rightarrow 3^+} f(x) = ?$

d) $\lim_{x \rightarrow 3} f(x) = ?$

e) $\lim_{x \rightarrow 4^-} [f(x) + g(x)] = ?$

f) $\lim_{x \rightarrow 3} \frac{f(x)}{g(x)} = ?$

g) $\lim_{x \rightarrow 1} \frac{g(x)}{f(x)} = ?$

2.

$$\text{Given: } f(x) = \begin{cases} \frac{(7-x)}{3x^2-21x} & \text{for } x < 7 \\ 7x & \text{for } 7 \leq x \end{cases}$$

a) $f(7) = ?$

b) $\lim_{x \rightarrow 7^+} f(x) = ?$

c) $\lim_{x \rightarrow 7^-} f(x) = ?$

d) $\lim_{x \rightarrow 7} f(x) = ?$

e) Is $f(x)$ continuous at $x = 7$? If not, what kind of discontinuity is it ? _____

3. Find the following limits.

a) $\lim_{x \rightarrow 3} \frac{x^2 + 3x - 1}{5 - x} = ?$

b) $\lim_{x \rightarrow 1} \frac{4x^2 + 3x - 7}{2x - 2} = ?$

4. We know that $\lim_{x \rightarrow 0} (2 + e^x) = 3$. That means, given any $\epsilon > 0$, there exists a $\delta > 0$ such that if $0 < |x - 0| < \delta$ then $|(2 + e^x) - 3| < \epsilon$.
If $\epsilon = 0.2$, find δ . (Don't simplify.)
5. Find the following limits.
- a) $\lim_{x \rightarrow \infty} \left(e^{-\left(\frac{x^2+3x}{2x}\right)} + 3 \right)$
- b) $\lim_{x \rightarrow -\infty} \tan^{-1} \left(\frac{2x^3 + 4x}{10x^2 + 100x + 57} \right)$
6. If $f(x) = 3^x + 1$ then write the limit that will define the slope of the tangent at $x = 7$. (Just set it up, don't find the limit.)
7. If $f(x) = 5x + x^3$ then write the limit that will define $f'(x)$. (Just set it up, don't find the limit.)
8. If $f(x) = 5 + x^{\sin(2x)}$ then write the limit that will define $f'(x)$. (Just set it up, don't find the limit.)
9. Find $\lim_{h \rightarrow 0} \frac{\frac{1}{1+h} - 1}{h}$.
10. Find $\lim_{h \rightarrow 0} \frac{(4(x+h) - 3) - (4x - 3)}{h}$.
11. If $f'(5) = 7$ and $f(5) = 23$ then what is the equation of the tangent line to $f(x)$ at $x = 5$?
12. If $g(x) = \frac{x^3}{3} - x^2 + x$ and $g'(x) = x^2 - 2x + 1$, then find the equation of the tangent line to $g(x)$ at $x = -2$.