

1. (5 points) If the point $(5, -3)$ is on the graph of an odd function f , then which one of the following points must also be on the graph of f ?

(a) $(3, 5)$

(b) $(3, -5)$

(c) $(-3, 5)$

(d) $(-3, -5)$

(e) $(5, 3)$

(f) $(-5, 3)$

(g) $(-5, -3)$

2. (5 points) Which one of the following equations must hold in order for a function g to be continuous at a number b ?

(a) $\lim_{x \rightarrow 0} g(x) = b$

(b) $\lim_{x \rightarrow 0} g(x) = 0$

(c) $\lim_{x \rightarrow 0} g(x) = g(b)$

(d) $\lim_{x \rightarrow 0} g(x) = g'(b)$

(e) $\lim_{x \rightarrow b} g(x) = b$

(f) $\lim_{x \rightarrow b} g(x) = 0$

(g) $\lim_{x \rightarrow b} g(x) = g(b)$

(h) $\lim_{x \rightarrow b} g(x) = g'(b)$

(i) $\lim_{x \rightarrow \infty} g(x) = b$

(j) $\lim_{x \rightarrow \infty} g(x) = 0$

(k) $\lim_{x \rightarrow \infty} g(x) = g(b)$

(l) $\lim_{x \rightarrow \infty} g(x) = g'(b)$

3. (10 points) Let $f(x) = 2x - 5x^2$.

Use the definition of a derivative as a limit to prove that $f'(x) = 2 - 10x$.

Show each step in your calculation and be sure to use proper terminology in each step of your proof.

4. (10 points) Determine a formula for an exponential function given that its graph goes through the points $(-5, 100)$, $(0, 20)$ and $(5, 4)$.

5. (10 points) What is the value of $\cos(\tan^{-1}(2))$?

6. (10 points) Given that $\cos \theta = 1/3$, evaluate $\sec \theta + 5 \tan^2 \theta$.

7. (10 points) Find the domain of the function $f(x) = \sqrt{\ln(4 - x^2)}$

8. (10 points) Solve for x in the equation below.

$$\ln(3e^{2x+5}) = x$$

9. (10 points) Find all horizontal asymptotes on the graph of $f(x) = \frac{15 - 8e^x}{2e^x + 3}$

10. (5 points each) Evaluate the following limits without the use of derivatives. Show sufficient justification for each answer. An answer of 'does not exist' is not sufficient. For infinite limits you must state if it is ∞ or $-\infty$.

(a) $\lim_{x \rightarrow 0} \frac{5 + 3e^x}{5 - 3 \cos x}$

(b) $\lim_{x \rightarrow \infty} \frac{5 \sin x}{2x}$

$$(c) \lim_{x \rightarrow 2^-} \frac{x^2 - 2x}{x^2 - 4x + 4}$$

$$(d) \lim_{x \rightarrow 2} \frac{\frac{1}{2} - \frac{1}{x}}{x^2 - 4}$$

Students – do not write on this page!

1. (5 points) _____

2. (5 points) _____

3. (10 points) _____

4. (10 points) _____

5. (10 points) _____

6. (10 points) _____

7. (10 points) _____

8. (10 points) _____

9. (10 points) _____

10a. (5 points) _____

10b. (5 points) _____

10c. (5 points) _____

10d. (5 points) _____

TOTAL (100 points) _____