Math Camp: Limits, Continuity, & Derivatives Worksheet

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Q1). Evaluate $\lim_{x\to 2} \frac{x^2+4x-12}{x^2-2x}$ using a table of function values. That is, input different values of x to justify your answer.

Q2). Determine whether the following function is continuous at $x = 2$ $f(x) = \frac{x^2-4}{x-2}$
Justify your conclusion algebraically and graphically.

Q3).
A). What is the first derivative of $f(x) = 4x^2$?
B). What is the second derivative of $f(x) = f(x) = 4x^2$?
C). Plot $f(x) = f(x) = 4x^2$ its first derivative, and its second derivative.

Q4).
A). What is the first derivative of $f(x) = e^x$?
B). What is the second derivative of $f(x) = e^x$?
C). What is the first derivative of $f(x) = 2e^x$?
D). What is the second derivative of $f(x) = 2e^x$?

Q5).
What is the first derivative of $f(x) = \log X$?
What is the second derivative $f(x) = \log X$?

Q6).
What is the first derivative of $f(x) = x^2 - 2x$?
What is the second derivative of $f(x) = x^2 - 2x$?
Plot $f(x) = x^2 - 2x$, its first derivative, and its second derivative.

Q7). Evaluate $\lim_{x \to 0} \frac{2(-3+x)^2-18}{x}$ using a table of function values. That is, input different values of x to justify your answer.

Q8). Determine whether the following function is continuous or discontinuous at the given points: $f(x) = \frac{x^2-4}{x-2}$
A). x=-1
B). x=0
C). x=3