

Maple Sample Test

April 16, 2013

Answer all questions. This is an open book exam and you are allowed to use the entirety of the resources available to you at your work station to aid you including your past Maple work.

You are, however, to work alone.

1. **Plots** Plot the following functions. Label your graphs appropriately



Figure 1: A plot of $f(t) = 50(1 - e^{-t})$ from $t = 0$ to $t = 7$.

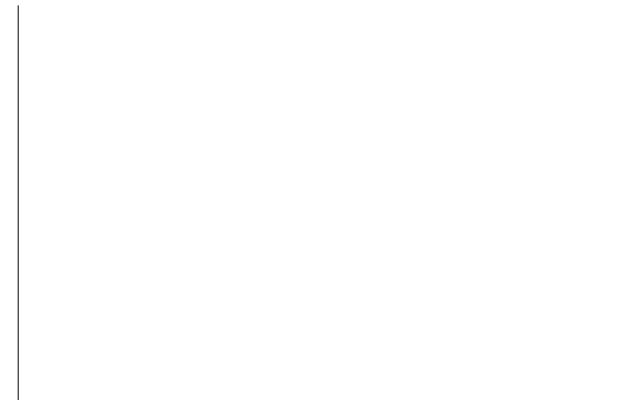


Figure 2: A plot of $g(x) = \ln(x + 1)$ from $x = 0$ to $x = 5$.

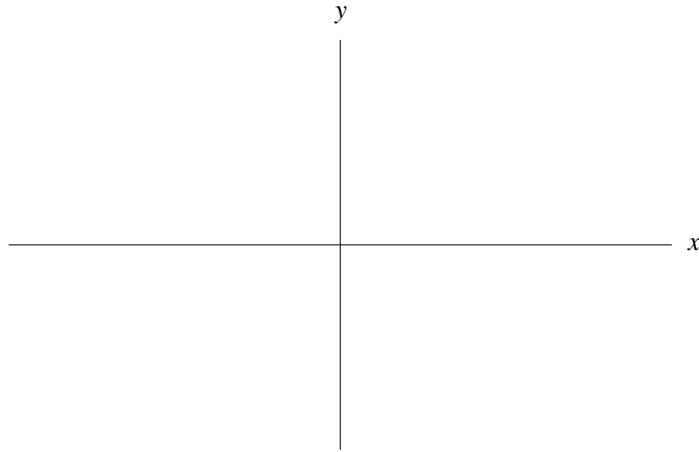


Figure 3: A plot of $h(x) = \sin(3\pi x)$ from $x = -1$ to $x = 1$.

2. **Differentiation** Find the derivatives of the following functions

(a) $f(t) = (t^3 - 3)(4t^4 - 4)$

Ans:

(b) $g(x) = \frac{\sin x + 4x}{e^x + 2}$

Ans:

(c) $h(t) = \ln(\tan(x) + x^3)$

Ans:

3. **Partial Derivatives** Find the following partial derivatives

(a) $\frac{\partial}{\partial x}(x^2 + 3y^2)e^{-x^2-y^2}$

Ans:

(b) $\frac{\partial}{\partial y} \frac{\sin x \sin y}{xy}$

Ans:

(c) $\frac{\partial}{\partial x}(\sin x + \sin y)$

Ans:

4. **Integrals** Find/evaluate the following integrals

(a) $\int \frac{dx}{(\sqrt{9-x^2})^3}$

Ans:

(b) $\int \frac{\sin y}{1-\cos y} dy$

Ans:

(c) $\int_0^2 re^{4-t^2} dt$

Ans:

5. **Partial Fractions** Use Maple to find the partial fraction expansions of

(a) $\frac{2}{x^2-x-2}$

Ans:

(b) $\frac{11x^2-9x+10}{x^3-x^2+3x-3}$

Ans:

(c) $\frac{1}{x^5-x-2}$

Ans:

6. **Newton's Method** Use Newton's Method to find, correct to three decimal places, a solution of

$$\cos x = x^2.$$