

# Midterm II

Wednesday, February 42, 2039

# MATH 151

11:00 – 12:20 Founders 4004

**Instructions: Show all work.** Failure to show work may result in loss of credit. Write your solutions in the space provided on the *answer sheets*. Do *not* hand in scratch paper. There are ten questions worth ten points each. You may use your graphing calculators for all questions, but decimal approximations are *not* acceptable. A one-page list of relevant formulae is also allowed. Please remember to circle your final answers. Some partial credit *may* be given. **Good Luck!**

- 1) If  $g(x) = \sqrt[3]{x^2 - 1}$  find the derivative of  $g$ . State the domain of  $g'$ .
- 2) Find the points on the curve  $y = \frac{\cos x}{2 + \sin x}$  where the tangent line is horizontal.
- 3) Differentiate the function  $y = (t + e^t)(t^2 - e^{-t})$ .
- 4) The position function of a particle is given by  $x(t) = t^3 - 5t^2 - 7t$ ,  $t \geq 0$ . When does the particle reach a velocity of 5? What is the acceleration when  $t = 6$ ?
- 5) Find an equation of the tangent line to the curve  $y = e^x \cos x$  at the point  $(0, 1)$ .
- 6) If  $y = \tan(\cos x)$  find  $\frac{dy}{dx}$ .
- 7) Find  $y'$  and  $y''$  by implicit differentiation if  $y^3 + 2y = x^3 + 4x$ .
- 8) Find an equation of the tangent line to the curve  $x^2 - 3xy + 3y^2 = 4$  at the point  $(-2, 0)$ .
- 9) Find  $D^{100}(\sin^3 x)$ .
- 10) Differentiate  $y = (\sin x)^x$ .

You are welcome to keep this *Questions sheet* for your files.