## MATH 1110 — Prelim 2

## Brief answers

Note: as indicated on the front page of the exam, justification is expected for all solutions. The following list provides only very brief "final answers" to each problem for the purposes of checking numerical correctness; full solutions will be posted later.

(1a)  $4x^3\cos(x^4 + e^6) - 4x^{-2}$ 

(1b) 
$$\frac{1}{(x+2)^2}$$

$$(1c) -2(3x)^{-5/3}$$

- (1d)  $x^{2^x} \left(\frac{2^x}{x} + 2^x \ln 2 \ln x\right)$
- (2a)  $(0.09)\pi$  m<sup>2</sup> per hour
- (2b)  $(4.5)\pi$  m<sup>3</sup> per hour
- (3a) a = 1 and b = 1
- (3a)  $(y-2) = \frac{-12}{13}(x-1)$
- (4a) -21
- (4b)  $1 2\pi$
- $(4c) \frac{3}{2}$
- (5a) False because  $\frac{dV}{dt}$  not only depends on  $\frac{dr}{dt}$  but also on r.
- (5b) False. There are different pairs of functions f, g for which the statement doesn't hold. For example g(x) = |x|,  $f(x) = x^2$ . Or f a constant function, g a function that is not differentiable at some point.
- (5c) False. There are different pairs of functions f, g for which the statement doesn't hold. For example f(x) = x, g a function that is continuous but not differentiable at some point.
- (6a) t = 8
- (6b) t = 6 and t = 7



(6c)