

Math 1210-009 Fall 2013

Practice Exam

10th December 2013

Name:

- No cell phones, computers, etc.
- No cheating.
- No notes, cheat sheets, books, etc.
- Write your name on each page.
- Show your work to get full credit.
- Make sure that what you write down is mathematically correct, e.g. don't forget equal signs etc.

	1	2	3	4	5	6	7	8	Σ
Possible points	15	15	10	10	15	15	10	10	100
Your points									

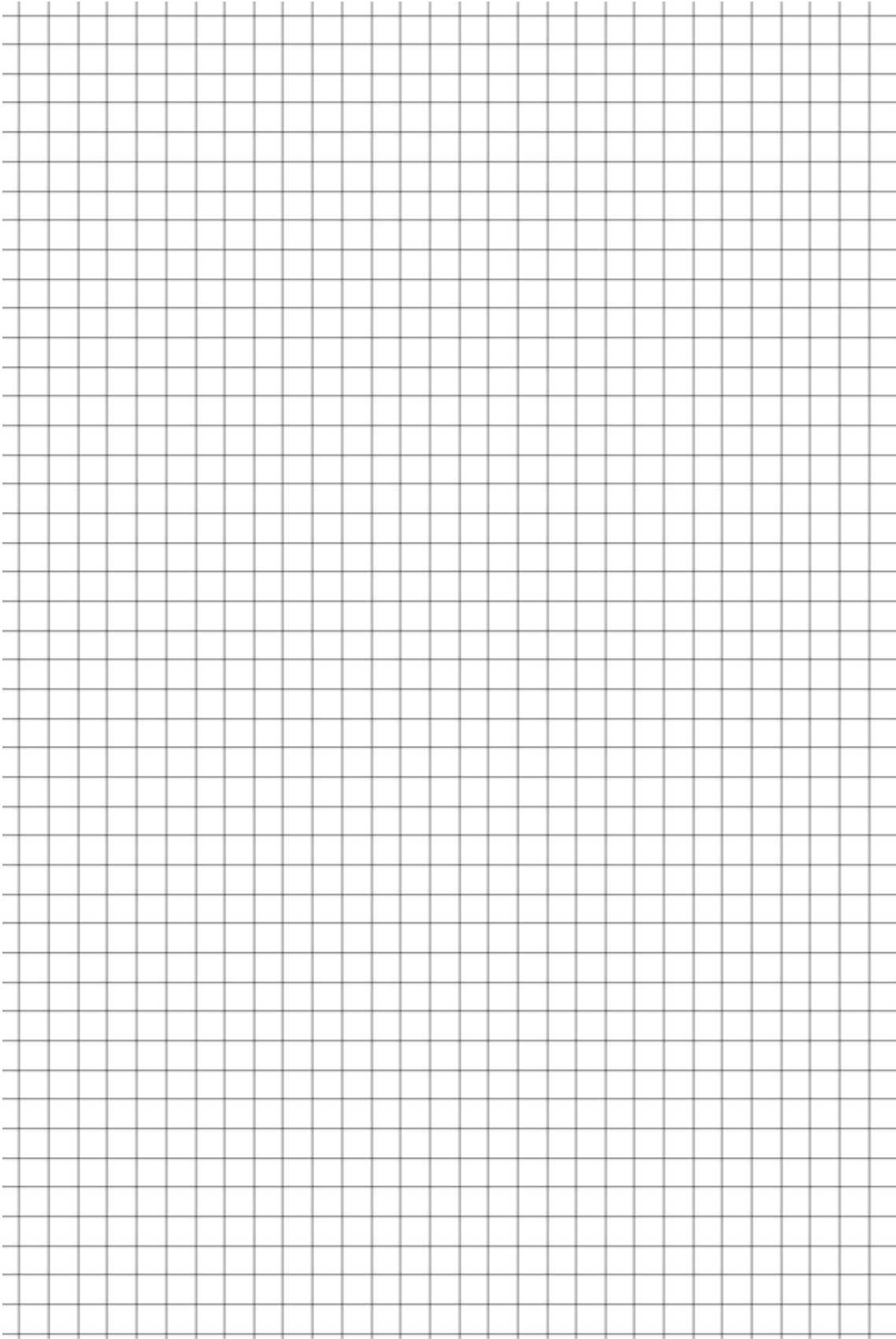
1. Draw the graph of the function

$$f(x) = \frac{3(x+2)^2}{(x-1)^2}.$$

You may use that

$$f'(x) = \frac{-18(x+2)}{(x-1)^3}$$

$$f''(x) = \frac{18(2x+7)}{(x-1)^4}.$$



2. Find the equation of the tangent line to the curve

$$f(x) = 5x^2 + 3x + 4\sqrt{x+1}$$

at $x = 0$.

3. In each of the following problems find the indicated limit or state that it does not exist.

(a)

$$\lim_{x \rightarrow -3} \frac{x^2 - 9}{2x^2 + x - 15}$$

(b)

$$\lim_{x \rightarrow 0} \frac{\sin 3x}{\sin 2x}$$

4. Find the first derivative of the following functions.

(a)

$$f(x) = \sqrt{\frac{x-1}{x+1}}$$

(b)

$$f(x) = x^2 \cos x + 2x \sin x - 2 \cos x$$

5. Consider the curve given by the function $y = 0.1x^2$ and the point $Q = (0; 1)$. Which are the point(s) P on the curve that minimise the distance to the point Q ?

6. (a) Give the definition of the derivative of a function.

(b) Use this definition to find the derivative of the function $f(x) = x^2 + 3x - 1$.

(c) Use this definition to find the derivative of the function $f(x) = \frac{3}{x+2}$.

7. Evaluate the following integrals:

(a)

$$\int_{-2}^2 x \sin^2(2x) \cos(2x) dx$$

(b)

$$\int \frac{2t^3}{\sqrt{t^4 - 6}} dt$$

8. (a) State the Mean Value Theorem for Integrals.

(b) Calculate the average of the function $f(x) = x^2 - x$ on $[0, 2]$.

(c) Find all values c that satisfy the Means Value Theorem for integrals for this function.