Math 124 H Autumn 2017
Mid-Term Exam Number One
October 24, 2017
Answers

There were two versions of the exam.
Version A: On version A, in problem 1(a), x approaches 4.

1. (a) 0 (b) 3 (c) $\frac{3}{4}$
2. (a) $3x + \frac{3}{2}$ (b) $\frac{\sqrt{3}}{2}$
3. (a)
$$f'(x) = \frac{(3x^2-1)(3x^2+5) - (x^3 - x + 4)(6x)}{(3x^2+5)^2}$$
(b) $g'(x) = 5x^4 \sin x + x^5 \cos x$
(c) $h'(x) = -x^{-2} - 6x^{-3}$
4. $4 \pm \frac{1}{6}\sqrt{816}$
5. There are infinitely many correct answers. For instance, $y = 6x - 9$ and $y = -\frac{1}{6}x - \frac{1}{144}$.
6. $c = -4$ or $c = \frac{11}{2}$

Version B: On version B, in problem 1(a), x approaches -1.

1. (a) $\frac{7}{2}$ (b) 4 (c) 0
2. (a) $-x + \frac{1}{2}$
(b) $-\frac{3}{2\sqrt{2}}$
3. (a)
$$f'(x) = \frac{(5x^4-1)(4x^2+1) - (8x)(x^5 - x + 5)}{(4x^2+1)^2}$$
(b) $g'(x) = 4x^3 \cos x - x^4 \sin x$
(c) $h'(x) = -4x^{-3} + 20x^{-5}$
4. $4 \pm 2\sqrt{7}$
5. There are infinitely many correct answers. For instance, $y = 6x - 9$ and $y = -\frac{1}{6}x - \frac{1}{144}$.
6. $c = 2$ or $c = -\frac{1}{3}$