5 Math101 answers

5.1 The answers are:

$$f_1'(x) = 2, \quad f_2'(x) = 1 - \sin(x), \quad f_3'(x) = e^x, \quad f_4'(x) = \frac{1}{2}x + \frac{1}{x}.$$

5.2 The answers are $f'(0) = -1$ and $f'(1) = 4$.

5.3 The answers are:

$$f_1'(x) = 3x^2, \quad f_2'(x) = \frac{1}{2}x^{-\frac{1}{2}}, \quad f_3'(x) = -x^{-2}, \quad f_4'(x) = -2x^{-3}, \quad f_5(x) = -\frac{1}{2}x^{-\frac{3}{2}}.$$

5.4 The answers are:

5.4(a) The first blue graph corresponds to the third red graph.

5.4(b) The second blue graph corresponds to the second red graph.

5.4(c) The third blue graph corresponds to the first red graph.

5.5 The answers are:

$$f'(x) = 6e^{2x} - \frac{1}{2x}, \qquad g'(x) = \frac{1}{2}\cos x, \qquad h'(x) = \frac{1}{x} - \frac{1}{2}e^{-\frac{1}{6}x}.$$

5.6 The answers are:

$$f'(x) = 7x^6 - 8x^3 - 6x, \quad g'(x) = -5x^4 + 6x^{\frac{1}{2}} + 2x^{-3}, \quad h'(x) = \frac{1}{2}x^{-\frac{1}{2}} - 2x^{-2}.$$

5.7 The answers are:

$$x = 0, \qquad\qquad x = 0, x = 6.$$

5.8 The answers are:

$$f'(x) = x^{-\frac{2}{3}}, \qquad\qquad f'(x) = 9x^2 + 8x.$$

5.9 The answers are:

$$f'(x) = -\frac{1}{2}x^{-\frac{3}{2}} - x^{-2}, \qquad f'(x) = \frac{15}{4}x^{\frac{11}{4}}, \qquad f(x) = -\frac{2}{x}.$$

5.10 The answers are:

5.10(a) The first blue graph corresponds to the second red graph.

5.10(b) The second blue graph corresponds to the third red graph.

5.10(c) The third blue graph corresponds to the first red graph.

5.11 The answers are:

$$f'(x) = \frac{-5}{x}, \qquad\qquad f'(x) = 3e^{3x}.$$