

**Quiz 12 solutions—version B**

Name \_\_\_\_\_

Student ID Number \_\_\_\_\_

1. Compute the indefinite integral

$$\int x^2(1 + 2\sqrt{x}) dx$$

and the definite integral

$$\int_0^1 x^2(1 + 2\sqrt{x}) dx$$

$$\begin{aligned}\int x^2(1 + 2\sqrt{x}) dx &= \int x^2 + 2x^{5/2} dx = \frac{x^3}{3} + \frac{4x^{7/2}}{7} + C, \\ \int_0^1 x^2(1 + 2\sqrt{x}) dx &= \left. \frac{x^3}{3} + \frac{4x^{7/2}}{7} \right|_0^1 = \frac{1}{3} + \frac{4}{7} = \frac{19}{21}\end{aligned}$$

2. Find the derivative
- $f'(x)$
- of the function

$$f(x) = \int_0^{\ln x} \cos e^u du$$

Let  $g(x) = \int_0^x \cos e^u du$ . Then  $g'(x) = \cos e^x$  by the fundamental theorem of calculus. Since  $f(x) = g(\ln x)$ , we get  $f'(x) = (\cos x)/x$  by the chain rule.