

## Math 112.01 – Quiz 7

1) Evaluate  $\int_0^1 te^{-t} dt$

**Solution:** Let's first find the antiderivative using integration by parts. Let  $u = t$  and  $dv = e^{-t} dt$  so that  $du = dt$  and  $v = -e^{-t}$ . (The other choice of  $u$  is not good here: Recall the LIATE rule). So

$$\int te^{-t} dt = -te^{-t} + \int e^{-t} dt = -te^{-t} - e^{-t} \text{ and}$$

$$\int_0^1 te^{-t} dt = -te^{-t} - e^{-t} \Big|_0^1 = 1 - \frac{2}{e}$$

2) Evaluate  $\int \arcsin(2x) dx$

**Solution:** Again by integration by parts and the "LIATE" rule we have

$$u = \arcsin(2x), \quad dv = dx \text{ so that } du = \frac{2}{\sqrt{1-4x^2}} \text{ and } v = x. \text{ Hence,}$$

$$\int \arcsin(2x) dx = x \arcsin(2x) - \int \frac{2x dx}{\sqrt{1-4x^2}}.$$

To evaluate the integral on the right, use a regular substitution:  $u = 1 - 4x^2$ . The final result will be

$$\int \arcsin(2x) dx = x \arcsin(2x) + \frac{\sqrt{1-4x^2}}{2}$$