

1. Demonstrate how to evaluate:

$$\int_0^{\pi/2} \cos(x) \sin^2(x) dx$$

2. *Revisiting Oylar 65 (almost without a calculator)*

We want to approximate  $\sqrt[3]{65}$ .

- What is a reasonable guess? Explain.
- Without using a calculator, compute a mixed number approximation using by a linear approximation technique using  $f(x) = \sqrt[3]{x}$ .
- Write an equation a cubic function ( $g(x)$ ) that has a zero at  $\sqrt[3]{65}$ .
- Using 4 as a seed, demonstrate how to use Newton's Method (with only a scientific calculator for arithmetic) to get  $x_1$ ,  $x_2$ , and  $x_3$ .

3. Evaluate  $L = \lim_{x \rightarrow 0^+} x \ln x$ .

4. *Revisiting Alien Highway*

You are driving in the dark on the Cartesian Plane along the graph of  $f(x) = e^x$ . An alien spaceship is at  $(3, 6)$ . What will your  $x$  value be when your headlight shines on the spaceship?

Once you have set up your solution, use Newton's Method with a seed of 0 to get approximations  $x_1$ ,  $x_2$ , and  $x_3$ . You can use a scientific calculator to for arithmetic and values of  $e^x$ .

