

# Practice Problems 2

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MAT 123 - Precalculus  
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**DUE DATE: NEVER.**

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**Exercise 0.** Review sections 3.1 – 3.5 & 4.1 – 4.4. Re-read everything thoroughly. Done? Good! You may now move to **Exercise 1.**

**Exercise 1.** Show that  $\sqrt{2 + \sqrt{3}} = \sqrt{\frac{3}{2}} + \sqrt{\frac{1}{2}}$  and that  $\sqrt{9 - 4\sqrt{5}} = \sqrt{5} - 2$ .

**Exercise 2.** Solve for x:

$$\frac{\log_6(15x)}{\log_6(5x)} = 2$$
$$\ln(\log_3(e^x + 2)) = 1$$

**Exercise 3.** Suppose someone invested money in a bank account that compounds interest four times a year. If their current amount of money in the account is 721% times the original amount of money deposited in the account, what was the interest rate,  $r$ , as a percentage?

**Exercise 4.** Suppose a circle has a radius  $r = b$  and suppose an ellipse is described by the equation  $ax^2 + \frac{y^2}{b^2} = 1$  where the  $b$  is the same as the radius of the circle. What must be the value of  $a$  so that the areas of the circle and the ellipse are equal?

**Exercise 5.** Find that the number  $c$  such that the area under the graph of  $1/x$  from 1 to  $c$  is equal to the *circumference* of the circle of radius  $r = \sqrt{2}$ .