Math 1071 - Calculus for Business and Economics | Quiz 4
Name: | Spring 2018

Section:

Follow the instructions in each problem.
Show supporting work, not just a final answer, to receive credit on a problem.

1. (**5 pts**) Zachary wants deposit some money in the bank now so that in 15 years, he will have $\$40,000$ to make a down payment on a house. He deposits it into an account that earns 2.4% interest compounded continuously. How much money does he need to put into the bank?

Continuous Compound Interest: $F = Pe^{rt}$

$t = 15$
$r = 0.024$
$F = 40,000$

$$\Rightarrow P = \frac{F}{e^{rt}} = \frac{40,000}{e^{0.024(15)}} = \boxed{\$27,907.05}$$

2. (**5 pts**) Let $f(x) = 3x^2 + 2$ and $g(x) = \sqrt{x-1}$. Find $f(g(x))$ and its domain. Explain your reasoning.

$$f(g(x)) = 3(\sqrt{x-1})^2 + 2 = 3(x-1) + 2$$
$$= 3x - 3 + 2$$
$$= \boxed{3x - 1}$$

$x \to g \to f$

Domain g: $[1, \infty)$ ✓
Range g: $[0, \infty)$ ✓
Domain f: $\mathbb{R}$

Domain of $(f \circ g)(x)$ is $[1, \infty)$