

WRITE YOUR NAME:

MAC 2233 Homework 6

Due in class, Friday April 6th

You can use more paper if necessary, but please STAPLE

Question 1. Bob and Alice want to remodel their bathroom in 3 years. They estimate the job will cost \$25,000. How much must they invest now at an annual interest rate of 7% compounded quarterly to achieve their goal? What if the compounding were continuous?

Future value  $B = 25,000$       Time  $t = 3$   
Quoted rate  $r = 0.07$

(i) If interest is compounded quarterly then  
 $B = P \cdot \left(1 + \frac{r}{k}\right)^{kt}$  or  $P = B \cdot \left(1 + \frac{r}{k}\right)^{-kt}$

$$P = 25,000 \cdot \left(1 + \frac{0.07}{4}\right)^{-12} = 25,000 \cdot (1.0175)^{-12}$$
$$= 25,000 \cdot 0.81205788 = \boxed{\$ 20,301.45}$$

(ii) If interest is compounded continuously then

$$B = P \cdot e^{rt} \quad \text{or} \quad P = B \cdot e^{-rt}$$

$$P = 25,000 \cdot e^{-0.07 \cdot 3} = 25,000 \cdot e^{-0.21}$$

$$= 25,000 \cdot 0.810584 = \boxed{\$ 20,264.61}$$