Math 433 H# Name: Key
Palekar / Greenberg **COMPOUND INTEREST** Date: _____

1) State the ***Compound Interest Formula***: $A = P\left(1+\frac{r}{n}\right)^{nt}$

2) Find the ***accumulated value*** of an investment of $10,000 for 5 years at an interest rate of 5.5% if the money is

a) compounded semiannually	b) compounded quarterly	c) compounded monthly
$A = 10000\left(1+\frac{.055}{2}\right)^{2\cdot 5}$	$A = 10000\left(1+\frac{.055}{4}\right)^{4\cdot 5}$	$A = 10000\left(1+\frac{.055}{12}\right)^{12\cdot 5}$
$= \$13,116.51$	$= \$13,140.67$	$= \$13,157.04$

3) Suppose that you have $6000 to invest. ***Which investment*** yields the greater return over 4 years: 8.25% compounded quarterly or 8.3% compounded semiannually?

$A_1 = 6000\left(1+\frac{.0825}{4}\right)^{4\cdot 4} = \$8317.84$

$A_2 = 6000\left(1+\frac{.083}{2}\right)^{2\cdot 4} = \$8306.64$

4) How much money should be ***deposited today*** in an account that earns 6% compounded semiannually so that it will accumulate to $10,000 in three years? [Round answer up to the nearest cent.]

$10,000 = P\left(1+\frac{.06}{2}\right)^{2\cdot 3}$

$10000 = P(1.03)^6$

$P = \frac{10000}{(1.03)^6} = \$8374.84$

5) Determine, to the nearest tenth, the ***number of years*** it would take for an investment to ***triple*** in value if it is deposited into an account with an annual interest rate of 5% compounded monthly.

$A = P\left(1+\frac{r}{n}\right)^{nt}$

$3P = P\left(1+\frac{.05}{12}\right)^{12t}$

$3 = \left(1.004166666667\right)^{12t}$

$\log 3 = 12t \log 1.004166666667$

$t = 22.0$ years

6) In 1626, Peter Minuit convinced the Wappinger Indians to sell him Manhattan Island for $24. If the Native Americans had put the $24 into a bank account paying compound interest at a 5% rate, how much would the investment be worth in the year 2006 if the interest were compounded daily? [Use TI]

2006 − 1626 = 380

$A = P\left(1+\frac{r}{n}\right)^{nt}$

$A = 24\left(1+\frac{.05}{365}\right)^{365\cdot 380} = \$4{,}278{,}004{,}859.35$

7) Parents wish to have $80,000 available for a child's education. If the child is now 5 years old, how much money must be set aside at 6% compounded semiannually to meet their financial goal when the child is 18?

$80{,}000 = P\left(1+\frac{.06}{2}\right)^{2\cdot 13}$

$80{,}000 = P(1.03)^{26} \rightarrow P = \frac{80000}{(1.03)^{26}} = \$37095.58$

8) Solve each equation.

a) $2x^{\frac{3}{4}} - 28 = 100$

$2x^{3/4} = 128$

$x^{3/4} = 64$

$x = 64^{4/3}$

$= 256$

b) $\left(\frac{1}{2}\right)^{x-2} = 4^{5x}$

$\left(2^{-1}\right)^{x-2} = \left(2^{2}\right)^{5x}$

$2^{-x+2} = 2^{10x}$

$-x+2 = 10x$

$2 = 11x \rightarrow x = \frac{2}{11}$

c) $5^x = 42.8$

$x \log 5 = \log 42.8$

$x = \frac{\log 42.8}{\log 5}$

$= 2.334$

[Round to 3 decimal places.]

d) $2\log_3 x + \log_3 \frac{1}{10} = \log_3 5 + \frac{1}{2}\log_3 4$

$\log_3\left(\frac{x^2}{10}\right) = \log_3(10)$

$\frac{x^2}{10} = 10 \rightarrow x^2 = 100$

$x = \pm 10$

$x = 10$

Why is −10 rejected?