© Scarborough November 2008 Math 141 Quiz 9 KEY

(10pts) NAME (printed neatly): _____

(10pts) Section Number (circle correct section): 503 (10:20am) 521 (11:30am) 523 (1:50pm)

Quiz Grade: _____

1. You purchase a new $180,000 home with a 20% down payment and borrowed the rest for 30 years at an annual interest of 5.2%, compounded monthly, on the unpaid balance.

a. (10pts) What is the effective yield (APY), to 4 decimal places, of the loan?

Eff(5.2, 12) = **5.3257%**

b. (10pts) What is the amount of your loan?

0.8 * (180000) = **$144,000**

c. (10pts) What are your monthly payments?

N = 12 * 30 I% = 5.2 PV = 144000 FV = 0 P/Y = C/Y = 12
Solve PMT = –790.7196686

Your monthly payment is **$790.72**.

d. (10pts) How much of the first month's payment is interest?

$$\left(\frac{0.052}{12}\right)(144000) = \textbf{\$624}$$

e. (10pts) At the end of 30 years, what is the total amount you will have paid for your home?

$$0.2(\$180000) + \left(\frac{\$790.72}{\text{month}}\right)\left(\frac{30 \text{ years}}{1}\right)\left(\frac{12 \text{ months}}{1 \text{ year}}\right) = \textbf{\$320,659.20}$$

f. (10pts) To the nearest dollar, how much would you still owe after 8 years?

Need to do one of these 3 methods:

i. Bal(12 * 8) = 124204.3184 [must have figures left in TVM from doing part c]
ii. N = 12 (30 – 8) I% = 5.2 PMT = –790.7196686 FV = 0 P/Y = C/Y = 12
Solve PV = 124204.3184
iii. N = 12 (30 – 8) I% = 5.2 PMT = –790.72 FV = 0 P/Y = C/Y = 12
Solve PV = 124204.3705

Therefore **$124,204** is amount owed after 8 years.

g. (10pts) To the nearest dollar, what would be your equity after 14 years?

Need to do one of these 3 methods:

i. Bal(12 * 14) = 102922.3254 [must have figures left in TVM from doing part c]
ii. N = 12(30 – 14) I% = 5.2 PMT = –790.7196686 FV = 0 P/Y = C/Y = 12
Solve PV = 102922.3254
iii. N = 12(30 – 14) I% = 5.2 PMT = –790.72 FV = 0 P/Y = C/Y = 12
Solve PV = 102922.3685

180000 – 102922.33 = 77077.67 or 180000 – 102922 = 77077.63
Therefore the equity after 14 years is **$77078**.

2. (10pts) A GPS manufacturer has a fixed monthly production cost of $59,985. If 360 GPS's are produced and sold, there is a loss of $43,785. A GPS is sold for $210. What is the break-even quantity?

Cost function: $C(x) = cx + F$
Revenue function: $R(x) = sx$
Profit function: $P(x) = R(x) - C(x)$

$C(x) = cx + 59985$
$R(x) = 210x$
$P(x) = 210x - (cx + 59985)$
$P(360) = 210(360) - c(360) - 59985 = -43785$
$360c = 59400$
$c = 165$

[Note: At the break-even point $R(x) = C(x)$ and $P(x) = 45x - 59985 = 0$.]

$R(x) = C(x)$
$210x = 165x + 59985$
$45x = 59985$
$x = 1333$

OR

$P(x) = 45x - 59985 = 0$
$45x = 59985$
$x = 1333$

Therefore the break-even quantity is **1333 GPS's**.