Problem Set 6.5

a) $PV = 3,000,000$

$n = 120$

$r = 6.25\%$

$PMT = -33,684.0291$

$\Rightarrow PMT = -33,687.0291$

$n = 84$

$r = 6.25\%$

$PV = \$2,286,965.561$

Refinance

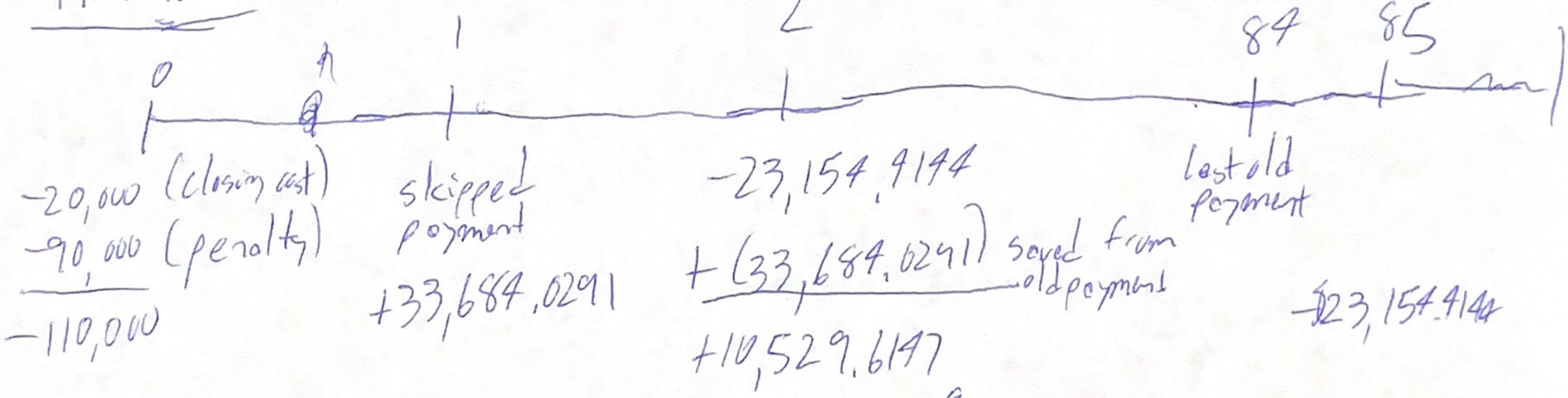
$PV = 2,286,965.561$

$n = 120$

$r = 4\%$

$PMT = -23,154.9144$

Timeline



$-20,000$ (closing cost)

$-90,000$ (penalty)

$-110,000$

skipped payment $+33,684.0291$

$-23,154.9144$

$+(33,684.0291)$ saved from old payment

$+10,529.6147$

last old payment

$-\$23,154.9144$

$CF_0 = -110,000$

$CF_1 = +33,684.0291$

$F0_1 = 1$

$CF_2 = 10,529.6147$

$F0_2 = 83$

$CF_3 = -23,154.9144$

$F_0 = 36$

$NPV_{@\frac{6.25\%}{12}} = \$137,798.8654$

Why $6.25\%^2$. Because it is the next best use of $110,000. If I don't use it to refinance, I can use it to pay down the existing 6.25% loan. There are monthly payments, so the rate must be divided by 12.

5) i) Original loan remaining balance in 3 years

PMT = -33,689.0291

n = 48

r = 6.25

PV = $1,427,300.263

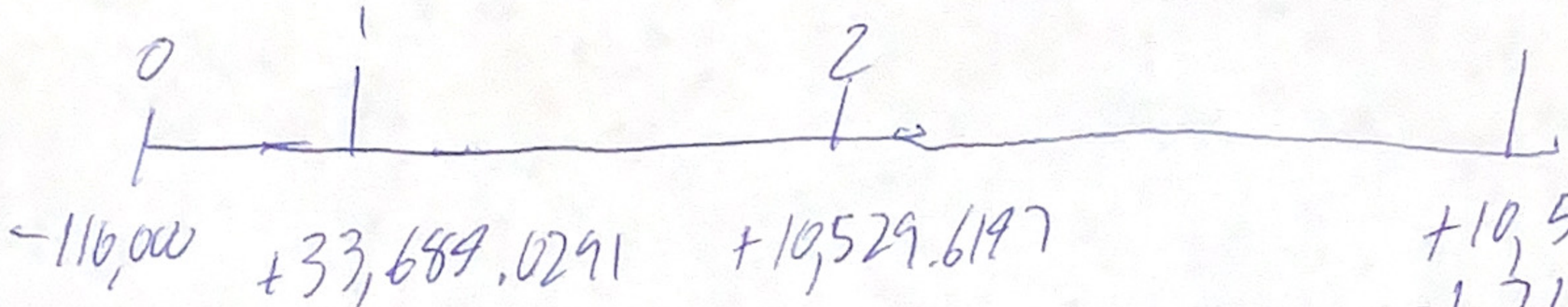
ii) New loan remaining balance in 3 years

PMT = -23,154.4194

n = 85 (remember the skipped payment?)

r = 9%

PV = $1,711,409.950



-110,000 +33,689.0291 +10,529.6197 +10,529.6197

-1,711,409.95

+1,427,300.263

-273,580.0723

$CF_0 = -110,000$

$CF_1 = 33,689.0291$

$F_0 = 1$

$CF_2 = +10,529.6197$

$F_0 = 34$

$CF_3 = -273,580.0723$

$NPV_{@6.25\%} = \$22,218.2994$

Still refinance, but be careful.

Closer Call