

Assignment 3

Wednesday, June 30, 2021 9:19 PM

- 1) A: \$3000, \$520 per month
B: \$13280, 24 months, compound 6%

$$PW_A = P + A(P/A, i, n) - F(P/F, i, n)$$

$$= 3000 + 520(P/A, 0.5, 24) - 500(P/F, 0.5, 24)$$

$$= 3000 + 11732.76 - 443.60$$

$$PW_B = P - F(P/F, i, n)$$

$$= 13280 - 500(P/F, 0.5, 24)$$

$$= 13280 - 443.60$$

$$= \$12836.40$$

$$PW_A > PW_B, \text{ so } PW_A$$

2) a) FW = $2000 \left(\frac{(1+0.0175)^{15.7} - 1}{0.0175} \right)$

$$= \$209350.43$$

b) FW = $2000 \left(\frac{(1+0.0058)^{15.12} - 1}{0.0058} \right)$

$$= \$631724.99$$

c) FW = $2000 \left(\frac{(1+0.000175)^{15.36} - 1}{0.000175} \right)$

$$= \$19077436.5$$

3) $i = \left(1 + \frac{r}{c}k\right)^c - 1$
 $= \left(1 + \frac{0.06}{12}\right)^{12} - 1$
 $= 0.06167$

Type 1

$$PW = 66 + \frac{66}{(1+0.06167)} + \frac{66}{(1+0.06167)^2}$$

$$= \$186.72$$

Type 2

$$PW = 66 + \frac{120}{(1+0.06167)}$$

$$= \$179.03$$

Type 3

$$PW = \$160 \rightarrow \text{Lowest PW, type 3}$$

$$f(t) = 500000 - \frac{460000}{3}t$$

$$P = \int_0^3 (500000 - \frac{460000}{3}t)e^{-0.01t} dt$$

Rugged into integral calculator,
P = \$179375.68

5) a) Monthly payment: $(1000-400)(A/P, 11.5\%, 48)$
 $= 1600(A/P, 0.979167, 48)$
 $= \$429.62$

b) $(P/A, i, 48) = \frac{1600/429.62}{38.462275}$
 $\Rightarrow i = 0.75\% (P/A, i, 48) = 37.973959$
 $i = 0.75 + \frac{(40.184752 - 38.462275)}{(40.184752 - 37.973959)}(1-0.75)$
 $i = 0.95\%$

6) $i = (1+0.05)^5 - 1 = 0.057625$
 $(1+i)^n = 1.057625, i = 0.057625$

Monthly payment = $350000(A/P, 0.057625, 20 \cdot 12)$
 $= 3112.13$

Interest = $350000 - 3112.13(P/F, 0.057625, 240-60)$

Principle paid = $350000 - 309615.70 = \$9034.30$

Interest paid = $(3112.13 \times 60) - 40189.30 = \146593.5

7) a) $130000 = 593(P/A, i, 28x12) + (32782(A/P, 0.75\%, 120))$
 $i = 0.495\%$

$$i_n = (1 + 0.00495)^{12} - 1$$

$$= 6.104\%$$

b) A: $130000(A/P, 0.625\%, 360)$
 $= \$708.97/\text{month}$

B: $593 + 415.27$
 $= \$1008.27/\text{month}$

c) A: $908.97 \times 360 = 130000 = \177229.2

B: $1008.27 \times 120 + 593 \times 180 - 130000 = \97732.4

d) $908.97(P/A, i, 360) = 593(P/A, i, 300) + 415.27(P/A, i, 120)$
 $i = 1.2\%$
 $i_n = (1 + 0.012)^{12} - 1$
 $= 15.39\%$

8) a) $1000 = 60(P/A, i, 60) + 1000(P/F, i, 60)$
 $i = 6.7\% \text{ semi annual}$

$$(i = (1+0.06)^2 - 1$$

$$= 12.36\%$$

b) $N = 2(30-5)$

Price = $60(P/A, 4.5\%, 50) + 1000(P/F, 4.5\%, 50)$
 $= \$1296.93$

c) $\$922.38$

$922.38 = 60(P/A, i, 49) + 1000(P/F, i, 49)$
 $i = 6.51\% \text{ semi annual}$
 $i_n = (1+0.0651)^2 - 1$
 $= 13.99\%$

9) a) $1108 = 87.5(P/A, i, 4) + 1000(P/F, i, 4)$
 $i = 5.7\%$

b) $P = 87.5(P/A, 4.5\%, 4) + 1000(P/F, 4.5\%, 4)$
 $P = \$975.97$
 $\text{Yes, } 975.97 > 935$