

Tute 1

"If you get a positive value times a number,
You need to shift the decimal to the right as
many times as the number specified - If
negative move it to the right.

Simple interest formula = $S = FV = P(1 + \text{plus IK})$

Compound interest formula = $S_k = P (1 + \text{plus } i)^k$

$S_n = P (1 + \text{plus } I/T)^n$

where I is interest

T is frequency of compounding per year

K is number of years

N is total number of periods - K T or TK

Depreciation Formula = V_0 or $P = \text{Initial value,}$

$V_k = P (1 - d)^k$

Tute 4

1. $Q = 24 - 3p$ or $p = 8 - Q/3$

2. $Q = 5p - 8$ or $p = 1.6 + 0.2Q$

3, either $24 - 3p = 5p - 8$ and $p = 4$
or $8 * Q/3 = 1.6 + 0.2Q$ and $Q = 12$

4. $TR = p * Q = 8Q - Q^2/3$

$MR = 8 - 2Q/3$

5. $\text{Max } \Pi \rightarrow MR = MC$

$8 - 2Q/3 = Q/3$

$Q = 8$

$P = 8 - 8/3 = 5.33$

6. Impose $p \leq 3$ - instead of equilibrium price
 $p = 4$

Demand at $p = 3$: $QD = 24 - 3(3) = 15$

Supply at $p = 3$: $QS = 5(3) - 8 = 7$

Excess demand = $15 - 7 = 8$

7. $AVC = 5 + 3Q$

$TVC = (AVC) Q = 5Q + 3Q^2$

8. $P = 18 - 3Q$, $MR = 18 - 6Q$

$18 - 6Q = 12$, $Q = 1$, $p = 15$

Tute 2

1. 5 years $1 + r = (FV/PV)^{1/5}$

(i) $r = 10.38\%$

(ii) $r = 10.47\%$

(iii) $r = 10.51\%$

(iv) $r = 10.52\%$

(v) $r = 10.52\%$

2. $1 + r = (1 + 0.06/12)^8 * (1 + 0.072/12)^4$

$1 + r = (1.005)^8 * (1.006)^4$

$1 + r = (1.0407) * (1.0242) = 1.06591$

$r = 6.59\%$

For an initial outlay of \$1000 the net return
is $1,000 (1.067) - 10 = 1,057$.

Rate of return 5.7%

For larger outlays, e.g. 10,000. $10,000 (1.067) - 10 = 10,660$.

Rate of return 6.6%

3. $2500 = 97 (1 + r)^{40}$ Take logs of both
sides.

$\text{Ln}(2500/97) = 40\text{Ln}(1 + r)$, or $3.249335 = 40\text{Ln}(1 + r)$, or $\text{Ln}(1 + r) = 0.0812334$

Take the exponential of both sides: $1 + r = 1.084624$ and $r = 8.4624\%$

$97 (1.0867)^{40} = 97 (27.822) = 2698.72$

Either (i) The rate of return is less than the
bond rate or (ii) the \$97 would have grown
to more than \$2,500 hence the purchase
wasn't a good investment.

4. (i) 10,000

(ii) $10,000 (1.08)^{-2} = 10,000 (0.8573) = 8573.39$

(iii) $10,000 (1.08)^{-10} = 10,000 (0.4632) = 4631.93$

5. (i) $1,050 (1.05)^{-1} = 1000$

(ii) $1,108 (1.05)^{-2} = 1004.99 (*)$

(iii) $1,160 (1.05)^{-3} = 1002.05$

6. $PV = 10,000 (1.07)^{-2} + 5,000 (1.07)^{-3} + 15,000 (1.07)^{-5}$

$PV = 8,734.39 + 4,081.49 + 10,694.79$

$PV = 23,510.67$

7. $100,000 (1 + i)^{16} = 125,000$

4

Tute 2 (cont)

$(1 + i)^{16} = 1.25 \rightarrow 1 + i = (1.25)^{1/16} = 1.014044$

4 4

$i = 0.0562$ or 5.62%

OR use logarithms

$\text{Ln}[(1 + i/4)^{16}] = \text{Ln } 1.25$ and $16\text{Ln}(1 + i/4) = 0.22314$

$\text{Ln}(1 + i/4) = 0.0139465$ and $1 + i/4 = 1.014044$.

8. $15,000 (1 + 0.055)^{12} = 30,000$

12

$(1 + 0.055)^{12} = 2$

12

$12 \text{ k Ln}(1 + 0.055) = \text{Ln } 2$

12

$12 \text{ k } 0.0045728 = 0.69315$

$k = 12.63$ years. About 12 years and 7½ months.

Tute 3

1. Add up PV to get NPV

$i = 6\%$ A B

-14,000

9,905.66

5,339.98

1,091.51 -15,000

943.40

5,161.98

11,754.67

NVP (6%): 2,337.14 2,860.05 (*)

$i = 9\%$ A B

-14,000

9,633.03

5,050.08

1,003.84 -15,000

917.43

4,881.74

10,810.57

NVP (9%): 1,686.95 (*) 1,609.74

2. Find i such that NVP (i) = 0



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Tute 3 (cont)

$$\text{NVP (10\%)} = -15,000 + 909.09 + 4,793.39 + 10,518.41$$

$$\text{NVP (10\%)} = 1,220.89 > 0$$

$$\text{NVP (12\%)} = -15,000 + 892.86 + 4,623.72 + 9,964.92$$

$$\text{NVP (12\%)} = 481.51 > 0$$

$$\text{NVP (13\%)} = -15,000 + 884.96 + 4,542.25 + 9,702.70$$

$$\text{NVP (13\%)} = 129.91 > 0$$

$$\text{NVP (14\%)} = -15,000 + 877.19 + 4,462.91 + 9,449.60$$

$$\text{NVP (14\%)} = -210.29 < 0$$

Say i is approximately $i = 13.38\%$

$$3. \text{ PV} = 150 [1 - (1 + 0.052 / 52)^{-156}]$$

$$\text{PV} = 150 [1 - 0.8556] = 21,656.12$$

$$4. \text{ FV} = 150 [(1.001)^{156} - 1]$$

$$\text{FV} = 150 [1.16873 - 1] = 25,310.26$$

$$\text{FV} = \text{PV} (1.001)^{156}$$
$$25,310.26 = 21,656.12 (1.16873) = 25,310.27$$

Almost perfect match.

$$5. (a) R = 120,000 (0.05/12) = 500$$

$$[1 - (1 + 0.05)^{-120}] [1 - 0.60716]$$

$$(b) \text{ Outstanding Balance: } B = 1272.79 [1 - (1 + 0.05)^{-96}] / (0.05/12)$$

$$B = 1272.79 [1 - 0.6709] = 100,536.97$$

$$(c) \text{ New } R = 100,536.97 (0.09/12)$$

$$[1 - (1 + 0.09)^{-96}]$$

$$\text{New } R = 100,536.97 (0.0075) = 1472.89$$

$$[1 - 0.48806]$$



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