

## ANSWERS TO SELECTED EXERCISES

### Section 1

1. (a) (i) 228.88 (ii) 227.40  
(b) (i) 156.14 (ii) 155.09
2. (a) 521.53 (b) 612.27

4.

COST OF A MORTGAGE			
25-year mortgage	April/79 11%	April/81 17.25%	July/81 20%
\$30,000	\$86,601	\$126,951	\$145,329
\$40,000	\$115,468	\$169,268	\$193,772
\$50,000	\$144,335	\$211,585	\$242,214
\$60,000	\$173,203	\$253,902	\$290,657

5. (a)

Payment Number	Payment	Interest	Principal	Balance
				\$7000
1	\$621	\$68	\$553	6447
2	621	63	558	5889
3	621	57	564	5325
4	621	52	569	4756
5	621	46	575	4181
6	621	41	580	3601
7	621	35	586	3015
8	621	29	592	2423
9	621	24	597	1826
10	621	18	603	1223
11	621	12	609	614
12	620	6	614	_____

5. (b)

Payment Number	Payment	Interest	Principal	Balance
				\$7000
1	\$621	\$70	\$551	6449
2	621	65	556	5893
3	621	59	562	5331
4	621	53	568	4763
5	621	48	573	4190
6	621	42	579	3611
7	621	36	585	3026
8	621	30	591	2435
9	621	24	597	1838
10	621	18	603	1235
11	621	13	608	627
12	621	6	615	12

6. (a)

Payment Number	Payment	Interest	Balance Reduction	Balance
				\$3601
7	\$621	\$36	\$621	2980
8	621	30	621	2359
9	621	24	621	1738
10	621	17	621	1117
11	621	11	621	496
12	621	5	621	(125)
Interest added on:		123	(123)	(2)

(b)

<b>PROPER METHOD</b>				
Payment Number	Payment	Interest	Principal	Balance
				\$10,000
1	\$906.32	\$131.60	\$774.72	9,225.28
2	906.32	121.40	784.92	8,440.37
3	906.32	111.08	795.24	7,645.12
4	906.32	100.61	805.71	6,839.41
5	906.32	90.01	816.31	6,023.10
6	906.32	79.26	827.06	5,196.04
7	906.32	68.38	837.94	4,358.10
8	906.32	57.35	848.97	3,509.13
9	906.32	46.18	860.14	2,648.99
10	906.32	34.86	871.46	1,777.53
11	906.32	23.39	882.93	894.60
12	906.37	11.77	894.60	

Total interest: \$875.89



4. (a) \$92.25

(b) \$110.04

(c) \$91.16

5. (a)  $P_1 = 941.96$

$$P_2 = 943.77$$

$$P_3 = 945.68$$

$$P_4 = 947.69$$

(b)  $P_{1.5} = 967.52$

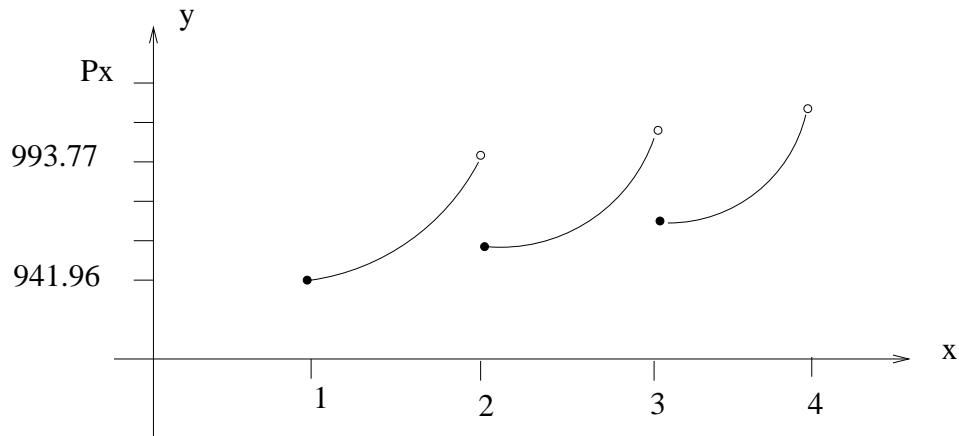
$$P_{1.75} = 980.55$$

$$P_{1.9} = 988.46$$

$$P_{2.5} = 968.38$$

$$P_{3.5} = 971.34$$

(c)



(d)  $y = P_t + x(P_{t+1} + Vr - P_t)$

$$P_{1.5} \simeq 967.86$$

$$P_{1.7} \simeq 980.82$$

$$P_{1.9} \simeq 988.59$$

$$P_{2.5} \simeq 969.72$$

$$P_{3.5} \simeq 971.68$$

(e)  $kVr$  represents the accrued interest during the fractional period.

6. (a) 11.905% per annum compounded semi-annually

(b) 14.42% per annum compounded semi-annually

(c) 9.53% per annum compounded semi-annually

(d) 13.369% per annum compounded semi-annually

(e) 6.91% per annum compounded semi-annually

8. (Comparing present values)

Interest: 13% compounded semi-annually

$$\text{Bond: } P = 20,000(1.065)^{-40} + 1050 a_{\overline{40}|.065}$$

$$= 16,463.62 < 18,000$$

Mortgage: Taking monthly rate to be 1.055%

$$P = 240 a_{\overline{132}|.01055} = 17,055.05 < 18,000$$

So, if you must choose, take the mortgage.

9. (b)  $2i \simeq 16.35\%$  per annum compounded semi-annually. This is too low.

### Section 3

1. (a) 28 (b) 50
2.  $x = 2500$ ,  $p = \$7$ ,  $P = \$1300$
3. (a) 4/3 million bushels for a profit of \$46.8 million.  
(b) Less than 3 million bushels.
4. \$1.50
5. (a) 2500 (b) \$1.75 (c) \$325
6. (a) 2000 (b) \$1.80 (c) 50% (d) \$200 (e) \$100
7. (a) 2050 (b) \$1.69 + tax (c) 41% (d) \$207.87 (e) \$89.50

### Section 4

1. (a) approx. 2530
2. 2%
3. He should accept the present offer.
4. (a) 400 (b) 548 (c) 693

### Section 6

- 1)  $\ln a$
- 2) 0
- 3)  $\frac{3x^2+1}{2x-3}$  is not in  $\frac{0}{0}$  form as  $x \rightarrow 1$  so only the first application of L'Hôpital's rule is O.K.
- 4) 1
- 5)  $\frac{1}{6}$
- 6)  $e^{\frac{3}{2}}$

7)  $e^2$

8) 1

9)  $e^{-8}$

10)  $-\frac{1}{2}$