**F.3 Mathematics – SOLUTIONS for NCM 3A Chapter 3 Supplementary Worksheet**

**Level 1**

1. Interest rate per 3-month period = 6% ÷ 4 = 1.5%

 Total number of 3-month periods in 2.5 years = 2.5 × 4 = 10

 Amount received after 2.5 years

 = $

 = $34 816, *cor. to the nearest dollar*

 Interest received after 2.5 years

 = $(34 816.225 – 30 000)

 = $4 816, *cor. to the nearest dollar*

2. Let *r*% be the interest rate offered by the first bank.

 

 The principal deposited in the second bank = $(200 000 + 28 980) = $228 980

 Interest rate per month = 7% ÷ 12 = 

 Total number of months in 2 years = 2 × 12 = 24

 Total amount received 2 more years later

 = $

 = $263 283, *cor. to the nearest dollar*

3. Total number of 4-minute periods in an hour = 60 ÷ 4 = 15

 Number of bacteria after an hour

 = 

= 8 758, *cor. to the nearest integer*

4. Let $*P* be the price of the flat 3 years ago, then

 

 ∴ The price of the flat 3 years ago was $1 800 000.

 ∴ The actual increase in the price of flat over these 3 years

 = $(2 083 725 – 1 800 000)

 = $283 725

5. (a) The value of the mobile phone in 2004

 = $

 = $1 351, *cor. to the nearest dollar*

 (b) The decrease in value

 = $(2 200 – 1 351)

 = $849

 Percentage decrease in value

 = 

 = 38.6%, *cor. to 3 sig. fig.*

6. (a) Let *D* be the decay factor.

 

 ∴ The decay factor is 0.75.

 (b) Value of the MP3 player in 2006

 = $1 500 (0.75)4

 = $475, *cor. to the nearest dollar*

 Since one third of the original value = $1 500 ÷ 3 = $500, and

 $475 < $500,

 Mary will receive the player in 2006.

7. The new number of boys = 24 × (1 + 25%) = 30

 The new number of girls = 30 × (1 – 10%) = 27

 The new number of students = 30 + 27 = 57

 Percentage change in the number of students in the choral

 = 

 = +5.56%, *cor. to 3 sig. fig.*

8. (a) This month the consumption of electricity = 28 × (1 – 8%) units

 = 25.76 units

 This month the charge for electricity per unit = $12 × (1 + 5%)

 = $12.6

 Difference in the expenditure on electricity between these two months

 = $(12 × 28 – 12.6 × 25.76)

 = $11.424

 (b) Percentage change in the expenditure on electricity over these two months

 = 

 = +3.4%

9. The new quarterly rates payable = $

 = $1 375

 Percentage change in the quarterly rates payable over these two years

 = 

 = 8.33%, *cor. to 3 sig. fig.*

**Level 2**

1. The interest rate of bank *A* = 5.5%

 Interest rate per half-year period = 5.5% ÷ 2 = 2.75%

 Total number of half-year periods in 3 years = 3 × 2 = 6

 Amount received from bank *A* after 3 years

 = $

 = $294 192, *cor. to the nearest dollar*

 The interest rate of bank *B* = 5.4%

 Interest rate per month = 5.4% ÷ 12 = 0.45%

 Total number of months in 3 years = 3 × 12 = 36

 Amount received from bank *B* after 3 years

 = $

 = $293 858, *cor. to the nearest dollar*

 ∴ Patrick should choose to deposit his money in bank *A*.

2. (a) Suppose Ivan invests $*P*, then

 the simple interest received by Ivan

 = $

 = $0.18*P*

 The compounded interest received by Victor

 = $

 = $(1.053 – 1)*P*

  0.18*P* – (1.053 – 1)*P* = 22 375

 

 The simple interest received by Ivan

 = $0.18 × 1 000 000

 = $180 000

 (b) The compound interest received by Victor

 = $(180 000 – 22 375)

 = $157 625

3. (a) His weight when he was 25 years old

 =kg

 = 66.2 kg, *cor. to 3 sig. fig.*

 (b) Increase in his weight during these 4 years

 = (66.228 773 – 60) kg

 = 6.23 kg, *cor. to 3 sig. fig.*

 Percentage increase in his weight during these 4 years

 =

 = 10.4%, *cor. to 3 sig. fig.*

4. (a) Let *G* be the growth factor.

 

 ∴ The growth factor is 1.005.

 (b) Population in 2006 = 7 000 000 × (1.005)6

 = 7 212 600, *cor. to the nearest hundred*

5. (a) Percentage decrease in its value

 = 

 = 18%

 (b) (i) The value of car after 4 years

 = $

 = $55 611, *cor. to the nearest dollar*

 (ii) Let $*V* be the value of car 3 years ago

 

 ∴ The value of car in 3 years ago is $223 081.

6. Suppose the percentage change in the value of flat during the second half of the year be +*a*%. Let $*P* the value of flat at the beginning of 2005. Then

 

 ∴ The percentage change during the second half of the year is +20%.

7. (a) The new cost of making a wooden bed is $2 394, so

 1 000 × (1 + 14%) + *a*(1 – 5%) + 950 × (1 + 8%) = 2 394

 1 000 × 1.14 + 0.95*a* + 950 × 1.08 = 2 394

 2 166 + 0.95*a* = 2 394

 0.95*a* = 228

 *a* = 240

 (b) The original cost of making a wooden bed

 = $(1 000 + 240 + 950)

 = $2 190

 Percentage increase in the cost of making a wooden bed

 =

 = 9.32%, *cor. to 3 sig. fig.*

8. Tax on the first $40 000 = $40 000 × 2% = $800

 Tax on the next $40 000 = $40 000 × 7% = $2 800

 Tax on the next $40 000 = $40 000 × 12% = $4 800

  $(800 + 2 800) < $7 494 < $(800 + 2 800 + 4 800)

  $80 000 < Johnny’s net chargeable income < $120 000

 Let Johnny’s net chargeable incomebe *x*.

 

  Johnny’s net chargeable income is $112 450.