Series and applications

Superannuation (1)

QUESTION **1** Find the value, to the nearest whole dollar, of:

a $\$[6000 + 6000(1.06) + 6000(1.06)^2 + 6000(1.06)^3 + \ldots + 6000(1.06)^{30}]$

b $\$[2400(1.075) + 2400(1.075)^2 + 2400(1.075)^3 + \ldots + 2400(1.075)^{25}]$

QUESTION **2** On 1st April 1995 a bank account was opened with a deposit of \$4000. The account pays interest at 5% p.a. compounded annually. A further \$4000 is added to the account on the 1st of April each year until, but not including, 2005 when the whole amount is withdrawn, immediately after the interest has been paid. Write down an expression (there is no need to evaluate), for the value of:

a the amount invested in 2004

b the amount invested in 2003

c the amount invested in 2002

d the amount invested in 1995

e the total of all the investments

Superannuation (2)

QUESTION **1** When Jesse was born his parents placed \$1000 into a special bank account where it earned 4% p.a. interest compounded annually. Each year on Jesse's birthday a further \$1000 was added to the account. Jesse received the total amount on his 18th birthday, the interest and final amount having just been paid.

a Write down an expression for the value of:

i the final amount

ii the second last amount invested (17th birthday)

iii the third last amount (16th birthday)

iv the first amount (day of his birth)

v the total of all the investments

b Find the total amount, to the nearest dollar, that Jesse received on his 18th birthday

QUESTION **2** Susan pays \$2500 into a superannuation fund on 1st June each year. Compound interest at 7.5% p.a. is paid on the investment. The first investment was made in 1988 and the final one in 2002. Susan withdrew the investment on 1/6/2003.

a Write down an expression for the value of the amount invested:

i in 2002

ii in 2001

iii in 1988

iv the total of all the investments

b Find the total amount, to the nearest dollar, withdrawn in 2003.

Superannuation (3)

QUESTION **1** On 31st January, 1990 Hayden joined a superannuation fund by investing \$5000 at 6% p.a. compound interest. He added \$5000 to the fund on 31st of January each year and intends to continue to do so until, but not including, the day he intends to retire 31/1/2010. Find the total accumulated value of his investment, to the nearest dollar, on that day.

QUESTION **2** \$500 is paid into a super fund at the end of each month for a year. Interest is paid at 0.3% per month. Find the total amount of the investment, to the nearest dollar, at the end of the year.

Page 162 1 **a** \$508 810 **b** \$175 383 2 **a** $\$4000(1.05)$ **b** $\$4000(1.05)^2$ **c** $\$4000(1.05)^3$ **d** $\$4000(1.05)^{10}$ **e** $\$4000(1.05 + 1.05^2 + 1.05^3 + \ldots + 1.05^{10})$

Page 163 1 **a i** \$1000 **ii** $\$1000(1.04)$ **iii** $\$1000(1.04)^2$ **iv** $\$1000(1.04)^{18}$ **v** $\$1000(1 + 1.04 + 1.04^2 + 1.04^3 + \ldots + 1.04^{18})$ **b** \$27 671 2 **a i** $\$2500(1.075)$ **ii** $\$2500(1.075)^2$ **iii** $\$2500(1.075)^{15}$ **iv** $\$2500(1.075 + 1.075^2 + 1.075^3 + \ldots + 1.075^{15})$ **b** \$70 193

Page 164 1 \$194 964 2 \$6100