Name: Date:

Topic: SEQUENCES

**Question 1** [3 + 1 + 1 = 5 marks]

Given that  $T_n = 200(0.5)^{n-2}$  then find:

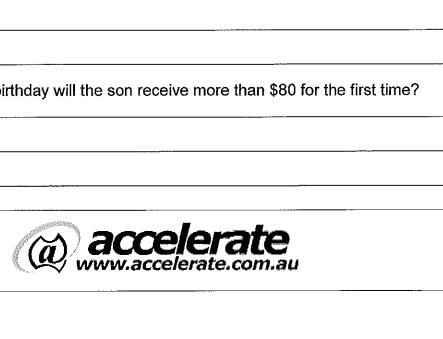
- (a) the first three terms of the sequence.
- (b) the eighth term of the sequence.
- (c) the recursive formula for the sequence.

**Question 2** [3 + 1 + 1 = 5 marks]

Given that  $t_{n+1} - t_n = 5$  and that  $t_1 = 3$  then find:

- (a) the first three terms of the sequence.
- (b) the general term for the sequence.





Question 5 [2 + 3 = 5 marks]

The Fibonnacci Sequence can be written as:

$$F_n + F_{n-1} = F_{n+1}$$
 where  $F_1 = F_2 = 1$ 

(a) Find F<sub>10</sub>

(b) Show that  $4F_5^2 + 5 = F_7^2 - F_6^2$ 

# **Question 6** [2 + 2 + 2 = 6 marks]

A car valued at \$19200 is bought January 1st 2004 It depreciates at a rate of \$1800 per year for the first five years and then 10% per annum thereafter.

(a) Find the value of the car on January 1st 2009

(b)	Find the value of the car on January 1st 2015
` '	,

If the car is sold when its value first dro	one helow \$3000 then find.

(c)	during	which	year	the	car	is	sold.
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(5+5+5+4+5+6=30 marks)

Name:

Topic:

Date:

# **SEQUENCES**

### **Question 1**

(a) 
$$T_1 = 400$$
,  $T_2 = 200$ ,  $T_3 = 100$ 

[3]

(b) 
$$T_8 = 200(0.5)^6 = 3.125$$

[1]

(c) 
$$T_{n+1} = \frac{1}{2}T_n$$
 where  $T_1 = 400$ 

[1]

### **Question 2**

$$t_{n+1} = t_n + 5$$

(a) 
$$t_1 = 3$$
,  $t_2 = 8$ ,  $t_3 = 13$ 

[1,1,1]

(b) 
$$t_n = 5n - 2$$

[1]

(c) 
$$t_{12} = 58$$

[1]

## **Question 3**

(a) 
$$T_n = 240(-0.75)^{n-1}$$
 or  $T_n = 320(-0.75)^n$ 

[1,1]

(b) 
$$T_{n+1} = (-0.75)T_n$$
 where  $T_1 = 240$ 

[1]

(c) 
$$T_6 = 240(-0.75)^5$$

[1]

[1]

### **Question 4**

(a) 
$$T_n = 3n + 2$$

[1]

$$T_{16} = $50$$

[1]

(b) 
$$T_n > 80$$

On his 31st birthday

[2]

#### **Question 5**

(a) 
$$F_{10} = 55$$
 [2]

(b) 
$$4F_5^2 + 5 = F_7^2 - F_6^2$$

$$4(5)^2 + 5 = 13^2 - 8^2$$
 [1,1]  
 $100 + 5 = 169 - 64$   
 $105 = 105$  verified [1]

#### **Question 6**

t<sub>1</sub> t<sub>2</sub> t<sub>3</sub> 19200, 17400, 15600, ...A.P. 2004, 2005, 2006,

(a) 
$$t_n = 1800n + 18200$$
  
 $t_6 = $10200$  [2]

(b) t<sub>1</sub> t<sub>2</sub> t<sub>3</sub> 10200,9180, 8262, ...G.P. 2009 2010 2011

$$t_n = 10200(0.9)^{n-1}$$
  
 $t_7 = 10200(0.9)^6 = $5420.70$  [1,1]

During 2020

[2]

$$(5+5+5+4+5+6=30 \text{ marks})$$