



Analyse Graphical Models

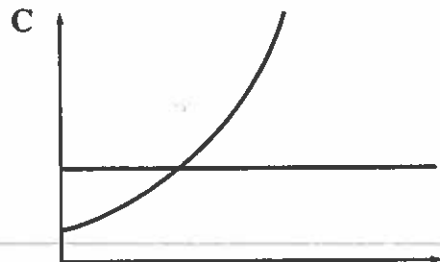
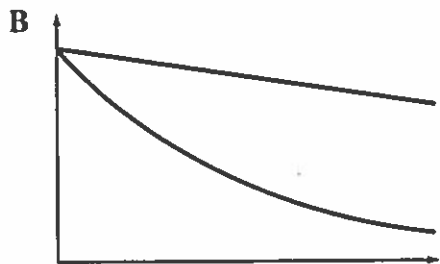
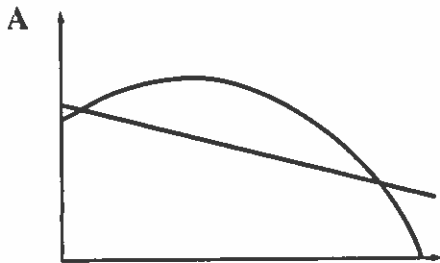
Section
5.4

1. Match each situation with its graph.

a) The number of bacteria in Colony X remained the same over time. Colony Y started with 50 bacteria and doubled every half-hour.

b) Two cups of water were cooled in different controlled environments. Cup X cooled at a constant rate. The temperature of Cup Y decreased by one-half every 20 min.

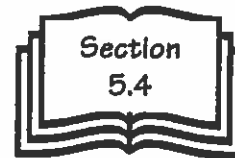
c) Ball X rolled down a ramp. Ball Y was thrown from a point above the ground.



2. The population of Town X started at 90 000 and increased by 25 000 every year. The population of Town Y started at 4000 and doubled every year. Which statement is true?

- A The population of Town X is always greater than the population of Town Y.
- B The rate of change of the population of Town X is increasing.
- C The rate of change of the population of Town Y is increasing.
- D The population of Town Y is greater than the population of Town X after 4 years.

Date: _____



3. Refer to question 2.

a) Complete the table of values.

Year	Town X Population	Town Y Population
0		
1		
2		
3		
4		
5		

b) Determine an equation to model the population of each town.

c) In what year is the population of Town Y greater than the population of Town X?

4. Ing has the choice of two payment options for her new job.

Option A: Starting salary of \$48 000, with a \$1000 raise every following year.

Option B: Starting salary of \$45 000, with a 2.5% raise every following year.

a) Complete the table of values.

Year	Option A Salary (\$)	Option B Salary (\$)
0		
1		
2		
3		
4		
5		
6		
7		

b) Which option should Ing choose? Why?

Unit 5 Day 8: Analyzing Real Life Data – Population of British Columbia. The data given below is the population of British Columbia since 1921.

Year	Pop'n (millions) actual	1st Diff	2nd Dif		Ratio
1921	0.52				
1931	0.69				
1941	0.82				
1951	1.17				
1961	1.63				
1971	2.18				
1981	2.82				
1991	3.37				
2001	4.08				

- Complete the table above filling in the first and second differences and the ratios.
- Which model fits the data the best?

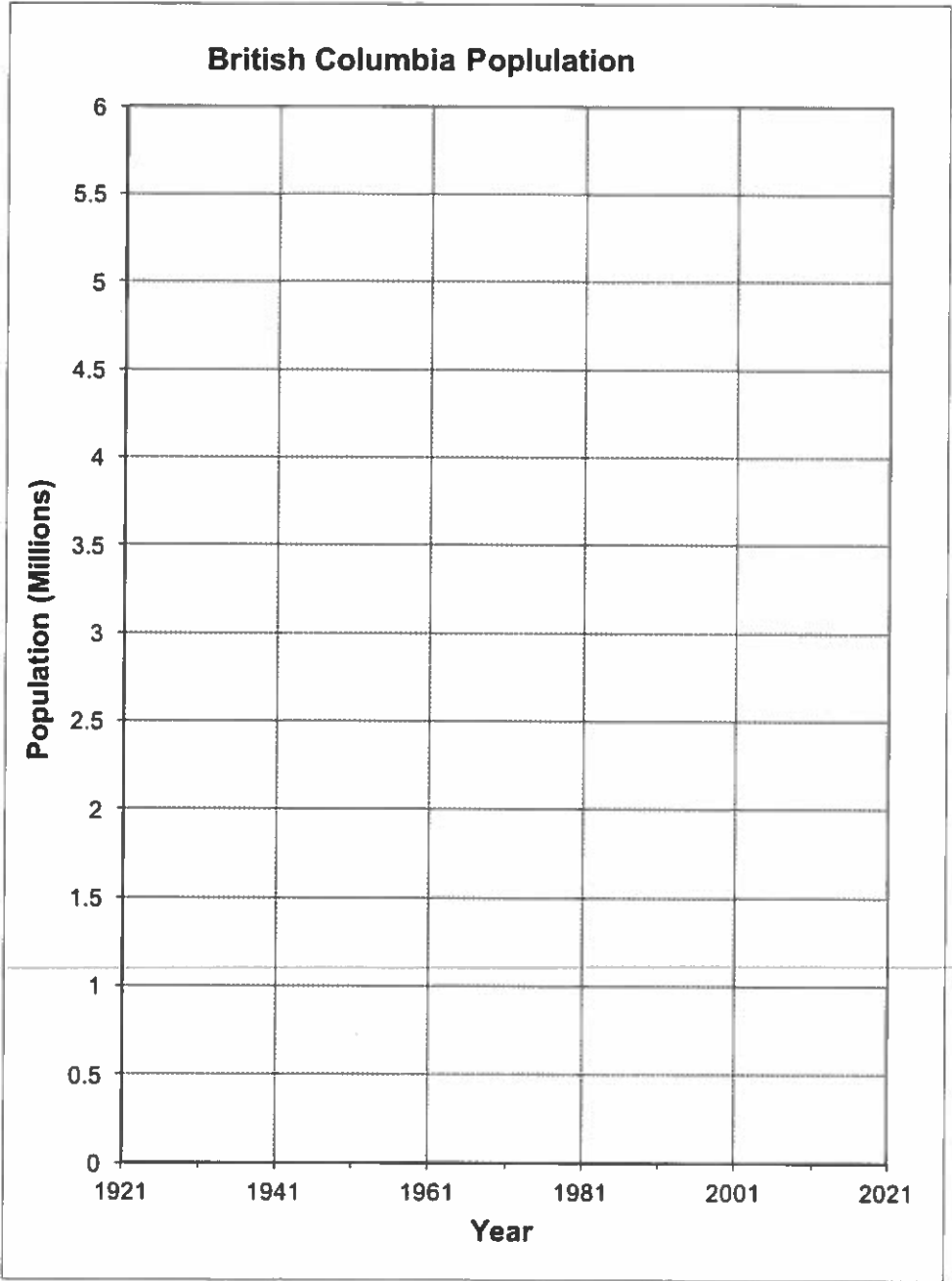
Regression Analysis: The regression equations for this data are given by:

linear $y=0.0455x+.1007$
 quadratic $y=0.0004x^2+0.0121x+0.4901$
 exponential $y=0.5252(1.02718)^x$
 where x is the number of years since 1921.

- Calculate the population for each year, using the given regression equations.

Year	Actual Pop	Calculated Population		
		Linear	Quadratic	Exponential
1921	0.52			
1931	0.69			
1941	0.82			
1951	1.17			
1961	1.63			
1971	2.18			
1981	2.82			
1991	3.37			
2001	4.08			
2011	est			

4. Estimate the population of BC in 2011 based on the data, then look up the actual 2011 population on-line.
5. Plot the actual population and the calculated populations on the same graph.



6. Which equation best describes the relationship how the population of BC changes over time?