Highfields State Secondary College

Course Overview

Faculty: Mathematics

Subject: **General Mathematics**

Year level: 12

Course Outline

Consumer arithmetic reviews the concepts of rate and percentage change in the context of earning and managing money, and provides an opportunity for the use of spreadsheets. Shape and measurement builds on and extends the knowledge and skills students developed in the P–10 Australian Curriculum with the concept of similarity and problems involving simple and compound geometric shapes. Students apply these skills in a range of practical contexts, including those involving three-dimensional shapes. Linear equations and their graphs uses linear equations and straight-line graphs, as well as piece-wise linear graphs and step graphs, to model and analyse practical situations.

Unit requirements

Subject matter describes the concepts, ideas, knowledge, understanding and skills that students are to learn in Unit 1. It is organised into topics and sub-topics. Notional time allocations have been provided for each sub-topic.

<table>
<tr><th colspan="2">UNIT 3</th></tr>
<tr><th>Topic 2: Time series analysis</th><th>Topic 3: : Growth and decay in sequences</th></tr>
<tr><td>students will develop mathematical understandings and skills to solve problems relating to the topics:
Describing and interpreting patterns in time series data In this sub-topic, students will:
• construct time series plots
• describe time series plots by identifying features such as trend (long-term direction), seasonality (systematic, calendar-related movements) and irregular fluctuations (unsystematic, short-term fluctuations), and recognise when there are outliers, e.g. one-off unanticipated events.
Analysing time series data (10 hours)
In this sub-topic, students will:
• smooth time series data by using a simple moving average, including the use of spreadsheets to implement this process
• calculate seasonal indices by using the average percentage method
• deseasonalise a time series by using a seasonal index, including</td><td>students will develop mathematical understandings and skills to solve problems relating to the topics:
The arithmetic sequence; In this sub-topic, students will:
• use recursion to generate an arithmetic sequence
• display the terms of an arithmetic sequence in both tabular and graphical form and demonstrate that arithmetic sequences can be used to model linear growth and decay in discrete situations
• use the rule for the nth term using tn=t1+(n−1)d, where tn represents the nth term of the sequence, t1= first term, n= term number and d= common difference of a particular arithmetic sequence from the pattern of the terms in an arithmetic sequence, and use this rule to make predictions
• use arithmetic sequences to model and analyse practical situations involving linear growth or decay, such as analysing a simple interest loan or investment, calculating a taxi fare based on the flag fall and the charge per kilometre, or calculating the value of an office photocopier at the end of each year using the straight-line method or the unit cost method of depreciation
The geometric sequence ; In this sub-topic, students will:
• use recursion to generate a geometric sequence
• display the terms of a geometric sequence in both tabular and graphical form and demonstrate that geometric sequences can be used to model exponential growth and decay in discrete situations
• use the rule for the nth term using tn=t1r(n−1) where tn represents the nth term of the sequence, t1= first term, n= term number and r= common ratio of a particular geometric sequence from the pattern of the terms in the sequence, and use this rule to make predictions</td></tr>
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the use of spreadsheets to implement this process • fit a least-squares line to model long-term trends in time series data, using appropriate technology • solve practical problems that involve the analysis of time series data.	• use geometric sequences to model and analyse (numerically or graphically only) practical problems involving geometric growth and decay (logarithmic solutions not required), such as analysing a compound interest loan or investment, the growth of a bacterial population that doubles in size each hour or the decreasing height of the bounce of a ball at each bounce; or calculating the value of office furniture at the end of each year using the declining (reducing) balance method to depreciate

Topic 4: Earth geometry and time zones

Subject matter

Locations on the Earth ; In this sub-topic, students will:

- define the meaning of great circles
- define the meaning of angles of latitude and longitude in relation to the equator and the prime meridian
- locate positions on Earth's surface given latitude and longitude, e.g. using a globe, an atlas, GPS and other digital technologies
- state latitude and longitude for positions on Earth's surface and world maps (in degrees only)
- use a local area map to state the position of a given place in degrees and minutes, e.g. investigating the map of Australia and locating boundary positions for Aboriginal language groups, such as the Three Sisters in the Blue Mountains or the local area's Aboriginal land and the positions of boundaries
- calculate angular distance (in degrees and minutes) and distance (in kilometres) between two places on Earth on the same meridian using $D=111.2 \times$ angular distance
- calculate angular distance (in degrees and minutes) and distance (in kilometres) between two places on Earth on the same parallel of latitude using $D=111.2 \cos\theta \times$ angular distance
- calculate distances between two places on Earth, using appropriate technology.

Topic: Time zones (5 hours)

In this sub-topic, students will:

- define Greenwich Mean Time (GMT), International Date Line and Coordinated Universal Time (UTC)
- understand the link between longitude and time
- determine the number of degrees of longitude for a time difference of one hour
- solve problems involving time zones in Australia and in neighbouring nations, making any necessary allowances for daylight saving, including seasonal time systems used by Aboriginal peoples and Torres Strait Islander peoples
- solve problems involving GMT, International Date Line and UTC
- calculate time differences between two places on Earth
- solve problems associated with time zones, such as online purchasing, making phone calls overseas and broadcasting international events
- solve problems relating to travelling east and west incorporating time zone changes, such as preparing an itinerary for an overseas holiday with corresponding times.

ASSESSMENT

IA1- PSMT ***REPORT, IN CLASS 3 LESSON OVER 4 WEEKS***	***IA2: EXAM*** ***120 MINS***	***IA3: EXAM*** ***120 MINS***