

Foundations for College Mathematics, Grade 11 (MBF3C)

Course Description

Course Title: Foundations for College Mathematics **Course Type:** College
Course Code: MBF3C **Credit Value:** 1.0
Grade: 11 **Prerequisite:** MFM2P or MPM2D

- **This course builds on** your knowledge from grade 10 Applied mathematics
- **It leads you to** MAP4C
- **This can lead you to many careers such as:** Baking and Pastry Chef, Child and Youth Care Worker, Drilling Rig Welder, Game Concept Artist, Sports Massage Therapist

Official Ontario Ministry of Education secondary curriculum available here:
<http://www.edu.gov.on.ca/eng/curriculum/secondary/math.html>

This course focuses on four main strands:

Mathematical Models

Personal Finance

Geometry and Trigonometry

Data Management

Mathematical models:

Students will use graphs and equations to solve problems about exponential relations arising from a variety of real-world applications, such as radioactive decay, population growth, drug absorption and compound interest. They will also learn to apply quadratic expressions to solve problems arising from real world problems such as a company's maximum profits or the distance travelled by a golf ball hit from an elevated tee.

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Personal Finance:

Students will learn how to gather, interpret and compare information about the costs and incentives associated with services available from financial institutes such as various credit and debit cards. For example, costs can include user fees, annual fees, service charges and interest charges on overdue balances, while incentives might include loyalty rewards and philanthropic incentives, such as support for Olympic athletes or a Red Cross disaster relief fund. Students will also learn about the procedures and costs involved in buying or leasing a vehicle, such as monthly payments, insurance, depreciation, maintenance and other miscellaneous expenses.

Problem: Determine the amount of interest you will pay on loan that is compounded annually at an interest rate of 3% after 15 years. The principal amount of the loan is \$120 000.00.

Solution:

$$\text{Loan} = \$120\,000$$

$$\text{Interest} = \frac{3}{100} = 0.03$$

$$\$120\,000 \times 1.03^{15} = \text{Total Loan} + \text{interest}$$

$$\$120\,000 \times 1.557967 = \text{Total Loan} + \text{interest}$$

$$\$186\,956.09 = \text{Total Loan} + \text{interest}$$

$$\text{Total} - \text{Principal} = \text{Interest}$$

$$\$186\,956.09 - \$120\,000 = \text{Interest}$$

$$\$66\,956.09 = \text{Interest}$$

You will pay \$66 956.09 of interest on the loan over 15 years.

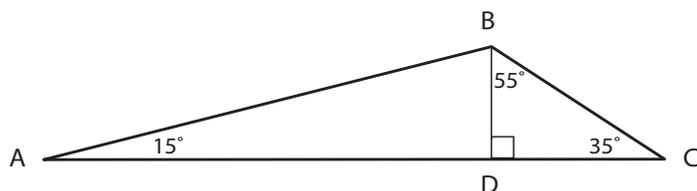
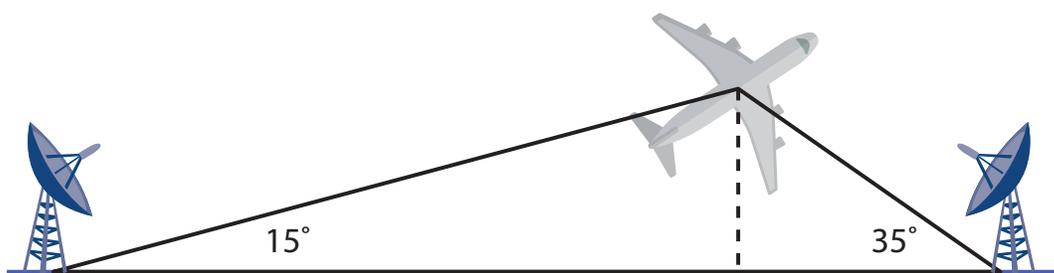
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Geometry and trigonometry:

Students will learn to recognize and describe real-world applications of geometric shapes and figures through investigation in a variety of contexts, such as why sewer covers are round and why rectangular prisms are used for packaging. They will also solve real-world trigonometry problems that involve metric and imperial measurements. For example:

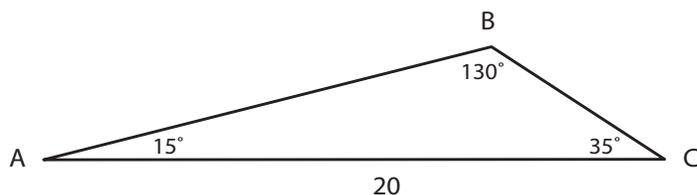
Suppose two radar stations located 20 miles apart each detect an aircraft between them as shown in the diagram below. How can we determine the altitude of the aircraft?



$$\begin{aligned}\angle CBD &= 180^\circ - 35^\circ - 90^\circ \\ &= 55^\circ\end{aligned}$$

$$\begin{aligned}\angle ABD &= 180^\circ - 15^\circ - 90^\circ \\ &= 75^\circ\end{aligned}$$

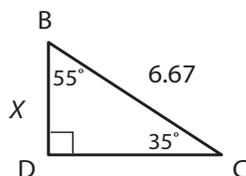
$$\begin{aligned}\angle B &= 55^\circ + 75^\circ \\ &= 130^\circ\end{aligned}$$



$$\frac{BC}{\sin 15^\circ} = \frac{20}{\sin 130^\circ}$$

$$BC = \frac{20 \times \sin 15^\circ}{\sin 130^\circ}$$

$$BC = 6.67$$



$$\sin 35^\circ = \frac{X}{6.67}$$

$$6.67 \times \sin 35^\circ = X$$

$$3.88 = X$$

\therefore the plane is 3.88 miles high.

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Data Management:

Students will learn how to connect probability (predicting the likelihood of future events) to statistics (the analysis of the frequency of past events) by collecting data about issues of interest, such as weather, sports, insurance policies, genetics and politics. They will also learn how to make inferences based on their samples.

Problem: Your friend claims that if he rolls a regular six-sided dice ten times, he has a 90% probability to roll a 6 at least once. Is he correct?

Solution:

Probability you will not roll a 6 is $\frac{5}{6}$

Probability you will not roll a 6 after 10 attempts

$$= \frac{5}{6} \times \frac{5}{6}$$

$$= \left(\frac{5}{6}\right)^{10}$$

$$1 - 0.16 = 0.84$$

$$= 0.16$$

= probability of rolling a 6