

# Foundations of Mathematics, Grade 10 (MFM2P)

## Course Description

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**Course Title:** Foundations of Mathematics  
**Course Code:** MFM2P  
**Grade:** 10

**Course Type:** Applied  
**Credit Value:** 1.0  
**Prerequisite:** MFM1P or MPM1D

- **This course builds on** your knowledge from grade 9 Applied mathematics
- **It leads you to** MBF3C, MCF3M, MEL3E

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

### **This course focuses on three main strands:**

Measurement and Trigonometry

Modelling Linear Relations

Quadratic relations of the form  $y = ax^2 + bx + c$

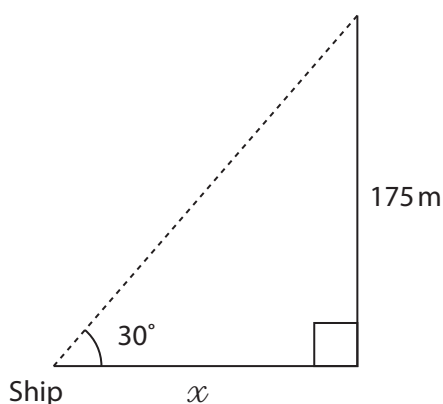
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### Measurement and trigonometry:

Students will apply the Pythagorean Theorem or the characteristics of similar triangles to solve indirect measurement problems, such as determining the height of a tree or a cell phone tower. They will also learn how trigonometry is used in the real world such as by navigators, surveyors and carpenters to solve problems like this:

A ship is nearing the rocks. The captain can see the top of the cliff at an angle of  $30^\circ$  with the horizon. His charts tell him that the cliff is 175 m above sea level. How far is the ship from hitting the rocks?



Solve for  $x$

$$\tan 30^\circ = \frac{x}{175}$$

$$175 \times \tan 30^\circ = x$$

$$101.3 \text{ m} = x$$

$\therefore$  the ship is 101.3 m away from the cliff.

### Trigonometric Table

Angle in degrees	Angle in Radians	Sine	Cosine	Tangent	Angle in degrees	Angle in Radians	Sine	Cosine	Tangent
$26^\circ$	0.454	0.438	0.899	0.488	$71^\circ$	1.239	0.946	0.326	2.904
$27^\circ$	0.471	0.454	0.891	0.510	$72^\circ$	1.257	0.951	0.309	3.078
$28^\circ$	0.489	0.469	0.883	0.532	$73^\circ$	1.274	0.956	0.292	3.271
$29^\circ$	0.506	0.485	0.875	0.554	$74^\circ$	1.292	0.961	0.276	3.487
$30^\circ$	0.524	0.500	0.866	0.577	$75^\circ$	1.309	0.966	0.259	3.732
$31^\circ$	0.541	0.515	0.857	0.601	$76^\circ$	1.326	0.970	0.242	4.011
$32^\circ$	0.559	0.530	0.848	0.625	$77^\circ$	1.344	0.974	0.225	4.331
$33^\circ$	0.576	0.545	0.839	0.649	$78^\circ$	1.361	0.978	0.208	4.705
$34^\circ$	0.593	0.559	0.829	0.675	$79^\circ$	1.379	0.982	0.191	5.145
$35^\circ$	0.611	0.574	0.819	0.700	$80^\circ$	1.396	0.985	0.174	5.671

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### Modelling linear relations:

Students will dig deeper into graphical and algebraic representations of lines. They will explore real-world examples such as cell phone plans and other expenses that include a base cost and a pay per use cost.

**Problem:** A school rents the local theatre to put on a stage production. The theatre charges a flat fee of \$500 and \$2 per person. The school is going to charge \$6 per person to attend the show. How many people need to attend the show so that the school doesn't lose any money?

### Solution:

Revenue  $d = 6p$  ②

Solve by substituting ① into ②

$$500 + 2p = 6p$$

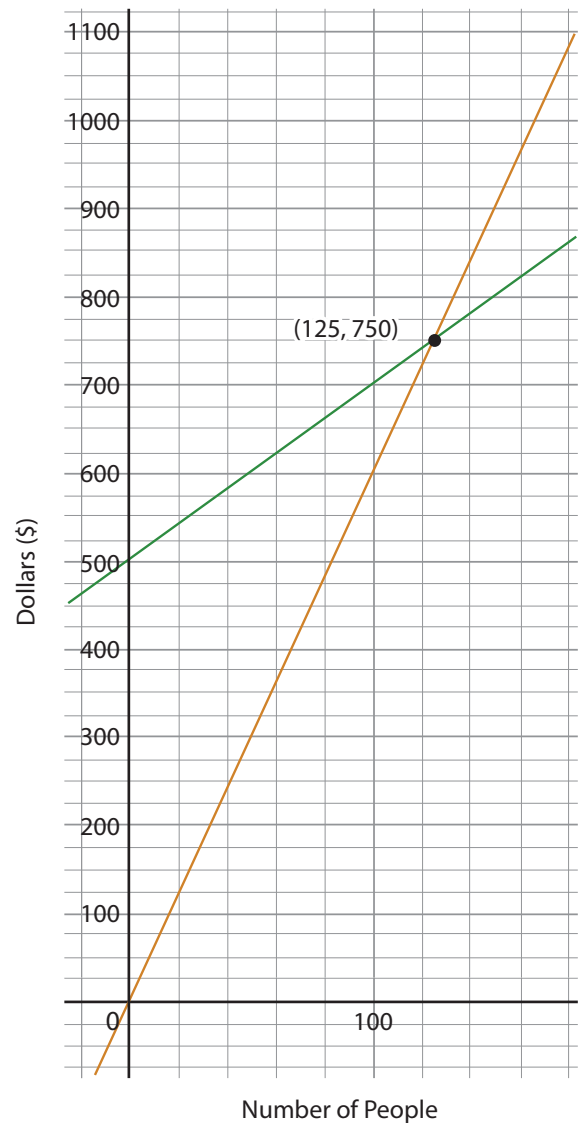
$$500 = 6p - 2p$$

$$500 = 4p$$

$$\frac{500}{4} = 4p$$

$$125 = p$$

$\therefore$  at least 125 people  
for the school not to



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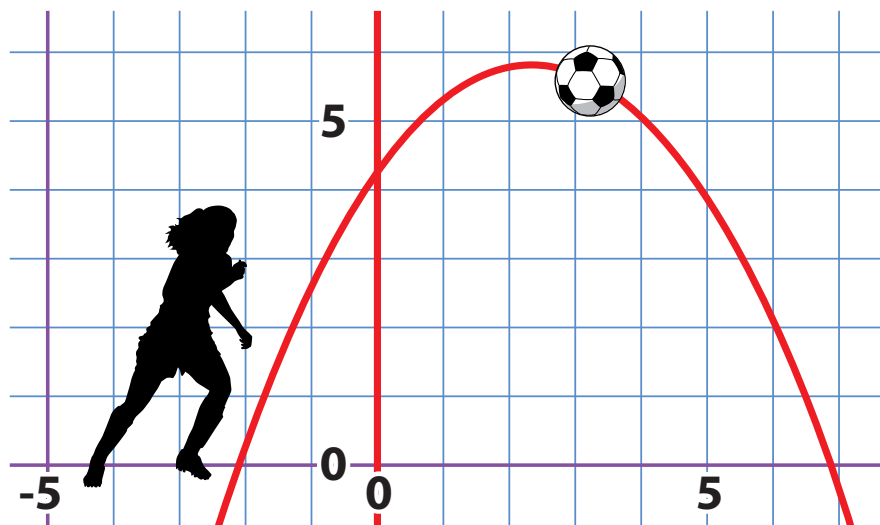
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### Quadratic relations of the form $y = ax^2 + bx + c$ :

Students will learn about quadratic equations. They will become familiar with algebraic (power of two) and graphical (parabolic) representations of quadratic relations by examining real life examples such as how they are used sports, in the bases of satellite dishes, radio telescopes and car headlights.

What does the graph below tell us?



This graph can tell us many things.

The y-intercept is at ~4.1 m which could be the height at which a soccer player hit the ball with their head.

The maximum height the ball goes into the air is at ~5.8 m

The ball hits the ground at ~6.9 seconds after it was headed.