

By the end of the year, your child will be meeting the Year 9 mathematics standard if ...

... they are equally confident using rational and irrational numbers to solve problems as well as variables and formulas. They will be able to make connections between algebraic expressions and graphs.

Pythagoras' theorem will be complemented by trigonometric ratios, which students will be able to use to solve problems.

Data will be analysed, described, and displayed in multiple ways and probabilities assigned to compound events.

Students will have strategies for describing effects, detecting errors, interpreting results and designing algorithms.

To meet the standard, your child will be learning to:

- solve problems with rational and irrational numbers
- extend exponent laws to variables
- expand and factorise quadratic expressions
- find the distance between two points and the gradient and midpoint of a line segment
- use linear or quadratic functions to model real-world contexts
- graph quadratic functions and solve simple quadratic equations
- use digital tools to show the effect of variations to functions, making connections between algebraic expressions and graphs
- find the surface area and volume of prisms and cylinders by applying formulas
- solve problems involving ratios, similarity and scale
- determine percentage errors in measurements
- apply Pythagoras' theorem and trigonometric ratios to solve problems with right-angled triangles
- compare the distributions of datasets and describe their shape
- analyse datasets using summary statistics
- explain how choices made about data can promote a point of view
- determine sets of outcomes for compound events and assign probabilities to each.

EMERGENCE OF ALGEBRA

In Year 9, students have a greater focus on algebra and spend significant time graphing relations, solving equations and rearranging formulas. A strong grasp of algebraic manipulation becomes an important skillset and assumed knowledge in all strands.

This is a small part of the skills and knowledge your child is learning in order to meet this standard. Talk to the teacher for more information about your child's learning.

MATHEMATICS PROBLEMS AT THIS LEVEL MIGHT LOOK LIKE THIS:

Teacher: From the top of a cliff, 100 m above sea level, the angle of depression to a ship sailing past is 17° . How far is the ship from the base of the cliff, to the nearest metre?

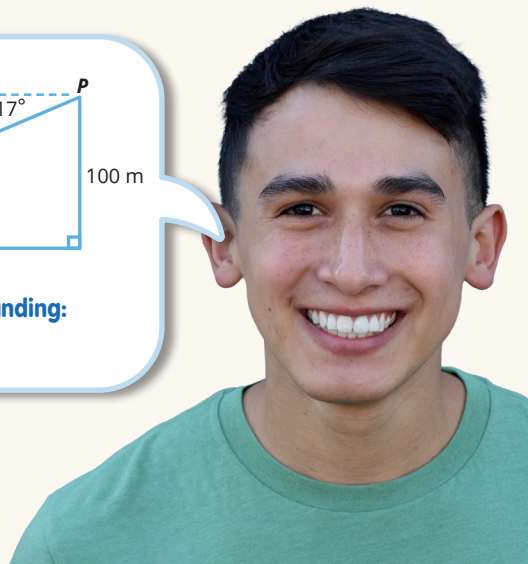
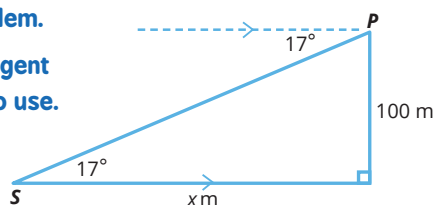
I drew a diagram to visualise the problem.

This helped me determine that the tangent was the correct trigonometric ratio to use.

I set up an equation: $\tan 17^\circ = \frac{100}{x}$.

I solved it: $x = 327.0852$.

**And finally, I restated my solution with appropriate units and rounding:
The ship is approximately 327 m from the base of the cliff.**



Ask the teacher what your child is doing in mathematics. Talk about how you can work together to support your child's learning.

MATHEMATICS AT HOME

Talk together and have fun with measurement and models

Here are some things you can do with your child.

- Ask them to teach you what they learnt in class. Adopt a curious mindset and ask questions to check the depth of their understanding.
- Observe parabolic paths in everyday life (e.g. the kick of a football or the throw of a ball, the shape of bridges, or watering with a garden hose). What connections can your child make about the corresponding quadratic expression?
- Measure the slope/gradient of a steep road in your local area. Ride a bicycle with a speedometer down roads of different slopes and compare the speeds and acceleration achieved.
- Involve your child in home improvement projects including budgeting, comparing prices and measuring.
- Calculate the volume and surface area of a wardrobe or cupboard in the house. How many storage containers of various sizes could fit on a particular shelf? How much paint is required to cover a door?
- Make a financial plan with your child to allocate their wages when they start a new job.
- Determine the height of a bird's or possum's favourite spot in the backyard, or the angle of elevation to the top of the roof from the street.

SUPPORT YOUR CHILD.

Parents, family and carers like you play a big part in your child's learning every day – you can support and build on what they learn at school.

Involve your child in easy, everyday activities like these

- Plan the grocery shop. Compare prices of products and work out quantities, considering when and how much to order based on price fluctuations.
- Track the fuel consumption of a car and price per kilometre based on the changing price of fuel.
- Measure for household projects such as present wrapping, painting a wall, or renovations.
- Calculate probabilities of various outcomes while playing games together.
- Analyse data from a device to implement an exercise routine, adjust screen time, and set goals.
- Think critically about data found online. Which sources are reliable? How was the data obtained? Is it presented in a biased or unbiased manner.
- Talking probabilistically about different options and discuss risk versus reward. Aim for more precision than either 0, 50/50 or 100 per cent chance. Unpack the rationale behind a choice and explore how the positive or negative outcomes could be handled.



THE WAY YOUR CHILD is learning to solve maths problems may seem strange. Ask questions. Get your child to show you how they do it and support them in their learning.

Being positive about mathematics is really important for your child's learning – even if you didn't enjoy it or do well at it yourself at school.

Talk with your child's teacher to understand what they are learning about in mathematics and what the learning is in the homework they are doing.

FOR SCHOOL HOLIDAYS, WEEKENDS OR RAINY DAYS

Here are some suggestions for what you and your child can do together.

- Try Sudoku, riddles and logic puzzles and play strategy games. Discuss different strategies and reflect on outcomes.
- Adjust the ratios of ingredients in a recipe to make it smaller or larger.
- Re-organise a cupboard or wardrobe to maximise the space.
- Plan a family road trip or holiday including the route, timing and costs.
- Record a video for a younger family member to teach them about something learnt in class.
- Learn how to use a software tool like Adobe Photoshop or Illustrator and create a set of notes or diagrams to make it easier to use next time.
- Plan for a major future purchase by comparing the options for a particular product and compile a report justifying the best option.

