Year 10A extension | Space

Unit circle trigonometric graphs and equations

Learn and practise | Free preview

A sample from this topic. The complete topic collection contains three different resources and worked solutions.

Read the explanation and worked example. Show your working; use a calculator only where asked.

What you will practise

- Extend trigonometry using the unit circle, radians, graphs and specified solution intervals.
- Explain a method and check the reasonableness of a result.

Useful starting skills: Use the prerequisite operations and representations shown in the worked example.

At angle θ on a unit circle, the point has coordinates (cos θ, sin θ). One full revolution is 2π radians or 360 degrees. Tangent is sin θ divided by cos θ wherever cos θ is not zero.

Sine and cosine have period 2π radians; tangent has period π. Use symmetry and the period to find all solutions within a stated interval. For $y=A\sin(Bx)+D$ with $B\neq0$, the amplitude is $|A|$, the period is $2\pi/|B|$ and the midline is $y=D$.

Worked example

Solve $\sin\theta=1/2$ for $0\leq\theta<2\pi$.

The reference angle is $\pi/6$.

Sine is positive in quadrants I and II.

Answer: $\theta=\pi/6$ or $5\pi/6$

Try it yourself

Name: _____ Date: _____

1. Convert 150 degrees to radians.

2. Find the unit-circle coordinates at $\theta=\pi/3$.

Answers and explanations

Check the method as well as the final answer. An alternative correct method is also valid.

1. 5π/6

Multiply degrees by π/180.

2. (1/2, √3/2)

Use the exact cosine and sine of 60 degrees.

Curriculum reference: VC2M10ASP03; VC2M10ASP04

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