MATHEMATICS ADVANCED YEAR 11 - MODULE 2 - LESSON 12

Phase Shifts and Horizontal Translations

Use this worksheet after reading the lesson to practise the key ideas and prove you can meet the success criteria.

Name _____

Date _____

Class _____

1. Key Ideas

A wave that starts at its peak is different from a wave that starts at zero — even if they have the same amplitude and period. This difference is called a phase shift . In this lesson, you will learn how horizontal translations affect trigonometric graphs, how to identify phase shifts from equations, and how phase shifts appear in real-world phenomena like sound, light, and tides.

- The general form of transformed sine and cosine functions
- Why $y = \sin(x - c)$ shifts right by c units

2. Success Criteria

By the end, you should be able to:

- The general form of transformed sine and cosine functions
- How to identify amplitude, period, phase shift, and vertical shift
- The relationship between phase shift and horizontal translation

3. Key Terms

Phase Shift
A horizontal translation of a periodic graph.

Horizontal Translation
A shift left or right; y = sin(x + c) shifts left by c units.

Vertical Shift
A shift up or down; y = sin(x) + d shifts up by d units.

Amplitude
The maximum displacement from the centre line; the coefficient a in y = a·sin(x).

Period
The horizontal length of one complete cycle; affected by the coefficient b in y = sin(bx).

General Form
y = a·sin(b(x + c)) + d describes amplitude, period, phase and vertical shift.

4. Activity: Build the Lesson Map

Use the lesson to complete the table. Keep answers brief but specific.

Prompt	Your answer
Main concept	
Important example	
Common mistake to avoid	
How this links to the next lesson	

5. Short Answer Questions

1. Explain this lesson goal in your own words: "The general form of transformed sine and cosine functions". Use one specific example from the lesson.

BAND 3 2 MARKS

2. Apply this idea to a new example: "How to identify amplitude, period, phase shift, and vertical shift". Show your reasoning clearly.

BAND 4 3 MARKS

3. Analyse why this idea matters for understanding Phase Shifts and Horizontal Translations: "The relationship between phase shift and horizontal translation".

BAND 5 4 MARKS

6. Extend: Apply the Idea

BAND 5/6 5 MARKS

A student gives a memorised answer about Phase Shifts and Horizontal Translations but does not use evidence or reasoning.

Improve the answer by writing a stronger response that uses accurate terminology, a relevant example and a clear explanation.

7. Multiple Choice

1. What is the best first step when answering a question about Phase Shifts and Horizontal Translations?

☐ A. Identify the key concept being tested

☐ B. Write every fact from memory

☐ C. Ignore the command word

☐ D. Skip examples and evidence

2. Which answer would show stronger understanding of Phase Shifts and Horizontal Translations?

☐ A. An answer with accurate terms and reasoning

☐ B. A copied definition only

☐ C. A single-word response

☐ D. An answer with no example

3. What should you do if a question asks you to explain?

☐ A. Link the idea to a reason or cause

☐ B. List unrelated facts

☐ C. Only draw a diagram

☐ D. Write the shortest possible answer

8. Success Criteria Proof

Finish with evidence that you can do each success criterion.

SUCCESS CRITERION 1

Prove that you can: The general form of transformed sine and cosine functions

BAND 3 2 MARKS

SUCCESS CRITERION 2

Prove that you can: How to identify amplitude, period, phase shift, and vertical shift

BAND 4 3 MARKS

SUCCESS CRITERION 3

Prove that you can: The relationship between phase shift and horizontal translation

BAND 5 4 MARKS

One thing I still need help with: