

Dilations of Functions

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

Pinch to zoom on a photo and everything stretches or shrinks proportionally. In mathematics, dilations do exactly the same thing to graphs — stretching them away from an axis or compressing them toward it. Understanding dilations is the key to sketching almost every transformed function you will meet in the HSC.

- $y = af(x)$ dilates vertically by factor a
- Why horizontal dilations are counter-intuitive (factor is $\frac{1}{b}$)

2. Success Criteria

By the end, you should be able to:

- $y = af(x)$ dilates vertically by factor a
- $y = f(bx)$ dilates horizontally by factor $\frac{1}{b}$
- How dilations affect coordinates of key points

3. Key Terms

Function

A relation where each input has exactly one output.

Domain

The set of all possible input values for a function.

Range

The set of all possible output values for a function.

Inverse Function

A function that reverses the effect of the original function.

Quadratic

A polynomial of degree 2, in the form $ax^2 + bx + c$.

Discriminant

The expression $b^2 - 4ac$ that determines the nature of quadratic roots.

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: " $f(x)$ dilates vertically by factor a ". Use one specific example from the lesson.

BAND 3 **2 MARKS**

2. Apply this idea to a new example: " $f(bx)$ dilates horizontally by factor $\frac{1}{b}$ ". Show your reasoning clearly.

BAND 4 **3 MARKS**

3. Analyse why this idea matters for understanding Dilations of Functions: "How dilations affect coordinates of key points".

BAND 5 **4 MARKS**

6. Extend: Apply the Idea

BAND 5/6

5 MARKS

A student gives a memorised answer about Dilations of Functions 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 Dilations of Functions?

- 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 Dilations of Functions?

- 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: $f(x)$ dilates vertically by factor a

BAND 3

2 MARKS

SUCCESS CRITERION 2

Prove that you can: $f(bx)$ dilates horizontally by factor $\frac{1}{b}$

BAND 4

3 MARKS

SUCCESS CRITERION 3

Prove that you can: How dilations affect coordinates of key points

BAND 5

4 MARKS

One thing I still need help with:
