

Stage 2 ★★

Creating graphs

Introduction

The purpose of these activities is to interpret the line of best fit on a graph.

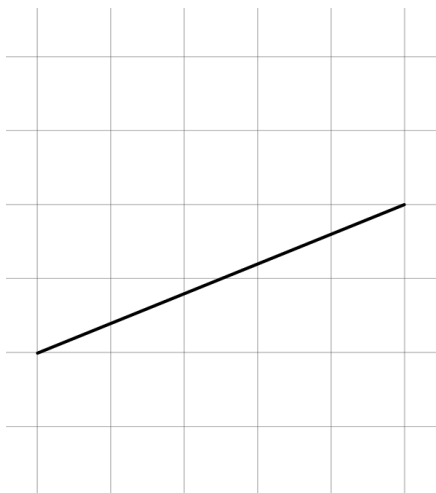
Learning objectives

1. Compare the gradient of a slope.
2. Calculate the gradient of a slope.
3. Use a tangent to find the gradient at a point on a curve.

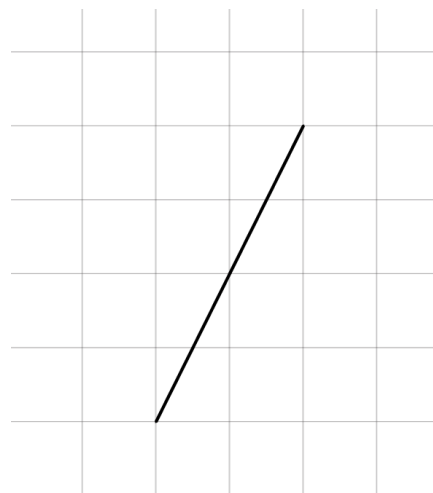
Comparing and calculating gradients

1. Which of the following has the steepest slope?
2. Calculate the gradient of each slope (each square counts as 1 unit).

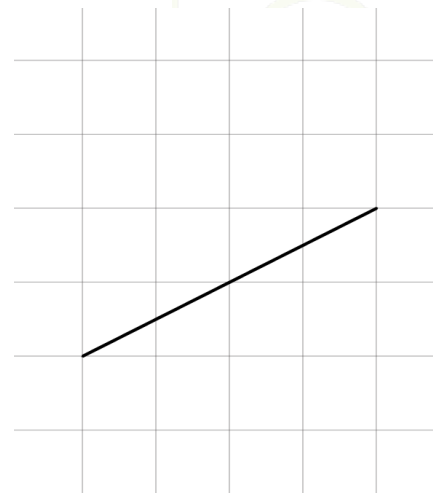
A.



B.



C.



Comparing and calculating gradients – answers

1. B has the steepest slope

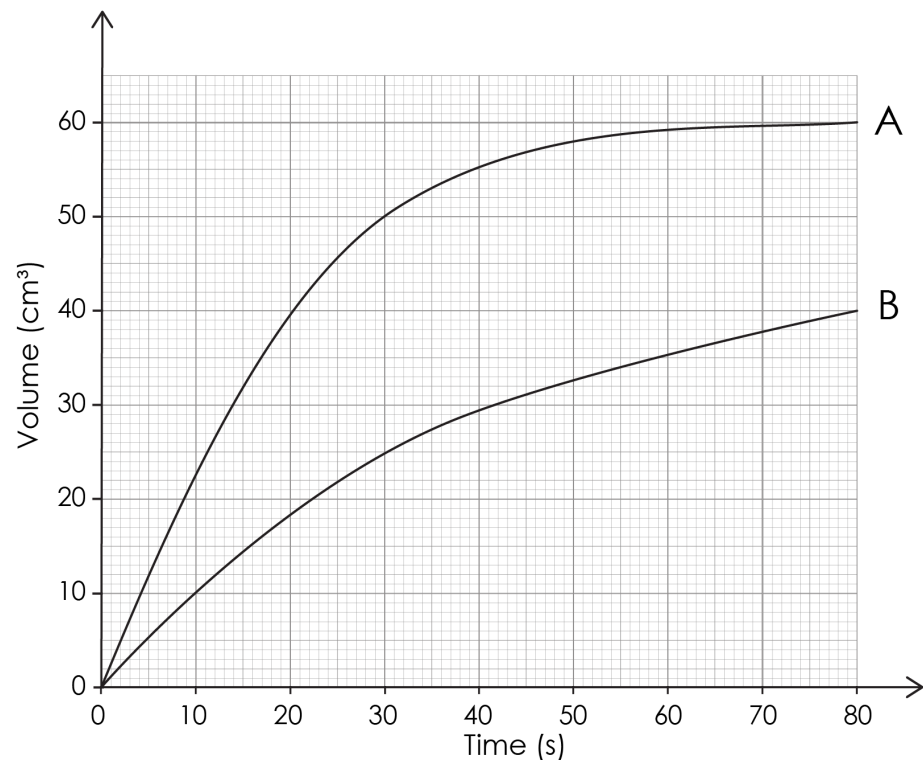
2. A: difference in $y = 2$
difference in $x = 5$
gradient $= \frac{2}{5} = 0.4$

B: difference in $y = 4$
difference in $x = 2$
gradient $= \frac{4}{2} = 2$

C: difference in $y = 2$
difference in $x = 4$
gradient $= \frac{2}{4} = 0.5$

Calculating the gradient

1. Which reaction is faster? How do you know?



2. Calculate the mean rate of reaction between 0 and 30 seconds for reaction A and reaction B.

Calculating the gradient – answer

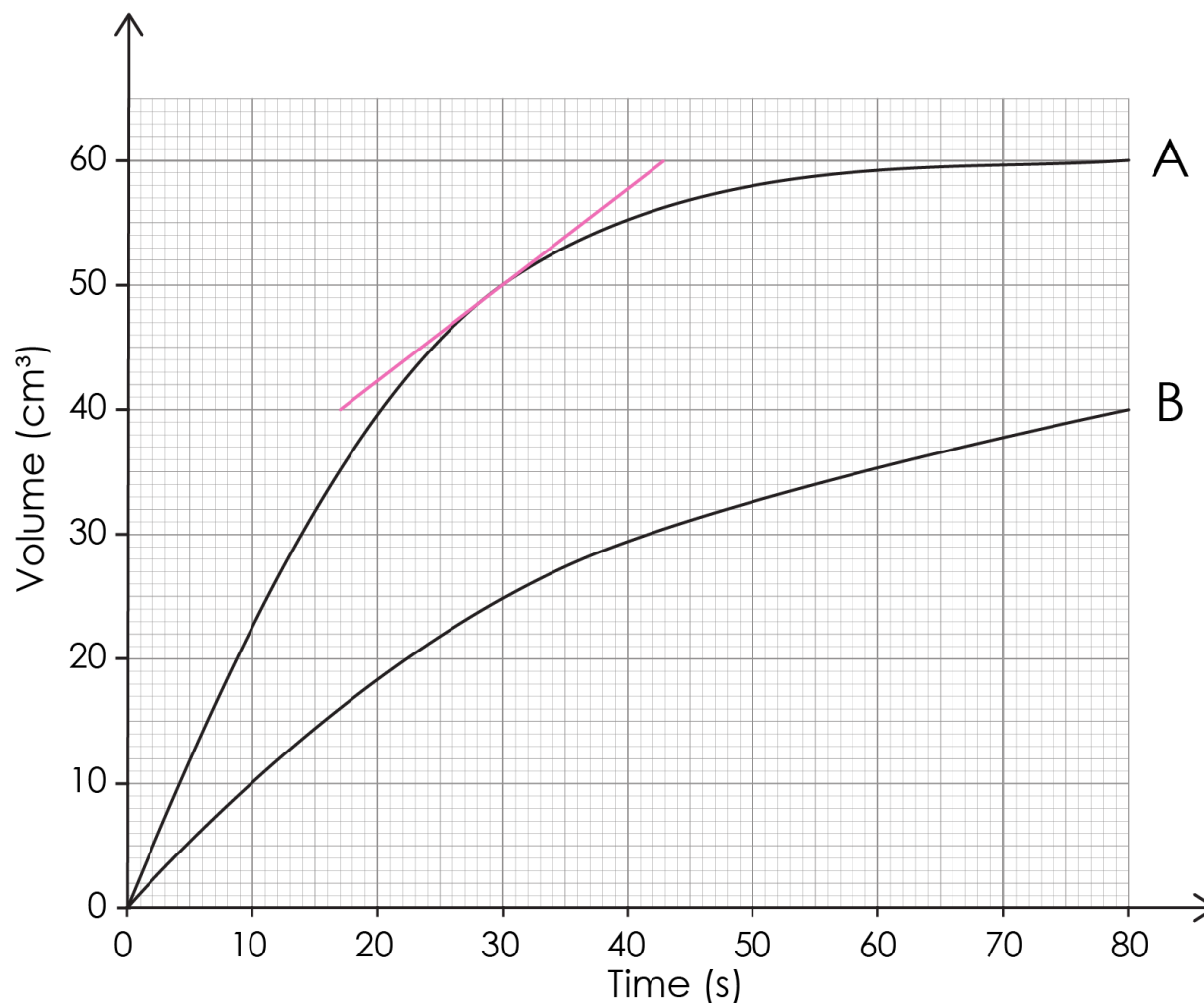
1. Reaction A is faster because the line of best fit is steeper.

2. A: Difference in $y = 50 - 0 = 50 \text{ cm}^3$
difference in $x = 30 - 0 = 30 \text{ s}$
gradient $= \frac{50}{30} = 1.7 \text{ cm}^3/\text{s}$

B: Difference in $y = 25 - 0 = 25 \text{ cm}^3$
difference in $x = 30 - 0 = 30 \text{ s}$
gradient $= \frac{25}{30} = 0.83 \text{ cm}^3/\text{s}$

Calculating the gradient using a tangent

Determine the rate of reaction at 30 seconds for reaction A using the tangent.



Calculating the gradient using a tangent – answer

Difference in $y = 60 - 40 = 20 \text{ cm}^3$

Difference in $x = 43 - 17 = 26 \text{ s}$

Gradient $= \frac{20}{26} = 0.77 \text{ cm}^3/\text{s}$

