InkMaths

QUESTION WORKBOOK

Trigonometric modelling

Trigonometry · Year 12–13

7 questions · 24 marks

NAVY SCREEN EDITION

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SECTION A · Warm-up

A1 Write down the amplitude and period of $y = 3 \sin 2t$, with t in seconds. [2]

A2 A model gives $h = 5 + 2 \cos t$. Write down the maximum and minimum values of h. [2]

SECTION B · Standard

B1 A wheel's seat height is modelled by $h = 10 - 8 \cos(\pi t/20)$, in metres and seconds. Write down the height of the axle and the radius of the wheel, and find the maximum seat height and the period of the ride. [4]

B2 A wheel's seat height is modelled by $h = 10 - 8 \cos(\pi t/20)$, in metres and seconds. Find the first time the seat is 14 m high. [4]

B3 A buoy's height above mean sea level is $y = 0.9 \sin 0.6t$, in metres and seconds. Find the amplitude, the period, and the first positive time at which the buoy is at mean sea level. [4]

SECTION C · Stretch

C1 A tide gauge fits the data $y = 2 \sin 0.5t + 1.5 \cos 0.5t$, in metres and hours. Express y as a single sine wave, and find the height of high tide and the first time it occurs. [6]

C2 A student claims that doubling the amplitude of a periodic model makes it oscillate twice as fast. Untangle the claim. [2]