Name:	Date:

Question 1: Find the centre and radius of the circle with equation $$(x-5)^2 + (y+3)^2 = 16$$	11·1 Bronze Outcome 1
Question 2: Solve $12 + x - x^2 > 0$.	8·3 Silver Outcome 2
Question 3: Find the value(s) of m. $$\int_{3}^{m} 8 - 2x \, dx = 7$$	9·2 Gold Outcome 3
Question 4: Find the equation of the straight line which is perpendicular to the line with equation $8y = x + 10$ and which passes through the point $(7, 3)$.	1·6 Silver Outcome 2
Question 5: For what values of x is the function $y = \frac{1}{3}x^3 - 2x^2 - 32x$ increasing?	6·4 Bronze Outcome 1

My score:

Exam Questions

Question 1:

If $x°$ is an acute angle such that $\tan x° = \frac{4}{3}$, show that the exact value of

$\sin(x + 30)°$ is $\dfrac{4\sqrt{3} + 3}{10}$.   (3)

Question 2:

Solve the equation

$\sin x - 2\cos 2x = 1$ for $0 \le x < 2\pi$.

                                        5

Question 3:

A manufacturer is asked to design an open-ended shelter, as shown, subject to the following conditions.

Condition 1

The frame of a shelter is to be made of rods of two different lengths:

- x metres for top and bottom edges;
- y metres for each sloping edge.

Condition 2

The frame is to be covered by a rectangular sheet of material.
The total area of the sheet is 24 m².

(a) Show that the total length, L metres, of the rods used in a shelter is given by

$$L = 3x + \frac{48}{x}.$$ 3

(b) These rods cost £8·25 per metre.

To minimise production costs, the total length of rods used for a frame should be as small as possible.

  (i) Find the value of x for which L is a minimum.

  (ii) Calculate the minimum cost of a frame.   7

My score: