Name:	Date:
Question 1: Find the equation of the tangent at the point (9, 1) on the circle $x^2 + y^2 - 12x + 4y - 6 = 0$.	11·2 Silver Outcome 2
Question 2: Find the equation of the straight line which is perpendicular to the line with equation $2y - 2x = 1$ and which passes through the point $(-4, 10)$.	1·6 Silver Outcome 2
Question 3: A curve for which $f'(x) = 4x^3 + 9$ passes through the point (1, 6). Find f(x).	9·3 Outcome 1
Question 4: Solve $2\sin 2x° - \sqrt{3} = 0$ for $0 \leq x \leq 360°$.	10·2 Bronze Outcome 1
Question 5: For what values of x is the function $y = x^3 - 3x^2 - 45x - 21$ stationary?	6·4 Silver Outcome 2
My score:	

Exam Questions

Question 1:

(a) Show that $(x + 1)$ is a factor of $x^3 - 13x - 12$. 3

(b) Factorise $x^3 - 13x - 12$ fully. 2

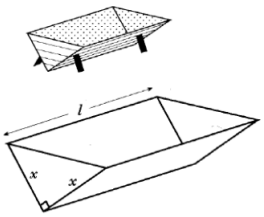
Question 2:

(*a*) Find the equation of the tangent to the curve with equation $y = x^3 + 2x^2 - 3x + 2$ at the point where $x = 1$. 5

(*b*) Show that this line is also a tangent to the circle with equation $x^2 + y^2 - 12x - 10y + 44 = 0$ and state the coordinates of the point of contact. 6

Question 3:

An open water tank, in the shape of a triangular prism, has a capacity of 108 litres. The tank is to be lined on the inside in order to make it watertight.



The triangular cross-section of the tank is right-angled and isosceles, with equal sides of length x cm. The tank has a length of l cm.

(*a*) Show that the surface area to be lined, A cm^2, is given by $A(x) = x^2 + \frac{432000}{x}$. 3

(*b*) Find the value of x which minimises this surface area. 5

My score: