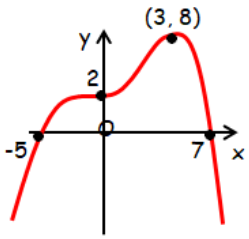
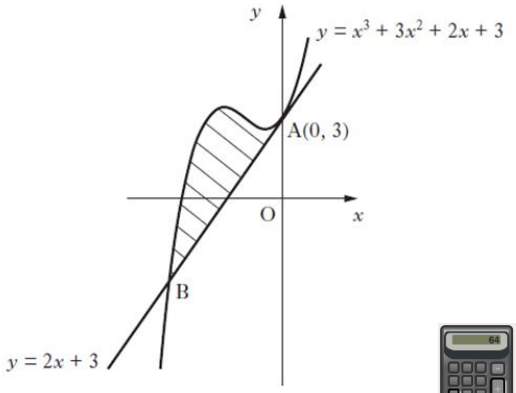
Name:	Date:
Question 1: Solve $x^2 + 5x + 4 \leq 0$.	8·3 Silver Outcome 2
Question 2: A curve for which $\frac{dy}{dx} = 12x^2 - 10x$ passes through the point (-1, 2). Express y in terms of x.	9·3 Outcome 1
Question 3: Find the coordinates of the stationary points of the curve with equation $y = 9x^2 - 3x^3$ and determine their nature.	6·5 Bronze Outcome 1 6·5 Silver Outcome 2
Question 4: Find the equation of the tangent at the point (6, -3) on the circle $x^2 + y^2 + 4x + 2y + 3 = 0$.	11·2 Silver Outcome 2
Question 5: The graph of y = f(x) is shown below.  Sketch the graph of y = f'(x).	6·4 Gold Outcome 3
My score:	

Exam Questions

Question 1:

The line with equation $y = 2x + 3$ is a tangent to the curve with equation $y = x^3 + 3x^2 + 2x + 3$ at A(0, 3), as shown in the diagram.



The line meets the curve again at B.

Show that B is the point (–3, –3) and find the area enclosed by the line and the curve. 6

Question 2:

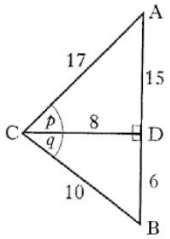
Medical researchers studying the growth of a strain of bacteria observe that the number of bacteria, present after t hours, is given by the formula $N(t) = 40e^{1.5t}$.

(*a*) State the number of bacteria present at the start of the experiment. 1

(*b*) How many minutes will the bacteria take to double in number? 4

Question 3:

Triangles ACD and BCD are right-angled at D with angles p and q and lengths as shown in the diagram.



(*a*) Show that the exact value of $\sin(p + q)$ is $\frac{84}{85}$. 4

(*b*) Calculate the exact values of:

(i) $\cos(p + q)$;

(ii) $\tan(p + q)$. 3

My score: