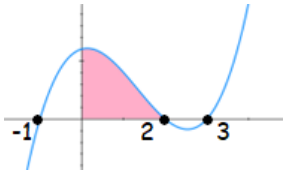
Name:	Date:
Question 1: Fully factorise the following polynomial; $f(x) = x^4 - x^3 - 21x^2 + x + 20$	7·1 Gold Outcome 3
Question 2: If A and B are acute angles with $\sin A = \frac{1}{3}$ and $\cos B = \frac{3}{7}$ find the exact value of $\sin(A + B)$.	10·1 Gold Outcome 3
Question 3: Show that the line y = 4x + 5 is a tangent to the circle $x^2 + y^2 + 2x + 15y + 53 = 0$ and find the coordinates of the point of contact.	11·3 Silver Outcome 2
Question 4:  The curve $y = x^3 - 4x^2 + x + 6$ intersects the x-axis at points (-1, 0) (2, 0) and (3, 0).  Calculate the shaded area.	9·4 Bronze Outcome 1
Question 5: Find the range of values of c such that the equation $x^2 + cx + 2c = 4x + 8$ has real roots.	8·4 Gold Outcome 3
My score:	

Exam Questions

Question 1:

Solve algebraically the equation

$\sin 2x = 2\cos^2 x$ for $0 \leq x < 2\pi$ 6

Question 2:

Find $\int_0^2 \sqrt{4x+1}\, dx.$ 5

Question 3:

(a) For a particular radioactive substance, the mass m (in grams) at time t (in years) is given by

$$m = m_0 e^{-0.02t}$$

where m_0 is the original mass.
If the original mass is 500 grams, find the mass after 10 years. 2

(b) The half-life of any material is the time taken for half of the mass to decay.
Find the half-life of this substance. 3

My score: