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Year 2 (A-Level)

Mixed sample questions

**The marks shown are for guidance purposes only**

**When not specified, round all non-terminating decimals to 3 significant figures**

Some useful Formulae:

$$\int u \frac{dv}{dx} dx = uv - \int v \frac{du}{dx} dx$$

$$(a + b)^n = a^n + \binom{n}{1} a^{n-1} b + \binom{n}{2} a^{n-2} b^2 + \binom{n}{r} a^{n-r} b^r + \dots + b^n$$

For  $(n \in \mathbb{N})$  Where  $\binom{n}{r} = {}^n C_r = \frac{n!}{r!(n-r)!}$

$$(1 + x)^n = 1 + nx + \frac{n(n-1)}{1 \times 2} x^2 + \dots + \frac{n(n-1) \dots (n-r+1)}{1 \times 2 \dots r} x^r + \dots$$

$(|x| < 1, n \in \mathbb{R})$

$$\sin(A \pm B) = \sin A \cos B \pm \cos A \sin B$$

$$\cos(A \pm B) = \cos A \cos B \mp \sin A \sin B$$

$$\tan(A \pm B) = \frac{\tan A \pm \tan B}{1 \mp \tan A \tan B} \quad (A \pm B \neq \left(k + \frac{1}{2}\right)\pi)$$

1 The graphs of  $y = 2x^2 - 5x - 6$  and  
 $y = -\frac{1}{2}x^2 + 3x + 2$  intersect at points A and B

a) Calculate the exact coordinates of A and B [4marks]

b) Hence calculate the exact area between the curves  
[4marks]

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A large rectangular area containing 28 horizontal lines, intended for writing or drawing.

2 The third and sixth terms of an A.P. are 15 and 21 respectively

a) Find the Nth term of the sequence **[3marks]**

b) Hence find the sum of the first 12 terms **[3marks]**

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**3**

Expand  $\left(\frac{1-2x}{1+x}\right)^{\frac{3}{2}}$  up to and including the term in  $x^3$

**[8marks]**

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Given that  $\sin A = \frac{2}{3}$  and  $\sin B = \frac{5}{6}$

where A and B are acute angles

a) Find the exact values of

$\cos(A + B)$  and  $\sin(A + B)$  [6marks]

b) Hence or otherwise find  $\tan(A + B)$  [4marks]

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A large rectangular area containing 25 horizontal lines, intended for writing or drawing.

**5** The gradient function of a curve is given as

$$f'(x) = \frac{2}{3x} + 4x$$

Given that the curve passes through the point  $(1, 0)$

a) Find  $f(x)$  **[3marks]**

b) Hence, evaluate  $\int_1^4 f(x) dx$  exactly **[5marks]**

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A large rectangular area containing 25 horizontal lines, intended for writing or drawing.