

Assessment Cover Sheet



Subject:	Additional Mathematics		Teacher's Name	AKHLAK HOSSAIN	
Topic	Mock Paper-1		IV's Name		
Year/Class	O level		IV Date		
Assessment Type	Worksheet		Obtained Mark		80
Awarding Body	CAIE				
Assessment Date		Time		Duration	1 hour 30 mins
Students Name					
Assessment Decision					
Feedback Received	Y/N	Parents Signature			
Parents General Comments					

Questions	
<p>1 (i) Differentiate $(x^2 + 3)\ln(x^2 + 3)$ with respect to x. [3]</p>	
<p>(ii) Hence find $\int x \ln(x^2 + 3) dx$. [3]</p>	

Notes:

1. Teachers must submit assignment briefs to the IV for approval at least 5 working days prior to the actual assessment date
2. Assessment decision/results must be submitted to the IV within 3 working days of the assessment/test
3. Assessment decisions/results should not be circulated without approval from the IV

2 Find the set of values of x for which $(2x + 1)^2 > 8x + 9$. [4]

3 Prove that $\frac{\sin A}{1 + \cos A} + \frac{1 + \cos A}{\sin A} \equiv 2\operatorname{cosec} A$. [4]

4 A function f is such that $f(x) = ax^3 + bx^2 + 3x + 4$. When $f(x)$ is divided by $x - 1$, the remainder is 3. When $f(x)$ is divided by $2x + 1$, the remainder is 6. Find the value of a and of b . [5]

Notes:

1. Teachers must submit assignment briefs to the IV for approval at least 5 working days prior to the actual assessment date
2. Assessment decision/results must be submitted to the IV within 3 working days of the assessment/test
3. Assessment decisions/results should not be circulated without approval from the IV

Assessment Cover Sheet



5 (i) Solve the equation $2t = 9 + \frac{5}{t}$. [3]

(ii) Hence, or otherwise, solve the equation $2x^{\frac{1}{2}} = 9 + 5x^{-\frac{1}{2}}$. [3]

iSTEM-BD

Notes:

1. Teachers must submit assignment briefs to the IV for approval at least 5 working days prior to the actual assessment date
2. Assessment decision/results must be submitted to the IV within 3 working days of the assessment/test
3. Assessment decisions/results should not be circulated without approval from the IV

6 Given that $\mathbf{a} = 5\mathbf{i} - 12\mathbf{j}$ and that $\mathbf{b} = p\mathbf{i} + \mathbf{j}$, find

(i) the unit vector in the direction of \mathbf{a} ,

[2]

(ii) the values of the constants p and q such that $q\mathbf{a} + \mathbf{b} = 19\mathbf{i} - 23\mathbf{j}$.

[3]

7 (i) Express $4x^2 - 12x + 3$ in the form $(ax + b)^2 + c$, where a , b and c are constants and $a > 0$.

[3]

(ii) Hence, or otherwise, find the coordinates of the stationary point of the curve $y = 4x^2 - 12x + 3$.

[2]

(iii) Given that $f(x) = 4x^2 - 12x + 3$, write down the range of f .

[1]

Notes:

1. Teachers must submit assignment briefs to the IV for approval at least 5 working days prior to the actual assessment date
2. Assessment decision/results must be submitted to the IV within 3 working days of the assessment/test
3. Assessment decisions/results should not be circulated without approval from the IV

- 8 A curve is such that $\frac{d^2y}{dx^2} = 4e^{-2x}$. Given that $\frac{dy}{dx} = 3$ when $x = 0$ and that the curve passes through the point $(2, e^{-4})$, find the equation of the curve. [6]

iSTEM-BD

Notes:

1. Teachers must submit assignment briefs to the IV for approval at least 5 working days prior to the actual assessment date
2. Assessment decision/results must be submitted to the IV within 3 working days of the assessment/test
3. Assessment decisions/results should not be circulated without approval from the IV

- 9 (i) Find, in ascending powers of x , the first 3 terms in the expansion of $(2 - 3x)^5$. [3]

The first 3 terms in the expansion of $(a + bx)(2 - 3x)^5$ in ascending powers of x are $64 - 192x + cx^2$.

- (ii) Find the value of a , of b and of c . [5]

Notes:

1. Teachers must submit assignment briefs to the IV for approval at least 5 working days prior to the actual assessment date
2. Assessment decision/results must be submitted to the IV within 3 working days of the assessment/test
3. Assessment decisions/results should not be circulated without approval from the IV

10 (a) Functions f and g are defined, for $x \in \mathbb{R}$, by

$$f(x) = 3 - x,$$
$$g(x) = \frac{x}{x+2}, \text{ where } x \neq -2.$$

(i) Find $fg(x)$. [2]

(ii) Hence find the value of x for which $fg(x) = 10$. [2]

(b) A function h is defined, for $x \in \mathbb{R}$, by $h(x) = 4 + \ln x$, where $x > 1$.

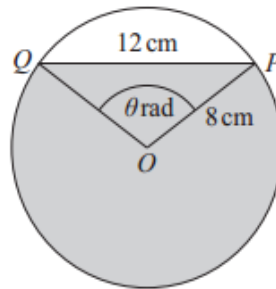
(i) Find the range of h . [1]

(ii) Find the value of $h^{-1}(9)$. [2]

Notes:

1. Teachers must submit assignment briefs to the IV for approval at least 5 working days prior to the actual assessment date
2. Assessment decision/results must be submitted to the IV within 3 working days of the assessment/test
3. Assessment decisions/results should not be circulated without approval from the IV

11. The diagram shows a circle, centre O , radius 8 cm. Points P and Q lie on the circle such that the chord $PQ = 12$ cm and angle $POQ = \theta$ radians.



- (i) Show that $\theta = 1.696$, correct to 3 decimal places. [2]
- (ii) Find the perimeter of the shaded region. [3]
- (iii) Find the area of the shaded region. [3]

Notes:

1. Teachers must submit assignment briefs to the IV for approval at least 5 working days prior to the actual assessment date
2. Assessment decision/results must be submitted to the IV within 3 working days of the assessment/test
3. Assessment decisions/results should not be circulated without approval from the IV

12. (a)(i) How many different 5-digit numbers can be formed using the digits 1, 2, 4, 5, 7 and 9 if no digit is repeated? [1]
- (ii) How many of these numbers are even? [1]
- (iii) How many of these numbers are less than 60 000 and even? [3]
- (b) A solid circular cylinder has a base radius of r cm and a volume of 4000 cm^3 .
- (i) Show that the total surface area, $A \text{ cm}^2$, of the cylinder is given by $A = \frac{8000}{r} + 2\pi r^2$. [4]
- (ii) Given that r can vary, find the minimum total surface area of the cylinder, justifying that this area is a minimum. [6]

Notes:

1. Teachers must submit assignment briefs to the IV for approval at least 5 working days prior to the actual assessment date
2. Assessment decision/results must be submitted to the IV within 3 working days of the assessment/test
3. Assessment decisions/results should not be circulated without approval from the IV