



Subject: Grade 12 Mathematics
Topic: Mathematics: Term 1 - Mini-Exam
Total: 48 Marks

Name: _____

Date: _____

Question 1: Multiple Choice

4 marks

Determine the value of $-4 - 1 + 2 + \dots + 143$.

- | | |
|----------|-------|
| A | 3 475 |
| B | 6 950 |
| C | 50 |
| D | 140 |

Question 2: Multiple Choice

4 marks

The point $(4; 2)$ lies on $f(x) = \log_a x$.

Determine the equation of f^{-1} in the form $y = \dots$

- | | |
|----------|----------------|
| A | $y = \log_2 x$ |
| B | $y = 2^x$ |
| C | $y = \log_4 x$ |
| D | $y = 4^x$ |

Question 3: True/False

2 marks

$\frac{\sin 4\theta - \sin 2\theta}{\cos 4\theta + \cos 2\theta}$ can be simplified to

$\tan 2\theta$.

TRUE

FALSE



Question 4: True/False

2 marks

If $f(x) = \frac{x-1}{3}$ then $f^{-1}(x) = 3x + 1$.

TRUE**FALSE****Question 5: True/False**

2 marks

The geometric series $2(x-1) + 4(x-1)^2 + 8(x-1)^3 + \dots$ will converge for $\frac{1}{2} < x < 2$.

TRUE**FALSE****Question 6: True/False**

2 marks

$f(x) = -\log_2 x$ and $g(x) = \left(\frac{1}{2}\right)^x + 1$

The transformation from f to g is a reflection over the line $y = 0$ and a vertical translation 1 unit up.

TRUE**FALSE****Question 7: Multiple Choice**

4 marks

Simplify the following:

$$\frac{\sin(-180^\circ - \theta) \cdot \tan(-\theta) \cdot \sin(90^\circ - \theta)}{\sin^2(180^\circ + \theta) + \cos^2 \theta}$$

- | | |
|----------|------------------------------|
| A | $-\sin^2 \theta$ |
| B | $\sin^2 \theta$ |
| C | $-\cos \theta + \sin \theta$ |
| D | $\cos^2 \theta$ |

Question 8: Multiple Choice

4 marks

Determine the 30th term of the sequence 5 ; 2 ; -3 ; -10 ; ...

A	-140
B	-82
C	-894
D	906

Question 9: Multiple Choice

4 marks

Simplify:

$$\frac{\sqrt{1 - \cos^2 2A}}{\cos(-A) \cdot \cos(90^\circ + A)}$$

A	$\tan A$
B	$-\sin A$
C	-2
D	2

Question 10: True/False

2 marks

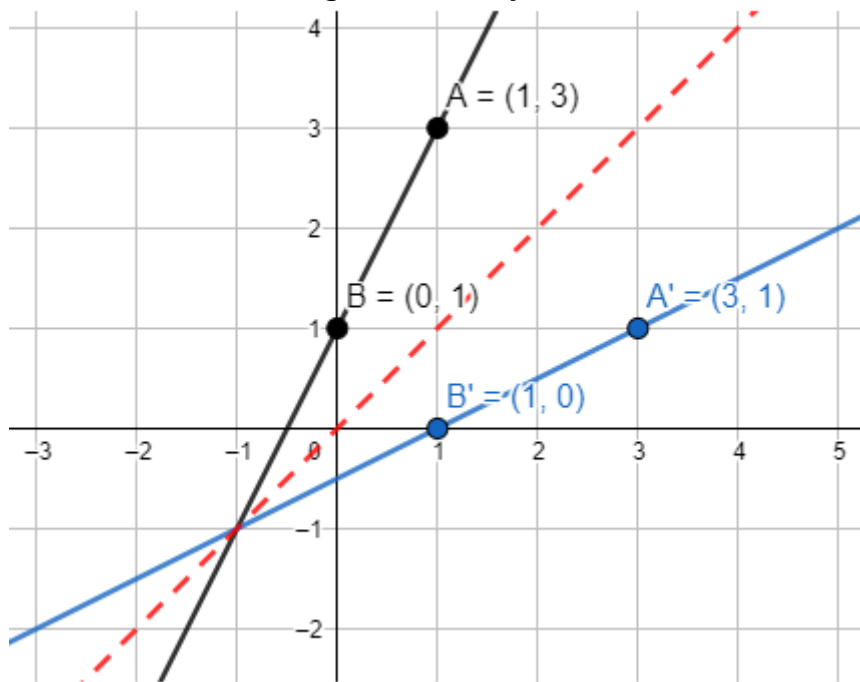
 $\frac{\sin(-2x)}{\cos(180^\circ - x)}$ can be simplified to $2 \sin x$.**TRUE****FALSE**

Question 11: True/False

2 marks

If $13 \cos B + 12 = 0$ and $\sin B > 0$, the value of $\sin 2B$ will be $\frac{10}{13}$.**TRUE****FALSE**

This image refers to question: 12



Question 12: True/False

2 marks

The graphs alongside are inverses of one another.

TRUE

FALSE

Question 13: Multiple Choice

4 marks

Determine the general solution, correct to one decimal place:

$$\sin 2\theta - 3 \cos 2\theta = 0$$

A $\theta = 71,6^\circ + k.180^\circ; k \in \mathbb{Z}$

B $\theta = 35,8^\circ + k.90^\circ; k \in \mathbb{Z}$

C $\theta = 71,6^\circ + k.360^\circ; k \in \mathbb{Z}$

D no solution

This image refers to question: 14



Question 14: Multiple Choice

4 marks

Express $3 + 6 + 12 + \dots + 192$ in sigma notation.

- | | |
|----------|-----------------------|
| A | $\sum_{n=1}^6 3^n$ |
| B | $\sum_{n=1}^6 3(2)^n$ |
| C | $\sum_{n=0}^5 2(3)^n$ |
| D | $\sum_{n=0}^6 3(2)^n$ |

Question 15: True/False

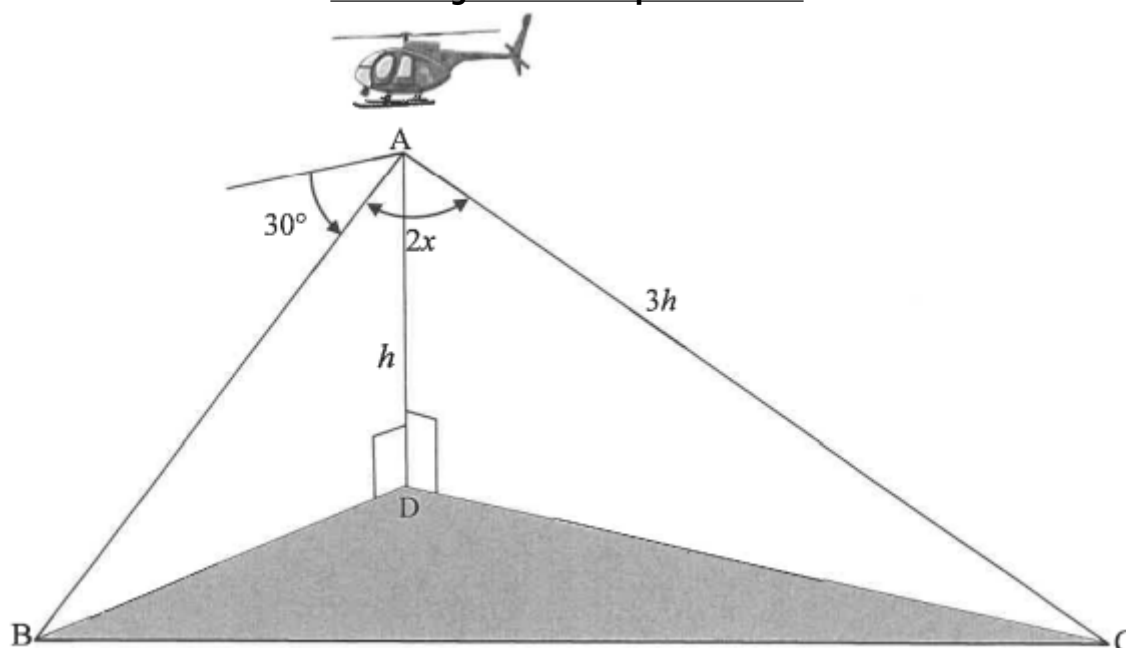
2 marks

The infinite sum of $\frac{1}{2} + \frac{1}{6} + \frac{1}{18} + \dots$ is $\frac{3}{4}$.

TRUE

FALSE

This image refers to question: 16



Question 16: Multiple Choice

4 marks

A pilot is flying in a helicopter. At point A , which is h metres directly above point D on the ground, he notices a strange object at point B . The pilot determines that the angle of depression from A to B is 30° . He also determines that the control room at point C is $3h$ metres from A and $BAC = 2x$. Points B , C and D are in the same horizontal plane.

The distance between the strange object at point B and the control room at point C can be given by:

- | | |
|----------|---------------------------------|
| A | $BC = h\sqrt{25 - 24 \cos^2 x}$ |
| B | $BC = 4h^2 - 3h^2 \cos 2x$ |
| C | $BC = 2h\sqrt{h \sin 2x}$ |
| D | $BC = h\sqrt{25 - 24 \cos 2x}$ |

Total: 48 Marks