



Subject: Grade 11 Mathematics
Topic: Mathematics: Term 1 - Mini-Exam
Total: 111 Marks

Name: _____

Date: _____

Question 1: True/False

2 marks

$x^2 - 5x - 4 = 0$ and $(x - \frac{5}{2})^2 + \frac{9}{4} = 0$ are equivalent equations.

TRUE

FALSE

Question 2: True/False

2 marks

Solve x and y :

$x + 2y = 0$ and $y - xy - \frac{1}{2}x^2 = -2$

The solution for the simultaneous equations is $(4; -2)$

TRUE

FALSE

Question 3: Text Input

3 marks

Solve for x :

$$\frac{x-3}{x^2+4x+3} = \frac{2x}{x+1}$$

The answer is: $x = \dots$

Give any fractions in the form a/b .

Question 4: True/False

2 marks

$\sin(\theta - 180^\circ) = -\sin \theta$

TRUE

FALSE



Question 5: Text Input

3 marks

Solve for θ , correct to one decimal place, where $\theta \in [45^\circ; 90^\circ]$.

$$2 \sin 3\theta = 1,4$$

Give the answer as a number only, with no degree sign.

Question 6: Text Input

3 marks

Solve for x :

$$\sqrt{5-x} + 1 + x = 0$$

The only solution to this equation is $x = \dots$

Give the answer as a number only.

Question 7: Multiple Choice

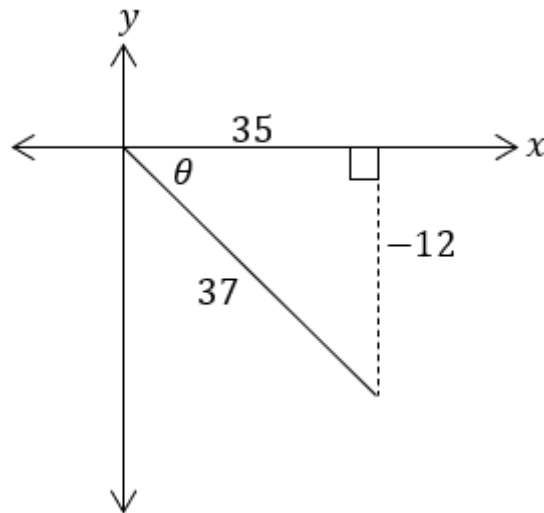
4 marks

The expression $\frac{\sin 245^\circ \cdot \cos 130^\circ}{\cos 310^\circ}$

can be simplified to:

- | | |
|----------|--------------------------------------|
| A | $-\sin 65^\circ$ |
| B | $\sin 65^\circ$ |
| C | $\sin 65^\circ \cdot \cos 50^\circ$ |
| D | $-\sin 65^\circ \cdot \cos 50^\circ$ |

This image refers to question: 8



Question 8: Multiple Choice

4 marks

Using the diagram alongside to determine the value of:

$$\frac{\sin(360^\circ - \theta)}{\cos(180^\circ - \theta)}$$

- | | |
|----------|------------------|
| A | $\frac{35}{37}$ |
| B | $-\frac{35}{37}$ |
| C | $-\frac{12}{35}$ |
| D | $\frac{37}{35}$ |

Question 9: Multiple Choice

4 marks

If $\sin 25^\circ = p$, determine $\cos 205^\circ$ in terms of p .

- | | |
|----------|-------------------|
| A | $-\sqrt{1 - p^2}$ |
| B | $\sqrt{1 - p^2}$ |
| C | $\frac{1}{p}$ |
| D | $-\frac{1}{p}$ |

Question 10: Multiple Choice

4 marks

Determine the general solution, correct to two decimal places, to the following equation:

$$3 \sin \beta + 2 \cos \beta = 0$$

- | | |
|----------|--|
| A | $\beta = -63,43^\circ + k.180^\circ; k \in \mathbb{Z}$ |
| B | $\beta = -33,69^\circ + k.180^\circ; k \in \mathbb{Z}$ |
| C | $\beta = 33,69^\circ + k.180^\circ; k \in \mathbb{Z}$ |
| D | $\beta = -41,81^\circ + k.360^\circ; k \in \mathbb{Z}$ |
-

Question 11: True/False

2 marks

The expression $\frac{pq^{-1} - p^{-1}q}{q^{-1} - p^{-1}}$ can be simplified to

$$p - q.$$

TRUE

FALSE

Question 12: Please Fill In The Blanks

4 marks

Solve for x :

$$4 - 7x = -2x^2$$

$$x = (1) \text{ or } x = (2) .$$

(Rounded to **TWO decimal** places)

Possible Answers: -0,72 | -2,78 | 0,71 | 2,78 | 0,72 | Non-real

1	
----------	--

2	
----------	--

Question 13: Please Fill In The Blanks

8 marks

Solve for x and y :

$$y - 3 + x = 0 \text{ and } x^2 - y = 2x + 3$$

$$\therefore x = (1) \text{ or } x = (2)$$

$$\therefore y = (3) \text{ or } y = (4)$$

Select the answers in the **order that they appear on the list**.

Possible Answers: -3 | -2 | -1 | 0 | 1 | 2 | 3 | 4 | 5

1	
3	

2	
4	

Question 14: Multiple Choice

4 marks

Solve for x :

$$x^2 - x - 12 = 0$$

- | | |
|----------|---------------------|
| A | $x = 4$ or $x = -3$ |
| B | $x = -4$ or $x = 3$ |
| C | $x = 6$ or $x = -2$ |
| D | $x = 4$ or $x = 3$ |

Question 15: True/False

2 marks

The following equation is given:

$$7.16^x = 224$$

The equation can be simplified so that the LHS and RHS are both in the form $7^a \cdot 2^b$, where $a, b \in R$.

TRUE	FALSE
-------------	--------------

Question 16: Text Input

3 marks

Solve for x :

$$6 - \sqrt{x+2} = x + 2$$

 $x = \dots$ Write your answer as a **number only**.

--

Question 17: Please Fill In The Blanks

10 marks

Consider the identity:

$$\frac{\cos^2 \theta - \sin^2 \theta}{\cos^2 \theta + \sin \theta \cos \theta} = 1 - \tan \theta$$

On the left-hand side, the numerator can be (1) using (2) and the denominator can be factorised using (3) .

The left-hand side can be simplified to:

$$\frac{\cos \alpha - \sin \alpha}{\cos \alpha}$$
$$= \frac{\cos \alpha}{\cos \alpha} - \frac{\sin \alpha}{\cos \alpha}$$

The first term is equal to (4) and the second term is (5) θ .

Possible Answers: simplified | factorised | highest common factor | square identity | difference of two squares | 0 | 1 | tan | -tan

1	
3	
5	

2	
4	

Question 18: Text Input

3 marks

Given the following identity:

$$\frac{3 - 3 \sin \theta}{\sin \theta - \sin^2 \theta} = \frac{B}{\sin \theta}$$

Determine the value of B .

Give the answer as a number only.

Question 19: Text Input

3 marks

Simplify as far as possible:

$$\frac{\cos(90^\circ - \theta) \cdot \cos(90^\circ + \theta)}{\sin(180^\circ + \theta) \cdot \sin(360^\circ - \theta)}$$

If the answer contains a θ , use Q as the symbol. Alternatively express the answer as a number only.**Question 20: True/False**

2 marks

Given: $x^2 + 8x - 1 + \frac{13}{x^2 + 8x + 4} = 9$

By method of substitution, the equation

$$(k - 1)(k - 4) = -13$$

can be solved first.

TRUE**FALSE**

Question 21: Multiple Choice

4 marks

Simplify the following:

$$\frac{8^x \cdot 6^{x-3} \cdot 9^{1-x}}{16^{x-1} \cdot 3^{-x}}$$

A	$\frac{3}{-2}$
B	6
C	$\frac{2}{3}$
D	$\frac{2}{-3}$

Question 22: Please Fill In The Blanks

4 marks

Chris solves an equation with the quadratic formula:

$$x = \frac{2 \pm \sqrt{8 - 4p}}{6}$$

The value(s) of p for which the roots are real is (1) .The value(s) of p for which the roots are equal is (2) .Possible Answers: $p \geq 2$ | $p \leq 2$ | $p = 2$ | $p = -2$

1	
----------	--

2	
----------	--

Question 23: Multiple Choice

4 marks

Simplify the following:

$$\frac{3^{2x} - 3^x}{3^x - 1}$$

A	3^x
B	$3^x - 3^{-x}$
C	$3^x - 1$
D	$x - 1$

Question 24: Please Fill In The Blanks

4 marks

For which value(s) of m will the following equation have equal roots?

$$x^2 + m + 3 = mx$$

$m = (1)$ and $m = (2)$.

Possible Answers: 2 | 3 | 4 | 5 | 6 | -2 | -3 | -4 | -5

1	
----------	--

2	
----------	--

Question 25: True/False

2 marks

If $2 \cdot 3^x + 3^{x+1} = 15$,

then a simplified equation can be $3^x = \frac{15}{5}$.

TRUE

FALSE

Question 26: Please Fill In The Blanks

6 marks

Given the following expression to simplify, without the use of a calculator:

$$\frac{\cos 315^\circ \cdot \sin 135^\circ}{\cos 240^\circ}$$

$$= \frac{A \cdot \sin 45^\circ}{B}$$

$$= \frac{C \cdot \frac{\sqrt{2}}{2}}{-\frac{1}{2}}$$

$$= -1$$

$$A = (1) .$$

$$B = (2) .$$

$$C = (3) .$$

Note: sqrt means “square root”, i.e. sqrt 2/2 means $\frac{\sqrt{2}}{2}$.

Possible Answers: $\cos 45^\circ$ | $-\cos 45^\circ$ | $\text{sqrt } 2/2$ | $-\cos 60^\circ$ | -1 | $-\text{sqrt } 2/2$

1	
3	

2	
----------	--

Question 27: Text Input

3 marks

Simplify without the use of a calculator:

$$\sqrt[3]{x^7} \cdot \sqrt[3]{x^{11}}$$

Express a^b as a^b in the answer.

--

Question 28: Multiple Choice

4 marks

Solve for x :

$$3^{2x+2} + 1 = 10.3^x$$

- | | |
|----------|------------------------------|
| A | $x = \frac{1}{9}$ or $x = 1$ |
| B | $x = 9$ or $x = 1$ |
| C | $x = -2$ or $x = 0$ |
| D | $x = -9$ or $x = -1$ |

Question 29: Please Fill In The Blanks

6 marks

Solve for θ , if $\theta \in (180^\circ; 360^\circ]$:

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

$$\sin \theta (\cos \theta - 1) = 0$$

$$\sin \theta = 0 \text{ or } \cos \theta = 1$$

$$\theta = (1)^\circ + k.360^\circ; k \in \mathbb{Z}$$

or

$$\theta = (2)^\circ + k.360^\circ$$

$$\therefore \theta = (3)^\circ$$

Possible Answers: 0 | 90 | 180 | 270 | 360

1	
3	

2	
----------	--

Question 30: True/False

2 marks

Solve for x :

$$4x^2 - 1 > 0$$

$$\text{The solution is } -\frac{1}{2} < x < \frac{1}{2}$$

TRUE	FALSE
-------------	--------------

