



Subject: Grade 10 Mathematics
Topic: Mathematics: Term 1 - Mini-Exam
Total: 105 Marks

Name: _____

Date: _____

Question 1: Multiple Choice

4 marks

Change the subject of the equation to v :

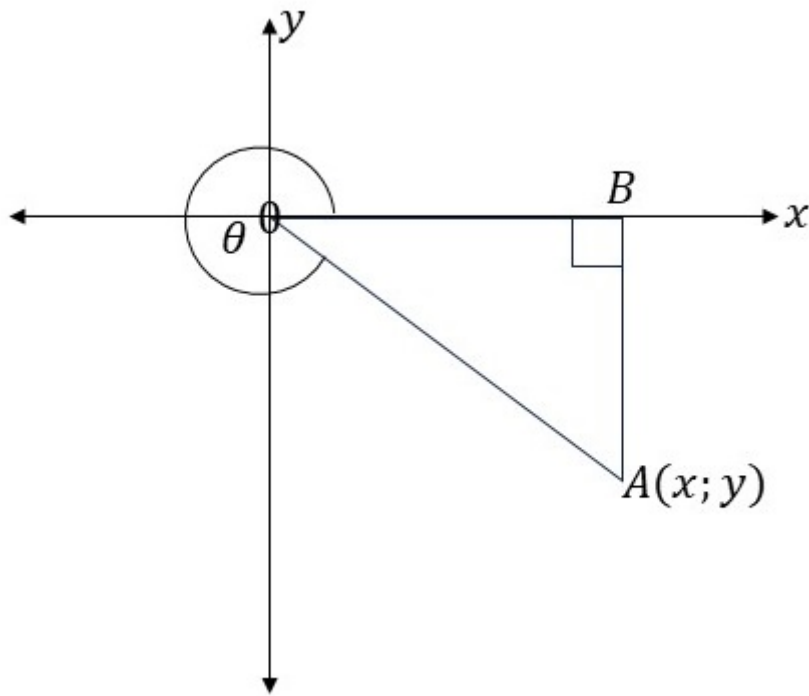
$$\frac{1}{u} + \frac{1}{v} = \frac{1}{f}$$

The answer is:

- | | |
|----------|------------------------|
| A | $v = f - u$ |
| B | $v = \frac{u - f}{fu}$ |
| C | $v = \frac{fu}{u - f}$ |
| D | $v = \frac{f - u}{fu}$ |



This image refers to question: 2



Question 2: Multiple Choice

4 marks

Study the given diagram.

$$\tan \theta = -\frac{7}{5} \text{ and } 180^\circ \leq \theta \leq 360^\circ$$

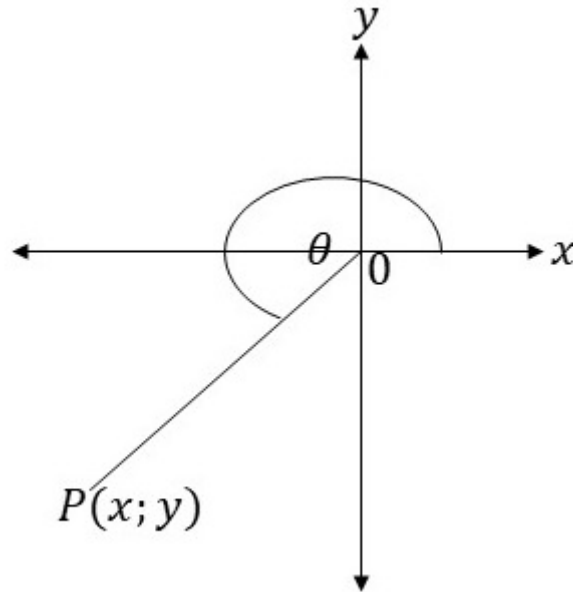
Simplify the following by using the sketch:

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

The answer is:

A	$-\frac{7}{\sqrt{74}}$
B	$-\frac{31}{\sqrt{74}}$
C	$\frac{7}{\sqrt{74}}$
D	$-\frac{5}{\sqrt{74}}$

This image refers to question: 3



Question 3: Please Fill In The Blanks

6 marks

Study the given diagram.

If $13 \cos \theta = -12$, the length of $OP = (1)$.

The coordinates of P are (2) therefore $\tan \theta = (3)$.

Possible Answers: -5 | 13 | 5 | (-12 ; 5) | (12 ; -5) | (-12 ; -5) | 5/12 | 13/12 | -5/12

1	
3	

2	
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Question 4: Multiple Choice

4 marks

Simplify:

$$\left(\frac{x^4 + x^4}{x^4 \times x^4}\right)^4$$

The answer is:

A	$\frac{8}{x^8}$
B	1
C	$\frac{8}{x^{16}}$
D	$\frac{16}{x^{16}}$

Question 5: True/False

2 marks

Factorise:

$$1 - \frac{1}{64a^3}$$

The answer is: $\left(1 - \frac{1}{4a}\right)\left(1 - \frac{1}{4a} + \frac{1}{4a^2}\right)$

TRUE**FALSE****Question 6: Text Input**

3 marks

Solve for x :

$$2 \cdot \left(\frac{1}{2}\right)^{-x} - 5^{-2} \cdot 5^2 = 0$$

Give the answer as a number only.



Question 7: Text Input

3 marks

Determine the answer without a calculator:

$$\sin 45^\circ \sec 45^\circ + \cos^2 30^\circ - \frac{\tan 30^\circ}{\cot 60^\circ}$$

Give your answer in the form a/b if it is a fraction.**Question 8: Text Input**

3 marks

Simplify and leave answer with positive exponents:

$$[(-2x^2)^3]^{-2}$$

The answer is: ...

If the answer is a fraction, give it in the form a/b .If there is a power in the answer for example a^n , give it as a^n .**Question 9: Please Fill In The Blanks**

4 marks

Solve for x :

$$6x - 3(1) < 5x$$

The answer is (2) .

In interval notation, it will be (...) .

Possible Answers: $x > -6$ | $x < -6$ | $x > 6$ | $x \in \mathbb{R}$ | $x \in (-6 ; \infty)$ | $x \in (-\infty ; -6)$ | $x \in (6 ; \infty)$

1	
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2	
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Question 10: Please Fill In The Blanks

6 marks

Peter buys 10 sweets- lollipops and liquorice- in total. Lollipops cost $R4,00$ per sweet and liquorice sweets cost $R4,50$ per sweet.

The total cost of all the sweets is $R43,50$.

Let x be the number of lollipops.

The value of x is (1) .

Peter has bought (2) liquorice sweets. He has paid (3) for the liquorice.

Possible Answers: 5 | 6 | 4 | 3 | 7 | $R43,50$ | $R12,00$ | $R31,50$

1	
3	

2	
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Question 11: True/False

2 marks

Solve x and y algebraically:

$$\begin{aligned}2x &= 5y + 1 \\ 24 - 7x &= 3y\end{aligned}$$

The solution is: (3; 1)

TRUE	FALSE
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Question 12: True/False

2 marks

The expression:

$$\frac{3^{n+4} - 6 \cdot 3^{n+1}}{7 \cdot 3^{n+2}}$$

simplifies to 1.

TRUE	FALSE
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Question 13: Multiple Choice

4 marks

Simplify:

$$\frac{x}{4-x} - \frac{2}{x} \times \frac{x-12}{x-4}$$

The answer is:

A	$\frac{(x+6)(x+4)}{x(4-x)}$
B	$\frac{(x+6)(x-4)}{x(4-x)}$
C	$\frac{-(x+6)(x+4)}{x(4-x)}$
D	$\frac{-(x+6)}{x}$

Question 14: Please Fill In The Blanks

4 marks

Simplify the expression:

$$(3x^2 - 4y^3)^2 - (x^2 + 2y^3)(x^2 - 2y^3)$$

The answer is: $8x^4 + Ax^2y^3 + By^6$ The value of A is (1) and the value of B is (2) .

Possible Answers: -20 | 5 | 12 | -24 | -12 | 20

1	
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2	
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Question 15: True/False

2 marks

The area of a rectangle is $x^2 - x - 12$ square units.The length is $x - 4$ units.The circumference of the rectangle is $4x - 1$ units.

TRUE	FALSE
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Question 16: Text Input

3 marks

Solve for θ :

$$\cos(3\theta + 10^\circ) = 0,9$$

The answer is $\theta = \dots$

Give the answer as a number only without the degrees sign.

Round the answer off to 2 decimal places if necessary.

Question 17: Multiple Choice

4 marks

Simplify:

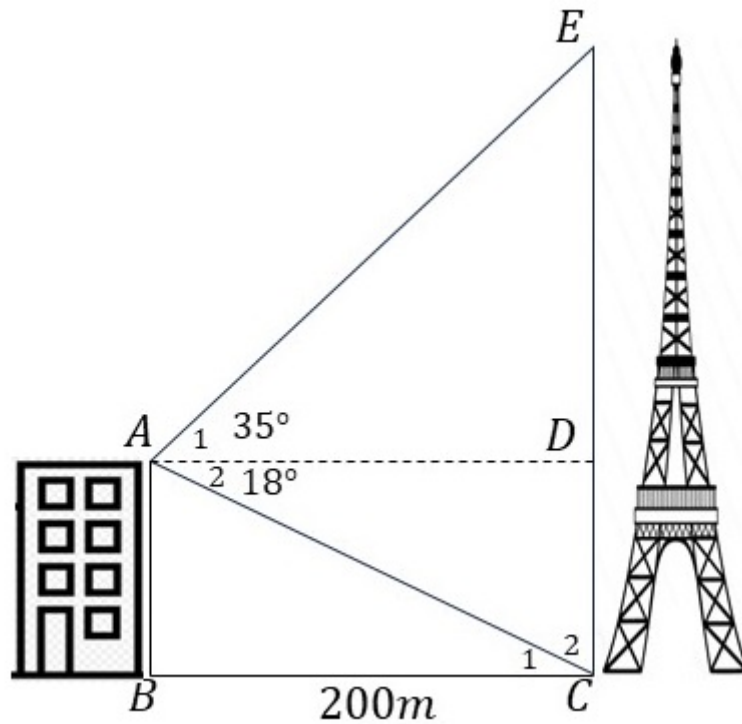
$$\frac{(ab)^{\frac{2}{3}} \cdot (a^3)^{-\frac{1}{9}} \cdot (b^2)^{-\frac{1}{3}}}{\left(a^{\frac{1}{3}}\right)^{-2}}$$

The answer is:

A	$\frac{1}{ab}$
B	$\frac{1}{b}$
C	$\frac{b}{a}$
D	a



This image refers to question: 18



Question 18: Text Input

3 marks

A tower and a building are 200m apart. If a person stands on top of the building, the angle of depression to the bottom of the tower is 18° . The angle of elevation from the top of the building to the top of the tower is 35° .

The height of the building is AB and the height of the tower is EC .

Calculate the answers for AB and EC and give them in the form: $AB; EC$.

Do **not** include units(m).

Round all answers off to 2 decimal places where necessary.

Question 19: True/False

2 marks

Solve for p :

$$(p - 7)(p + 3) = 24$$

The answer is: $p = 9$ en $p = 5$

TRUE

FALSE

Question 20: True/False

2 marks

Factorise fully:

$$(x^2 - 1)^2 - 9$$

The answer is: $(x^2 + 2)(x^2 - 4)$ **TRUE****FALSE****Question 21: Text Input**

3 marks

Solve for x :

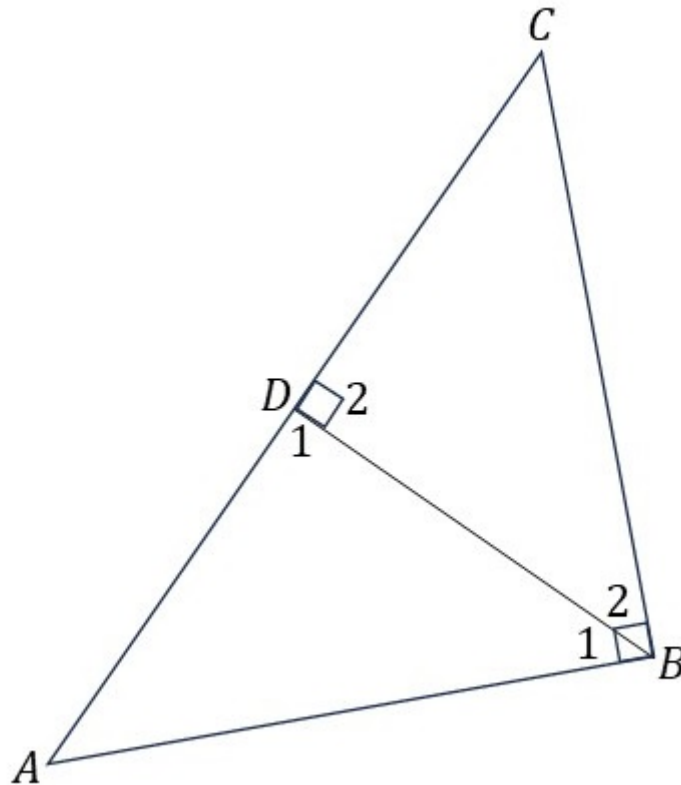
$$2x^2 = 4x$$

The answer is

Give the answer as a number only.

If there are 2 answers, give the answer in the form: $x_1; x_2$ 

This image refers to question: 22, 23



Question 22: Multiple Choice

4 marks

Study the sketch.

Choose the **incorrect** statement:

- | | |
|----------|--------------------------------|
| A | $\sin \hat{C} = \frac{BD}{BC}$ |
| B | $\cos \hat{C} = \frac{BC}{AC}$ |
| C | $\cos \hat{C} = \frac{DC}{BC}$ |
| D | $\tan \hat{C} = \frac{BD}{AC}$ |

Question 23: True/False

2 marks

In the given sketch, $\sin \hat{B}_2 = \cos \hat{C}$.

TRUE

FALSE

Question 24: Please Fill In The Blanks

4 marks

Simplify:

$$\frac{x+2}{4x^2-2x+1} - \frac{8x+1}{16x^3+1}$$

The question was given in a test and after the test you compare your answer with your friend.

You do it together and you decide the LCD is (1) and the final answer is $\frac{A}{LCD}$.

The numerator A is (2) .

Possible Answers: $(2x+1)^2(2x-1) \mid (4x^2-2x+1)(16x^3+1) \mid (2x-1)^2(2x+1) \mid 2x^2-3x-6 \mid 2x^2+12x+10 \mid 2x^2+13x+10$

1	
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2	
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Question 25: True/False

2 marks

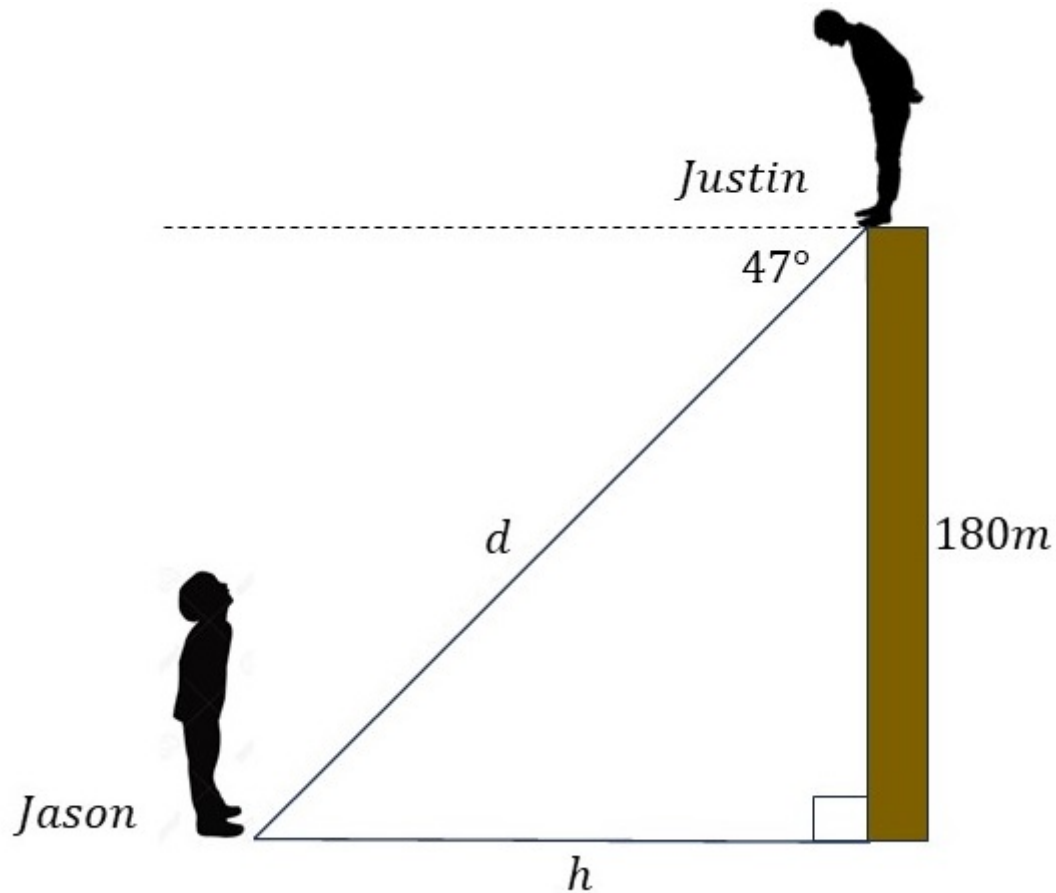
If $\sin \theta < 0$ and $\tan \theta > 0$, then θ is:

$$180^\circ < \theta < 360^\circ$$

TRUE

FALSE

This image refers to question: 26



Question 26: Please Fill In The Blanks

4 marks

Justin, a rock climber, completes a 180m vertical climb. Jason stands on the ground watching him. The angle of depression from Justin to Jason is 47° .

The shortest distance between Jason and Justin is (1) metres and Jason is (2) metres from the foot of the vertical climb.

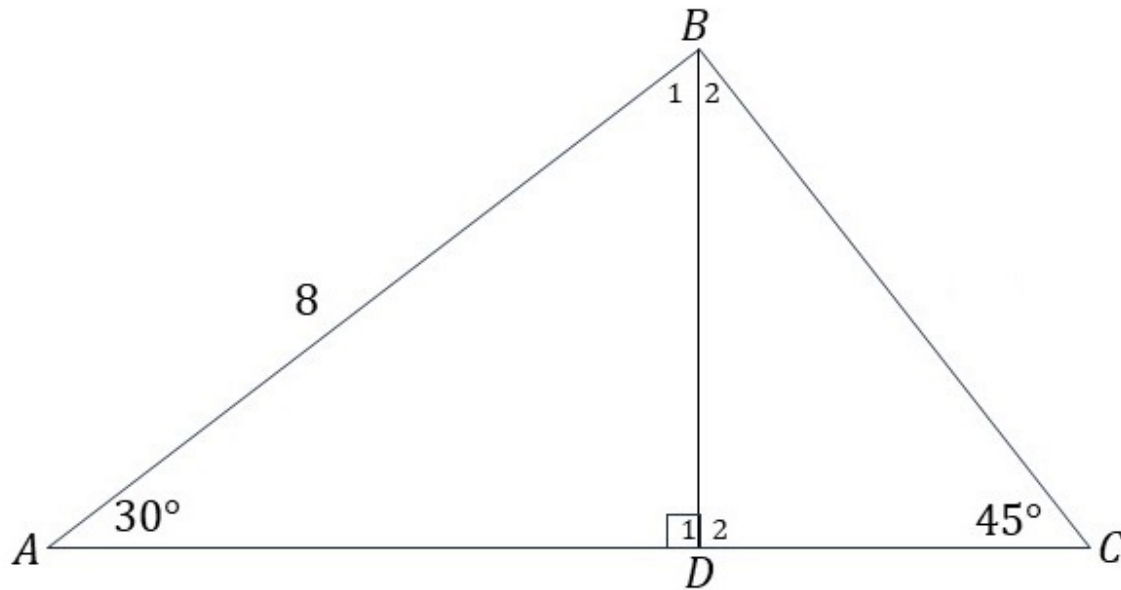
Answers are rounded off to 2 decimal places.

Possible Answers: 263,93m | 167,85m | 246,12m | 304,92m | 166,12m

1	
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2	
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This image refers to question: 27



Question 27: Please Fill In The Blanks

8 marks

In the given diagram, $AB = 8$, $\hat{A} = 30^\circ$, $\hat{D}_1 = 90^\circ$ and $\hat{C} = 45^\circ$.

The length of $AD = (1)$ units and the length of $BD = (2)$ units.

(3) Reason: sides opp equal $\angle$ s

Therefore $AC = (4)$ units.

Answers are rounded off to 2 decimal places.

Possible Answers: 9,23 | 4 | 6,93 | 16 | 10,93 | 14,93 | $AB = BD$ | $BD = BC$ | $BD = DC$

1	
3	

2	
4	

Question 28: Multiple Choice

4 marks

Factorise completely:

$$6a^2 - 11a - 10$$

The answer is:

- | | |
|----------|--------------------|
| A | $(2a - 5)(3a - 2)$ |
| B | $(6a - 5)(a - 2)$ |
| C | $(2a - 5)(3a + 2)$ |
| D | $(5 - 2a)(3a + 2)$ |
-

Question 29: Text Input

4 marks

Factorise fully:

$$5x + y^2 - 5xy - y$$

Question 30: Text Input

3 marks

Solve for x :

$$1 - (x - 1)^2 = 0$$

The answer is $x_1 = \dots$ or $x_2 = \dots$.

Give the answer as the number only.

If there are 2 answers, give the answer in the form: $x_1; x_2$

Total: 105 Marks