Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Identity no: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Seat No: \_\_\_\_\_\_\_\_\_

BCA ACADEMY

SCHOOL OF BUILDING & DEVELOPMENT

# SINGAPORE

 **MATHEMATICS SCREENING TEST**

**(Set B)**

## 1.5 HOURS

 **Instructions to candidates**

# Do not turn over this page until you are told to do so.

# Check that you have the correct exam paper, number of pages and questions.

1. This paper consists of **TEN (10)** questions (100 marks). Answer ALL questions
2. Write your **Name, IC NO. and Seat No.** on this cover page.
3. All answers are to be written in THIS booklet.
4. Do **NOT** tear out any page. This booklet is the property of BCA Academy and **must not be removed** from the test centre.
5. Mobile phones are to be switched off and electronic equipments are not allowed to be used.
6. Candidates are to bring their own non-programmable scientific calculator.
* Unless otherwise stated, leave your answers in 3 significant figures.
* Unless the questions require the answers in term of$ π$, the calculator value for $π=3.142$ should be used.
* If working is needed for any question, it must be shown with the answer. Omission of essential working will result in loss of marks.

|  |  |  |  |
| --- | --- | --- | --- |
| For Official Use: | Test Centre: | Test Date: | Marks( /100): |
| Marker: | Checker: |

1. Simplify the following expressions using **fractions only**. Show your working clearly .

(a)   (5 marks)

(b)  (5 marks)

1. (a) Given that $3.2×10^{3}+7×10^{x}+2.1×10^{y}+1.6×10^{z}=3417.16$, where *x, y* and *z* are integers. Find the values of *x, y* and *z*. (5 marks)

(b) Given that $\left(16a\right)^{2y}×(2a^{2})^{x-6}=16a^{2(x-2)}$, where *a* is a constant. Find the values of *x* and *y*. (5 marks)

1. (a) The lengths of the sides of a triangle are 3*x*, 6*x*, and 6*x* – 2 respectively. If the perimeter is not greater than 43 units and the longest side is shorter than the sum of the two shorter sides, find the range of values of *x.* (5 marks)

3. (b) In the diagram given below, the area of the rectangular pond is 180 m2 and the fully shaded area around the pond represents a path built around it.

 (i) Write down the length and breadth of the pond, in terms of *x*. (2 marks)

 (ii) Form an equation in *x* and show that it reduces to $2x^{2}-35x+60=0$.

 (3 marks)

*x* m

*x* m

Pond

Path

Path width = 15 m m

Pond Area = 180 m2

Path length = 20 m

1. In the figure shown below, ABD and CBE are two straight lines. AE is parallel to CD.

 Given that $BDC=46.57°$.

Find:

9 cm

3 cm

4 cm

B

A

D

C

E

3.5 cm

46.57°

1. Length BC.
2. Length CD.
3. Area of the triangle BDC.

(10 marks)

1. In the diagram, *O* is the centre of the circle PQRS. *TP* and *TR* are tangents to the circle. *RTU* = 38° and *QP* = *QR*. SOQT make a straight line. Calculate

 (10 marks)

(a) *POR,*

(b) *PSR,*

(c) *PQU,*

O

38°

U

R

P

S

Q

T

1. In the figure below, *A, B, C, D* and Q are points on the circumference of the circle and *AB* is a diameter of the same circle. The length of *AC* is 8 cm. The point *P* lies on the chords *AC* and *DQ* such that *AP* : *PC* = 3: 1 and *DP* is perpendicular to *AC*. It is also given that *CBA* = 60° and the area of triangle *ACD* is 12 cm2. Calculate
2. *BAC,*
3. *ADC,*
4. The length of chord *DQ.*

(10 marks)

D

A

B

P

C

Q

60°

Given:

*AB* is the diameter of the circle

*AC* = 8 cm

*AP : PC* = 3 : 1

Area of *∆ACD* = 12 cm2

*DPC* = 90°

*CBA* = 60°

1. (a) Find the values of x, y and z equation of the following.

$$\left(\begin{matrix}-4&2z\\2y+1&1\end{matrix}\right)=\left(\begin{matrix}x+3&-6\\-3&1\end{matrix}\right)$$

 (5 marks)

7. (b) Find the variable, x and y of the following.

$$\left(\begin{matrix}3&-1\\-2&0\end{matrix}\right)\left(\genfrac{}{}{0pt}{}{x}{y}\right)=\left(\genfrac{}{}{0pt}{}{7}{-4}\right)$$

(5 marks)

8. (a) In the diagram, *C* is the midpoint of *XY.* *B* is the point on *YZ* such that *ZB* = $\frac{1}{4}ZY$. $\vec{XY}=p$and$\vec{XZ}=q$.Express, as simply as possible, in terms of **p** and **q**,

(i) $\vec{YZ}$,

(ii) $\vec{BZ}$,

(iii) $\vec{XB}$. (5 marks)

X

C

Y

B

Z

**q**

**p**

A

1. (b) Given that $\left|\rightharpoonaccent{AB}\right|=\left|\rightharpoonaccent{AC}\right|=5$ and $\left|\rightharpoonaccent{AB}\right|= \frac{2}{3}×\left|\rightharpoonaccent{AD}\right|$.

A

B

C

D

45˚

45˚

45˚

Find magnitude and direction for the following vectors:

1. $\rightharpoonaccent{AB}+\rightharpoonaccent{AC}$
2. $\rightharpoonaccent{AC}-\rightharpoonaccent{AD}$

(5 marks)

1. A dice is thrown three times. What is the probability that:

 (a) The dice produce a result smaller than four in each of the throw?

 (b) The total of the three throws is less than 5?

 (c) All the three throw produce the same result?

(10 marks)

10. (a) Simplify

 log 64 • log4 11• log 3. (5 marks)

 (b) Given: log *a* + log *b* = log (*a* + *b*)

 Find the value of a in terms of b. (Hint: log *a* + log *b* = log *ab*) (5 marks)

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