الاختبار التجريبي
Practice Test

الشهادة الثانوية - 2016
QSSC – 2016

الرياضيات التأسيسية
Foundation Mathematics
In the name of Allah, the Most Gracious, the Most Merciful

Do not turn the pages of the test book until your supervisor tells you to do so.

The Practice test for Foundation mathematics has 18 test items.

General Instructions:

• You have to use a pencil to answer multiple-choice questions or for drawings.
• You have to use a pen to answer constructed response questions.
• The test items are presented in English and Arabic to help you better understand the questions.
• Some of the items are multiple-choice items, and some require you to write a short answer.
• Multiple-choice items have four alternative responses. Mark your answer in the box next to your answer choice.
• Mark only one answer for each multiple-choice item. If you want to change your answer, completely fill in the box for the answer you do not want. If more than one answer is marked, or if your answer is not clearly marked, you will not receive credit. In the sample below, the third answer choice will be considered the student’s response.
• For the short-answer items you may answer in either English or Arabic. You must write your answers in the spaces provided in this test book.

• You may use the blank pages at the end of this test book to make notes or do calculations, but you will not receive credit for anything written on those pages.

• If you wish to change any of your short answers, make sure it is clear what your response is. If there are two responses or the response is unclear, you will not receive credit.

• Do not spend too much time on any one item. If you find an item too difficult, do the rest of the test and return to the difficult item later.

• Respond to all items, even if you are unsure. You will not lose points for incorrect responses.

• You will be given a warning at half-time and 30 minutes before finishing time. You will be given a final warning 10 minutes before finishing time.
1. Estimate the area of the shaded region below.

2. The table shows the amounts of Omar’s phone bills from September 2012 to December 2013.

<table>
<thead>
<tr>
<th>التاريخ (Date)</th>
<th>سبتمبر 2012 (Sep)</th>
<th>ديسمبر 2012 (Dec)</th>
<th>مارس 2013 (Mar)</th>
<th>يونيو 2013 (Jun)</th>
<th>سبتمبر 2013 (Sep)</th>
<th>ديسمبر 2013 (Dec)</th>
</tr>
</thead>
<tbody>
<tr>
<td>مبلغ الفاتورة (Amount of the bill)</td>
<td>400</td>
<td>530</td>
<td>252</td>
<td>720</td>
<td>1380</td>
<td>190</td>
</tr>
</tbody>
</table>

Calculate the second value of the four – point moving average for the data.
How far does Hamad walk in 90 minutes if he walks at an average speed of $6 \text{ km/hr}$?

- 9 km
- 18 km
- 54 km
- 540 km

Look at the figure below.

Which of the following represents the displacement vector from A to D?

- $\begin{pmatrix} 3 \\ 4 \end{pmatrix}$
- $\begin{pmatrix} 4 \\ 3 \end{pmatrix}$
- $\begin{pmatrix} 5 \\ 3 \end{pmatrix}$
- $\begin{pmatrix} 5 \\ -1 \end{pmatrix}$
Given the vector \( a = i - 3j - k \).
Which of the following is the component form of the vector \( a \)?

- \[
\begin{pmatrix}
-3 \\
-1 \\
1
\end{pmatrix}
\]
- \[
\begin{pmatrix}
1 \\
-1 \\
3
\end{pmatrix}
\]
- \[
\begin{pmatrix}
-1 \\
3 \\
1
\end{pmatrix}
\]
- \[
\begin{pmatrix}
1 \\
-3 \\
-1
\end{pmatrix}
\]

The following vectors are the position vectors of the two points A and B.

- \( \overrightarrow{OA} = \begin{pmatrix} 5 \\ 6 \end{pmatrix} \)
- \( \overrightarrow{OB} = \begin{pmatrix} 31 \\ 12 \end{pmatrix} \)

What is the midpoint of the line segment \( AB \) (the point that divides \( AB \) by the ratio 1:1)?

- \( (9,18) \)
- \( (18,36) \)
- \( (3,13) \)
- \( (18,9) \)
If the point \( P'(2, -5) \) is the image of the point \( p(-6, 15) \) after a dilation with center \((0, 0)\). Find the scale factor of the dilation \( k \)?

- \( k = -3 \)
- \( k = \frac{1}{3} \)
- \( k = \frac{1}{3} \)
- \( k = 3 \)

The diagram shows a solid shape made of 7 cubes.

Which of these represents the side view?

- A
- B
- C
- D
Which of the following is a unit vector?

- $\frac{5}{4}i + \frac{4}{5}j$
- $-i + j$
- $\frac{3}{5}i + \frac{2}{5}j$
- $\frac{6}{10}i - \frac{8}{10}j$

Look at the histogram showing the lengths of frogs in a sample.

Approximately how many frogs have lengths of 4 centimeters or more?

- 150
- 180
- 330
- 410
Suppose the vector \[ r = \begin{pmatrix} 8 \\ -6 \\ 10 \end{pmatrix} \].

Find the vector \[ p = \frac{1}{2} r \].

The options are:

- \[ p = \begin{pmatrix} 4 \\ 3 \\ -5 \end{pmatrix} \]
- \[ p = \begin{pmatrix} 16 \\ -12 \\ 20 \end{pmatrix} \]
- \[ p = \begin{pmatrix} 10 \\ -4 \\ 12 \end{pmatrix} \]
- \[ p = \begin{pmatrix} 4 \\ -3 \\ 5 \end{pmatrix} \]
Look at the quadrilateral $ABCD$.

What is the image of the point $C$ after a translation with the vector $\begin{pmatrix} 2 \\ -3 \end{pmatrix}$?

- (2, -3)
- (4, -5)
- (0, -5)
- (-1, 0)

انظر إلى الشكل الرباعي $ABCD$.

ما صورة النقطة $C$ بعد انسحاب الشكل بالمتجه $\begin{pmatrix} 2 \\ -3 \end{pmatrix}$؟

انتهت الأسئلة الموضوعية

End of the multiple choice questions
For questions 13 through 18, write your answers in the spaces provided, and show your work:

13

Find the interquartile range of the following data.

\[37, 48, 52, 63, 51, 71, 42\]

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Look at the two vectors shown in the first grid.

Draw \(a - b\) graphically on the second grid below.
A. Construct the relative frequency table.

<table>
<thead>
<tr>
<th>Weights (kg)</th>
<th>frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>30 - 35</td>
<td>7</td>
</tr>
<tr>
<td>35 - 40</td>
<td>16</td>
</tr>
<tr>
<td>40 - 45</td>
<td>18</td>
</tr>
<tr>
<td>45 - 50</td>
<td>4</td>
</tr>
<tr>
<td>50 - 55</td>
<td>5</td>
</tr>
</tbody>
</table>

A. The frequency distribution of weights (in kg) of 50 persons is given below.

B. Draw the relative frequency histogram for the data.
The diagram below represents the trapezoid $ABCD$, answer the following:

A. On the same set of axes, draw the image of the trapezoid $ABCD$ after a rotation through $90^\circ$ clockwise about $(0, 0)$, and label it $A'B'C'D'$.

B. On the same set of axes, draw the image of the shape $A'B'C'D'$ after a reflection in the line $y=x$, and label it $A''B''C''D''$.

C. Describe the transformation that equivalent to the combination of the transformations above.

الإجابة:
A. Find $|p|$. 

B. What is the scalar product $p \cdot q$? 

C. Find $\cos \theta$ rounded to three decimal digits.
The following data represents the maximum temperatures (in Degrees Celsius) during five days in the city of Doha.

34, 30, 33, 27, 26

A. Find the mean temperature.

B. Calculate the variance of the temperatures.

C. What is the standard deviation of the temperatures, correct to two decimal digits?

End of all Questions