



EXAMINATIONS COUNCIL OF ESWATINI  
Eswatini General Certificate of Secondary Education

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**MATHEMATICS**

**6880/03**

Paper 3 Calculator Structured Questions (Core and Extended)

**October/November 2019**

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*Confidential*

***MARK SCHEME***

***{6880/03}***

***MARKS: 100***

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This document consists of **10** printed pages.

Question	Answers	Marks
1 (a) (i)	11, 13	1
(ii)	30, 41	2
(b) (i)	$2n+1$	2
(ii)	$n^2 + 5$	2
2	$\frac{8995 \times 100}{80}$ o.e. (E)11 243.75	1 1
3 (a)	$8 = p - p^2 + 5 - 5p$ $p^2 + 4p + 3 = 0$ $(p+3)(p+1) = 0$ $p = -3$ or $p = -1$	1 1 1 1
(b)	$-2 \leq x \leq \frac{3}{2}$	3
4	Line from (0,0) to (2,10) Line from (2,10) to $(3\frac{1}{2}, 10)$  Line from $(3\frac{1}{2}, 10)$ to (5,40) Line from (5,40) to (7,30)	2 1  1 2
5 (a)	$45^\circ$	1
(b)	$37^\circ$	3
(c)	$93^\circ$	2
6 (a)	$\frac{(m+2)(m-3) - (m+3)(m-2)}{(m+3)(m-3)}$ $\frac{m^2 - m - 6 - m^2 - m + 6}{(m+3)(m-3)}$ $\frac{-2m}{(m+3)(m-3)}$	1 2 1
(b)	$\frac{p(p-q)}{(p+q)(p-q)}$  $\frac{p}{(p+q)}$	2  1
7 (a)	$ff(x) = 9x - 16$	2
(b)	$(ff)^{-1}(x) = \frac{x+16}{9}$	2
(c)	$3(3x-4)^2$ $3(9x^2 - 12x - 12x + 16)$ $27x^2 - 72x + 48$	1 1 1

<b>8 (a)</b>	$w = 23$	1
<b>(b)</b>	27	1
<b>(c)</b>	Line joining the points: (10, 12), (30,18), (50,30), (70,23), (90,15), and (115,12)	3
<b>(d)</b>	$40 < x \leq 60$	1
<b>(e)</b>	$\frac{120 + 540 + 1500 + 1610 + 1350 + 1380}{110}$	2
	$\frac{6500}{110}$	1
	59.1	1
<b>9 (a)</b>	A sphere, radius 3cm, centre C.	3
<b>(b)</b>	Plane perpendicular to plane <i>BMW</i> through M.	2
<b>10 (a)(i)</b>	Shear, invariant line <i>x</i> -axis, shear factor 2	3
<b>(ii)</b>	Enlargement, centre (3, 0), Scale factor -2	3
<b>(b)(i)</b>	$\begin{pmatrix} a & b \\ c & d \end{pmatrix} \begin{pmatrix} 2 & 1 \\ 1 & -2 \end{pmatrix} = \begin{pmatrix} 1 & -2 \\ 2 & 1 \end{pmatrix}_{oe}$	1
	$\begin{pmatrix} a & b \\ c & d \end{pmatrix} = \frac{-1}{5} \begin{pmatrix} 1 & -2 \\ 2 & 1 \end{pmatrix} \begin{pmatrix} -2 & -1 \\ -1 & 2 \end{pmatrix}$	1
	$= \begin{pmatrix} 0 & 1 \\ 1 & 0 \end{pmatrix}$	1
<b>(ii)</b>	$\begin{pmatrix} 3 & 0 \\ 0 & 1 \end{pmatrix}$	2
<b>11 (a)</b>	<i>ABD</i> and <i>CDB</i> or <i>PHB</i> and <i>GBH</i> or <i>BFO</i> and <i>HQD</i>	2
<b>(b)</b>	<i>PBH</i> , <i>DQH</i> , <i>DRB</i> , or <i>GHB</i> (any 3)	3
<b>(c)</b>	<i>EF</i> and <i>PB</i> are equal. The similarity factor would be 1, so <i>BF</i> = <i>FG</i> hence the two would be congruent.	1 1
<b>12 (a)</b>	$p = \frac{14}{39}, \quad q = \frac{23}{38}$	2
<b>(b)</b>		2

(c)	$1 - \frac{15}{40} \times \frac{14}{39} \times \frac{13}{38} \text{ oe}$ $\frac{145}{152}$	1
(d)	$1 - \left( \frac{25}{40} \times \frac{24}{39} \times \frac{23}{38} + \frac{15}{40} \times \frac{14}{39} \times \frac{13}{38} \right) \text{ oe}$ $\frac{75k}{104k}$	2
(d)	$\frac{25}{40} \times \frac{24}{39} \times \frac{23}{38} + \frac{15}{40} \times \frac{14}{39} \times \frac{13}{38} \text{ oe}$ $\frac{29k}{104k}$	1
<b>13 (a)</b>	$\frac{100}{x+10}$	1
<b>(b)(i)</b>	$\frac{100}{x} - \frac{100}{x+10} = 1$	1
<b>(ii)</b>	$100x + 1000 - 100x = x^2 + 10x$	1
<b>(ii)</b>	$x^2 + 10x - 1000 = 0 \text{ AG}$	1
<b>(ii)</b>	<p>For <math>\frac{p+q}{r}</math></p> <p>Where <math>p = -10</math> and <math>r = 2</math></p> <p><math>q = 4100</math></p> <p>27, -37</p>	1 1 2
<b>14 (a)</b>	1.4, 2.8, 4, 8	2
<b>(b)</b>	All 7 points plotted	2
<b>(c)</b>	Smooth curve through all plotted points.	1
<b>(c)</b>	2.3 minutes	1
<b>(d)</b>	The worm had a certain length from the start. <b>Or,</b> $2^0 \neq 0$	1