

**CAMBRIDGE INTERNATIONAL EXAMINATIONS**

Cambridge International General Certificate of Secondary Education

## **MARK SCHEME for the March 2016 series**

### **0580 MATHEMATICS**

**0580/22**

Paper 2 (Paper 22 – Extended), maximum raw mark 70

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### Abbreviations

cao	correct answer only
dep	dependent
FT	follow through after error
isw	ignore subsequent working
oe	or equivalent
SC	Special Case
nfww	not from wrong working
soi	seen or implied

Qu.	Answers	Mark	Part Marks
<b>1</b>	7, - 4	<b>1</b>	
<b>2</b>	$2x(1 - 2y)$ final answer	<b>2</b>	<b>M1</b> for $2(x - 2xy)$ or $x(2 - 4y)$ or for correct answer then spoilt
<b>3</b>	75.1 or 75.09 to 75.10	<b>2</b>	<b>M1</b> for $\cos [\dots] = \frac{0.9}{3.5}$
<b>4</b>	$n < 1.5$ oe final answer	<b>2</b>	<b>B1</b> for 1.5 oe in answer or <b>M1</b> for $3 > 8n - 6n$ oe
<b>5</b>	9.1 oe	<b>2</b>	<b>M1</b> for $\frac{5.2}{PQ} = \frac{12.4}{21.7}$ oe
<b>6</b>	$\frac{4}{9}$ oe, must be fraction	<b>2</b>	<b>M1</b> for $10 \times 0.\dot{4} - 0.\dot{4}$ oe
<b>7</b>	130 or 130.0 to 130.1	<b>2</b>	<b>M1</b> for $\frac{1}{2} \times 22.3 \times 27.6 \times \sin 25$
<b>8</b>	$\frac{1}{5} \begin{pmatrix} 7 & 2 \\ 8 & 3 \end{pmatrix}$ oe isw	<b>2</b>	<b>M1</b> for $\frac{1}{5} \begin{pmatrix} a & b \\ c & d \end{pmatrix}$ soi or $k \begin{pmatrix} 7 & 2 \\ 8 & 3 \end{pmatrix}$ $k \neq 0$ or $\det = 5$ soi
<b>9</b>	$\frac{35(\text{or } 95)}{60} + \frac{39}{60}$ $2\frac{7}{30}$	<b>M1</b> <b>A2</b>	accept $\frac{35k(\text{or } 95k)}{60k} + \frac{39k}{60k}$ or <b>A1</b> for $\frac{67}{30}$ or $\frac{134k}{60k}$ or $1\frac{74k}{60k}$ or $2\frac{14k}{60k}$
<b>10</b>	64000	<b>3</b>	<b>M2</b> for $\frac{1.6 \times 20000^2}{100^2}$ oe or <b>M1</b> for figs 64 in answer or $1 \text{ cm}^2 = 40000 \text{ m}^2$

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<b>Qu.</b>	<b>Answers</b>	<b>Mark</b>	<b>Part Marks</b>
<b>11</b>	16.58 cao	<b>3</b>	<b>B2</b> for 16.6 or 16.580 to 16.583 final answer or 16.58 not as final answer or <b>M1</b> for $\frac{38}{360} \times 2 \times \pi \times 25$ and <b>B1</b> for rounding their more accurate answer correctly to 4sf
<b>12</b>	87 cao nfw	<b>3</b>	<b>B2</b> for 87.04.... or 87.0 nfw or <b>M1</b> for 500.5 or 5.75 seen or for $(500 + 0.5) \div (5.8 - 0.05)$ and <b>B1</b> for <b>truncating</b> their decimal answer to an integer
<b>13 (a)</b>	$2^5 \times 3^2 \times 7$ oe final answer	<b>3</b>	<b>B2</b> for product of two of $2^5, 3^2, 7$ or <b>B1</b> for 2, 3 and 7 seen or <b>M1</b> for $2 \times 1008$ or $3 \times 672$ or $7 \times 288$ soi
<b>(b)</b>	$2.016 \times 10^3$	<b>1</b>	
<b>14 (a)</b>	$x^8 y^7$ final answer	<b>2</b>	<b>B1</b> for answer $x^8 y^k$ or $x^k y^7$ ( $k \neq 0$ )
<b>(b)</b>	$27 p^6 m^{15}$ final answer	<b>2</b>	<b>B1</b> for 2 correct of 27, $p^6, m^{15}$ in a product as answer
<b>15</b>	111.2 or 111.1 to 111.2	<b>4</b>	<b>M2</b> for [cos =] $\frac{2.8^2 + 3.6^2 - 5.3^2}{2 \times 2.8 \times 3.6}$ or <b>M1</b> for implicit form <b>A1</b> for [cos =] $-0.362$ to $-0.361$
<b>16</b>	44.1 or 44.07...	<b>4</b>	<b>M1</b> for 4 of mid-values 15 30 45 55 75 soi  <b>M1</b> for $\sum fx$ for any $x$ in intervals including boundaries  <b>M1 dep</b> for $\sum fx \div 70$ <b>Dep</b> on 2nd <b>M</b> mark earned



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Qu.	Answers	Mark	Part Marks
21 (a)	$\frac{2}{3}$ oe	1	
(b)	their $\frac{2}{3}$ , $\frac{7}{8}$ , $\frac{5}{8}$ oe	2	<b>B1</b> for either $\frac{7}{8}$ or $\frac{5}{8}$
(c) (i)	$\frac{1}{24}$ oe	2	<b>M1</b> for $\frac{1}{3} \times \frac{1}{8}$ seen
(ii)	$\frac{17}{24}$ oe	3	<b>M2FT</b> for $\frac{1}{3} \times \frac{7}{8} + \frac{2}{3} \times \frac{5}{8}$ or <b>M1FT</b> for $\frac{1}{3} \times \frac{7}{8}$ or $\frac{2}{3} \times \frac{5}{8}$