# MARK SCHEME for the October/November 2012 series

# 0580 MATHEMATICS

**0580/31**  Paper 3 (Core), maximum raw mark 104

**Abbreviations**

cao     correct answer only
cso     correct solution only
dep     dependent
ft       follow through after error
isw     ignore subsequent working
oe      or equivalent
SC     Special Case
www   without wrong working

| Qu. | Answers | | | Mark | Part Marks |
|-----|---------|--|--|------|------------|
| 1 | **(a)** | **(i)** | Any two multiples of 10 | 1 | |
| | | **(ii)** | 30 | 2 | **B1** for any other common multiple of 10 and 15 ie 30$k$ |
| | **(b)** | **(i)** | 6 or 9 or 6 and 9 cao | 1 | |
| | | **(ii)** | 27 cao | 1 | |
| | | **(iii)** | 23 cao | 1 | |
| | **(c)** | **(i)** | Example of odd square number | 1 | |
| | | **(ii)** | Example of odd sum of primes | 1 | |
| | **(d)** | $4^{-2}$, $8^0$, $\sqrt{169}$, $2^5$ | | 2 | **B1** for only 1 out of order or for three seen correctly evaluated |
| 2 | **(a)** | **(i)** | 12.5(0) | 1 | |
| | | **(ii)** | $\dfrac{7}{19}$ | 2 | **B1** for $\dfrac{175}{475}$ oe seen |
| | | **(iii)** | 133.75 | 2 | **M1** for $\dfrac{7}{20} \times 475$ |
| | **(b)** | 503.5(0) | | 2 | **M1** for $106 \div 100 \times 475$ <br> Or $475 + (6 \div 100 \times 475)$ |
| | **(c)** | 28.56 | | 3 | **M1** for $350 \times 1.04^2$ oe <br> dep **M1** for 'their 378.56' – 350 <br><br> **Or M1** for $(350 \times 0.04)$ (imp by 14) <br> **and** $(350 + \text{'their 14'}) \times 0.04$ (imp by 14.56) <br> dep **M1** 'their 14' + 'their 14.56' |

| 3 | (a) | (i) | 0 | 1 | |
|---|---|---|---|---|---|
| | | (ii) | 1 | 1 | |
| | | (iii) | 1.6 | 3 | **M1** for $(0 \times 6) + 1 \times 2 + 2 \times 3 + 3 \times 1 + 4 \times 2 + 5 \times 1$ or better<br>**dep M1** for 'their 24' $\div$ 15 |
| | | (iv) | Bar chart with<br>– horizontal axis correctly labelled<br>– and vertical axis correctly scaled<br>– and bars of correct height and equal width,<br>– and with equal gaps or no gaps | 4 | **B1** for horizontal axis labelled correctly<br>**B1** for linear vertical scale to at least 5<br>**B2** for all bars correct height and equal width with equal or no gaps<br>Or **B1** for unequal widths or at least four bars correct height and equal width |
| | (b) | (i) | $\dfrac{5}{15}$ or $\dfrac{1}{3}$ | 1 | |
| | | (ii) | $\dfrac{11}{15}$ | 1 | |
| | | (iii) | $\dfrac{6}{15}$ or $\dfrac{2}{5}$ | 1 | |
| 4 | (a) | (i) | 70° | 1 | |
| | | (ii) | isosceles | 1 | |
| | | (iii) | 40°<br>Corresponding (to angle *CBD*) | 1<br>1 | dep on 40° (accept longer reasons) |
| | | (iv) | similar | 1 | |
| | (b) | (i) | 305° | 1 | |
| | | (ii) | (Angle between) tangent (and) radius | 1 | |
| | | (iii) | 125° or 235° | 1 | |
| | | (iv) | kite | 1 | |

| 5 | (a) | $(CD^2 =)$ $(32 - 20)^2 + 15^2$ oe<br>$(CD =)$ $\sqrt{369}$ = 19.20 to 19.21 | **M1**<br>**A1** | **A0** for 19.2 alone. |
|---|-----|------|------|------|
| | (b) | 3017 | **2** | **M1** for 20 + 15 + 32 + 19.2(1) [implied by 86.2(1)]<br>Or **M1** for (20 × 35) + (15 × 35) + (32 × 35) + (19.2(1) × 35) |
| | (c) | 390 | **2** | **M1** for (20 + 32) × 15 ÷ 2 oe |
| | (d) | 273 | **2ft** | **M1** for 'their **(c)**' × 7 ÷ 10 |
| | (e) (i) | trapezium constructed<br>$BC = 5$ cm, $AD = 8$ cm<br>Both 90º to $AB$ | **2** | **B1** for $C$ or $D$ correctly positioned |
| | (ii) | 49 – 53° | **1ft** | |
| | (iii) | 34.4 – 36.4 m | **1ft** | |
| 6 | (a) | 9  16  25<br>7  10  13 | **2**<br>**2** | **B1** for 2 correct<br>**B1** for 2 correct, or difference of 3 between diagrams 4 and 5 |
| | (b) | square | **1** | |
| | (c) (i) | 22 | **1** | |
| | (ii) | $3n - 2$ oe final answer | **2** | **B1** for $3n \pm j$ seen<br>Or $kn - 2$, where $k \neq 0$ |
| | (d) (i) | 20 | **2** | **ft M1** for '*their* **(c)(ii)**' = 58 or better, seen |
| | (ii) | 400 | **1ft** | 'their **(d)(i)**'$^2$ (must be evaluated) |

| 7 | (a) | (i) | 140 | 2 | **M1** for $80 + 5 \times 12$ or better |
|---|-----|-----|-----|---|----------------------------------------|
| | | (ii) | 30 | 2 | **M1** for $(230 – 80) \div 5$ or 150 seen |
| | | (iii) | $\dfrac{C - 80}{5}$ or $\dfrac{C}{5} - 16$ or $\dfrac{80 - C}{-5}$ <br> final answer | 2 | **M1** for $C - 80 = 5n$ <br> Or **M1** for $\dfrac{C}{5} = \dfrac{80}{5} + \dfrac{5n}{5}$ or better |
| | (b) | | $9x + 2$      final answer | 2 | **M1** for $9x + k$ or $mx + 2$ <br>     or $6x + 8$ or $-6 + 3x$ <br>     or $9x + 2$ spoilt |
| | (c) | | $x = 3, y = 4$ | 3 | **M1** for correct method to eliminate one variable <br><br> **A1** $x = 3$ <br> **A1** $y = 4$ |
| 8 | (a) | (i) | 165 000 | 2 | **M1** for figs 165 or $55 \times 40 \times 75$ seen |
| | | (ii) | 165 | 1ft | '*their* **(a)(i)**' $\div 1000$ |
| | (b) | (i) | 10 minutes 24 seconds | 2 | **M1** for $260 \div 25$ or 10.4 seen or 624 seen |
| | | (ii) | 255 | 1 | |
| | (c) | | 30 | 2 | **M1** for $\sqrt[3]{27000}$ |
| 9 | (a) | | $y$-values  –2, 4, 8, 4, –2 | 3 | **B2** for 3 or 4 correct <br> **B1** for 2 correct |
| | (b) | | 10 correctly plotted points | 3ft | **B2ft** for 8 or 9 points <br> **B1ft** for 6 or 7 points |
| | | | Smooth curve through 10 correct points and correct shape. | 1 | Curve must pass above $y = 10$ |
| | (c) | | $x = 1.5$ oe | 1 | |
| | (d) | (i) | Line $y = 6$ drawn | 1 | |
| | | (ii) | $x = 3.5$ to $3.7$ <br> $x = -0.7$ to $-0.5$ | 1ft <br> 1ft | Ft their curve and their line drawn |

| 10 | **(a) (i)** Rotation, | **3** | **B1** for each |
|----|----|----|----|
|    | 90° anticlockwise oe, | | |
|    | (centre) (0, 0), origin, O | | |
|    | **(ii)** Enlargement, | **3** | **B1** for each |
|    | (scale factor) 2, | | |
|    | (centre) (–1, 1) | | |
|    | **(b) (i)** correct translation | **2** | **B1** for 3 right or 4 down |
|    | **(ii)** correct reflection | **2** | **B1** for reflection in any line parallel to $x$-axis **or** for correct reflection in $x = -1$ |