Summary Method C2 (Jan '08)

1.
a)
Recall that the area of a sector is given by: $A = \frac{1}{2}r^2\theta$ (where θ is measured in radians).
b)
Recall that the arc length is given by: $L = r\theta$. Don't forget to include the length of the two radii.

2.
a)
The common difference is the number added to get from one term to the next (note: while not in this case, the common difference could be negative).
b)
Use $a = 51$ and the common difference calculated in a), along with the U_n formula (given in the formula book).
c)
One method is to calculate (using the formula in the formula book) $S_{200} - S_{100}$. The other is to treat the last half of the series as a new series with the same common difference, but a equal to U_{101} as calculated in part b).

3.
a)
Use the sine rule: $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$ (which is not provided in the formula book).
b)
Use the area formula: $A = \frac{1}{2}ab\sin C$ (which is also not provided in the formula book).

4.
The formula for the trapezium rule is provided in the formula book. Ordinates will be $x_0 = 0, x_1 = 1, x_2 = 2, x_3 = 3$.

5.
a)
i.
Differentiate, remembering that reducing $\frac{1}{2}$ by 1 gives $-\frac{1}{2}$.
ii.
Substitute the x coordinate of $x = 4$ into your answer for i.
iii.
Use the straight line formula $y - y_1 = m(x - x_1)$ with the point P and the gradient $-\frac{1}{m}$ where m is the gradient of the curve given in ii.
iv.
Use the line equation you calculated in iii. to determine the y-intercept, then use $A = \frac{1}{2}bh$ to find area.
v.
Maxima occur when $\frac{dy}{dx} = 0$, so set the gradient (found in i.) to 0 and solve for x.
b)
i.
Remember when integrating to divide by the power. Recall that dividing by $\frac{5}{2}$ is the same as multiplying by $\frac{2}{5}$.
ii.
Use your integral, adding limits of the x coordinates of O and P, to find the area under the curve bounded by the x axis. Add the area of the triangle below, calculated in a) iv.

6.
a)
i.
The binomial expansion formulae are included in the formula book. For small, positive integer values of n such as these, Pascal's triangle will probably be quickest.
ii.
As above.
b)
i.
Replace x in the previous expression with $4x$. Remember that x^3 will become $(4x)^3$, not $4x^3$.
ii.
As above.
c)
Use the expressions calculated in part b) to simplify the expression. Some terms cancel.

7.

a)

Use the log rule $\log_a x - \log_a y = \log_a \frac{x}{y}$ to combine the logs on the right-hand side.

b)

Recall that $\log_a a = 1$ and $n \log_a x = \log_a x^n$. Combine the logs on the right-hand side and simplify.

8.

a)

Substitute some values in, and sketch the appropriate exponential curve. Note that the graph should have an asymptote on the x axis (approaching zero as x approaches $-\infty$), and it should cross the y axis at the point (0,1) like all such curves, since $a^0 = 1$.

b)

i.

Recall that the transformation $f(x) \rightarrow f(ax)$ represents a stretch in the x direction of scale factor $\frac{1}{a}$.

ii.

Recall that the transformation $f(x) \rightarrow f(x + a)$ represents a translation of $\begin{bmatrix} -a \\ 0 \end{bmatrix}$.

c)

i.

Note that $9^x = (3^2)^x = 3^{2x}$ and that $3^{x+1} = 3^x \times 3^1$. Rearrange and factorise.

ii.

Solve the factorised quadratic, substitute back the value of Y, and take logs of both sides to find a solution for x in each case.

9.

a)

Multiply both sides by the denominator on the left, substitute $1 - \cos^2 \theta$ for the $\sin^2 \theta$ on the left, simplify and solve the resultant quadratic.

b)

Let $\theta = 3x$, then solve the simplified solution from part a) by changing your limits ($0° < 3x < 540°$), drawing the graph of $\cos \theta$ and finding all solutions in the range, before converting back to find solutions for x.