

QUESTION	VALUE	SCORE
1	20	
2	20	
3	20	
4	20	
5	20	
TOTAL	100	

Trig formulas

- $\sin^2 \theta + \cos^2 \theta = 1$
- $\tan^2 \theta + 1 = \sec^2 \theta$ $\cot^2 \theta + 1 = \csc^2 \theta$
- $\sin(2\theta) = 2 \sin \theta \cos \theta$ $\sin^2 \theta = \frac{1}{2}(1 - \cos(2\theta))$ $\cos^2 \theta = \frac{1}{2}(1 + \cos(2\theta))$

Integration by parts formulas:

- $\int u dv = uv - \int v du$
- $\int \tan x dx = \ln |\sec x| + C$ $\int \sec x dx = \ln |\sec x + \tan x| + C$

Area of surface of revolution from $y = f(x)$, $a \leq x \leq b$:

- Rotation about x -axis: $S = 2\pi \int_a^b f(x) \sqrt{(f'(x))^2 + 1} dx$
- Rotation about y -axis: $S = 2\pi \int_a^b x \sqrt{(f'(x))^2 + 1} dx$

Some formulas for parametric equations:

- $dy/dx = \frac{dy/dt}{dx/dt}$ $ds = \sqrt{(dx/dt)^2 + (dy/dt)^2} dt$

Polar coordinates and polar curves:

- $\begin{cases} x = r \cos \theta \\ y = r \sin \theta \end{cases} \quad \begin{cases} r^2 = x^2 + y^2 \\ \tan \theta = y/x \end{cases} \quad . \text{ Area bounded by the polar curve: } S = \frac{1}{2} \int_{\alpha}^{\beta} r^2 d\theta$