1. Evaluate \( \int_0^{\pi/2} \sin^3 x \cos^2 x \, dx \)

2. Evaluate \( \int \sqrt{16 - x^2} \, dx \)

3. Find the side lengths and angles of the triangle with vertices at:
   \( \vec{A} = (1, 2, 0) \)
   \( \vec{B} = (1, 0, 3) \)
   \( \vec{C} = (0, 2, 3) \)

4. A fly completes a circle of radius 3 cm in 2 seconds. Find \( \vec{r}(t) \), \( \vec{v}(t) \), and \( \vec{a}(t) \) for this path.

5. Solve \( z^3 = 1 \). Express the answers in both rectangular and polar forms.
6) Find a 2nd order linear homogenous differential equation which has
\[ f(t) = 5e^{-t} - 6e^{2t} \]
as a solution.

7) For which values of \( C \) does the solution to
\[ f''(t) + 8f'(t) + C \cdot f(t) = 0 \]
involve sines & cosines?

8) Evaluate:
   a) \[ \sum_{n=1}^{\infty} n \cdot x^n \]
   b) \[ \sum_{n=0}^{\infty} \frac{1}{n} x^n \]