Some useful formulas

To be filled
Multiple choice questions

(1) Let $b = <2, 0, 1>$, $a = <1, 0, -3>$. Find $\text{proj}_a b$.
   (A) 
   (B) 
   (C) 
   (D)

(2) Find $<1, 1, -2> \times <3, -2, 1>$
   (A) 
   (B) 
   (C) 
   (D)

(3) Find the sum of the series
   $\sum_{n=1}^{\infty} \frac{1}{n(n + 2)}$
   (A) 
   (B) 
   (C) 
   (D)

(4) Find the angle between the planes $2x + y + z = 1$, $2x - y + 2z = 1$.
   (A) 
   (B) 
   (C) 
   (D)
(5) Expand the function
\[ f(x) = \sin(x) \]
in Taylor series around the point \( a = \pi/2 \).

(6) Determine the interval of convergence for the power series
\[
\sum_{n=0}^{\infty} \frac{2^n(x - 3)^n}{\sqrt{n + 3}}.
\]
(7) Find the points on the curve $r = 1 - \sin(\theta)$, where the tangent line is horizontal or vertical.

(8) Find the exact length of the polar curve $r = \sin(\theta), 0 \leq \theta \leq \pi/3$. 
(9) Find the volume of the parallelepiped spanned on the vectors \( \vec{a} = \mathbf{i} + \mathbf{j} - 2\mathbf{k} \), 
\( \vec{b} = 3\mathbf{i} - 2\mathbf{j} + \mathbf{k} \), \( \vec{c} = \mathbf{j} - 5\mathbf{k} \)

(10) Find the equations of the plane passing through the origin and the points 
\( P(2, -4, 6) \) and \( Q = (5, 1, 3) \).
(11) Find the line of intersection of the planes $2x - y + z = 2$, $3x - 2y + z = 1$.

(12) Find the plane that passes through the point $P(1, -1, 1)$ and contains the line $x = 2y = 3z$. 