

Exam ①

- ① Find the angle between the vectors.

$$A = \langle 2, 0, 1 \rangle$$

$$B = \langle 4, -2, 0 \rangle$$

- ② Find the curvature at $t=0$ of the curve
 $\vec{r}(t) = \langle \cos(2t), 4t, \sin(2t) \rangle$.

- ③ Find parametric equations for the tangent line to the curve with parametric equations

$$x(t) = 3 + 2\sqrt{t}$$

$$y(t) = t^3 - t$$

$$z(t) = t^3 + t$$

at $(5, 0, 2)$.

- ④ Find the length of the curve

$$\vec{r}(t) = 6t\mathbf{i} + 8t^{3/2}\mathbf{j} + 6t^2\mathbf{k} \quad 0 \leq t \leq 1.$$

- ⑤ Find an equation of the plane that contains the point $(1, 3, 5)$ and is perpendicular to the given line, $\{x=3+t, y=3t, z=5-2t\}$.

- ⑥ Find an equation of the plane that contains the line $\{x=3+4t, y=2, z=4t\}$ parallel to the given plane, $3x+6y-3z=18$.

- ⑦ Find the distance from the given point to each of the following.

$$(3, 7, -5)$$

(A) xy -plane

(B) y -axis