

MATH 1260
Test 1 Sample Questions
(Partial) Answers

(1) (a) $\vec{a} \cdot \vec{b} = -1$. (b) $\vec{a} \times \vec{b} = \langle 1, 5, 1 \rangle$. (c) the projection of \vec{a} in the direction of \vec{b} is $\langle -\frac{1}{2}, 0, \frac{1}{2} \rangle$.

(2) (a) $\vec{r}(t) = \langle 1, 2, -1 \rangle + t\langle -4, -1, 1 \rangle$. (b) $y + z = 1$.

(3) $\vec{r}(t) = \langle \frac{2}{3}t^3 - 2t^2, -\cos(t), \frac{1}{2}t^4 - t^3 - 5t \rangle$ and $\vec{a}(t) = \langle 4t - 4, \cos(t), 6t^2 - 6t \rangle$.

(4) The ball has a height of $20\sqrt{3} - 19.6$ meters when it reaches the target. Since this number is bigger than 5, the ball does not hit the target.

(5) Two such planes are $2x - y = -8$ and $3y - 2z = -6$. Other such planes are $x + y - z = -7$ and $3x - z = -15$.

(6) The equation of the plane is $6x + 4y - 4z = 6$ (or any multiple of this equation).

(8) Fixing x : Parabolas. Fixing y : Parabolas. Fixing z (level curves): Either 0 or 1 or 2 lines.

(14) Yes, they are linearly dependent.

(16) 9.6047.

(17) The particle is at $(-1, -\pi, 4\pi^3)$.

(18) $\langle \cos t, -\sin t, e^t \rangle, \langle -\sin t, -\cos t, e^t \rangle, \sqrt{q + e^{2t}}$.

(27) $-2x^2 + 2x$.

(28) $-x^5 + 3x^4 + 2x^3$.