

2. (a) $\frac{\sqrt{6}}{2}$ (b) $x + y + 2z = 3$ (c) $(0, 1, 1)$

3. (a) $\vec{QP} = \hat{i} - 2\hat{j}$ (b) $\frac{4}{\sqrt{65}}$ (c) $\frac{9}{\sqrt{130}}$
 $\vec{QR} = -2\hat{j} + 3\hat{k}$

4. (a) $\frac{7}{2}$ (b) $6x + 3y + 2z = 11$ (c) YES

5. $\vec{L}(\alpha) = \langle -1, 1, 1 + \alpha \rangle$

6. $\pi/4$

7. $\vec{v}(t) = -3\sin t \hat{i} + 3\cos t \hat{j} + \hat{k} = \langle -3\sin t, 3\cos t, 1 \rangle$
 $\vec{a}(t) = -3\cos t \hat{i} - 3\sin t \hat{j} = \langle -3\cos t, -3\sin t, 0 \rangle$
speed = $|\vec{v}(t)| = \sqrt{10}$

8. (a) $\langle 4, -3, -2 \rangle$ (b) $\langle 4, -3, -2 \rangle \cdot \vec{r}(t) = 6$
(c) $\frac{d}{dt} (\langle 4, -3, -2 \rangle \cdot \vec{r}(t)) = 0 \Rightarrow \langle 4, -3, -2 \rangle \cdot \vec{v}(t) + 0 = 0$
 $\Rightarrow \vec{N} \perp \vec{v}(t)$

9. $\langle t, \cos t, t \sin t \rangle$

10. line: $\langle 0, 3, 2 + \theta \rangle$, acceleration: $\langle -2, 3, 0 \rangle$

11. $t^3 + 2t$