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Q1 Answers

a) Answer:

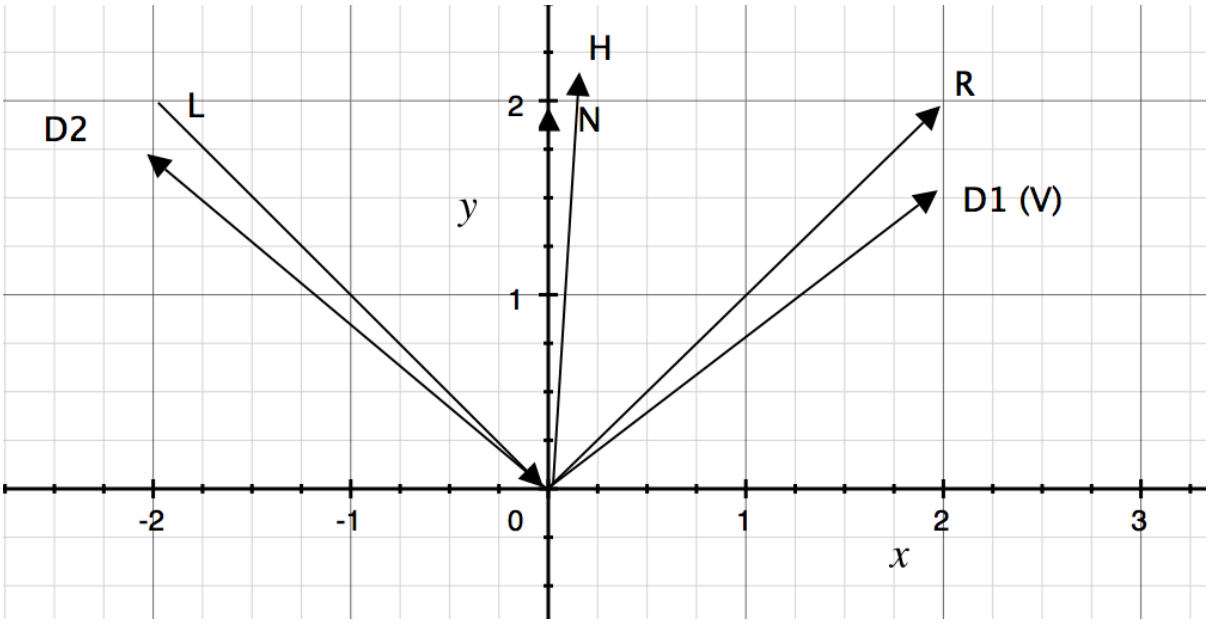
(i) reflected direction: the counter direction of the incident light: $\left(\frac{5}{\sqrt{66}}, \frac{5}{\sqrt{66}}, \frac{4}{\sqrt{66}}\right)$

(ii) Exit point: $\left(\frac{-5}{\sqrt{66}}, \frac{-5}{\sqrt{66}}, \frac{-4}{\sqrt{66}}\right)$

b) Answer:

(i) Phong Model:

According to simple shading model,



For D1, $I_{D1}=K_d(N\cdot L)I_L+K_s(V\cdot R)^n I_L$, $I_{D1}=2I_{D2}$

For D2, $I_{D2}=K_d(N\cdot L)I_L$

$$I_{D2} = 0.1 \cdot \cos\left(\frac{\pi}{4}\right)\cdot I_L=\frac{\sqrt{2}}{20}I_L,$$

So, $K_s(V\cdot R)^n I_L=\frac{\sqrt{2}}{20}I_L$

$$0.5\cdot\cos\left(\frac{\pi}{18}\right)^n\cdot I_L=\frac{\sqrt{2}}{20}I_L$$

n = 127.78

(ii) Bling-Phong Model

For D1, $I_{D1}=K_D(N\cdot L)I_L+K_s(N\cdot H)^n\cdot I_L$

so, n = 513