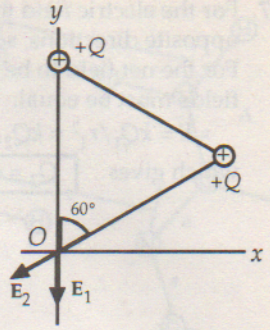
33. (*a*) The directions of the individual fields are shown in the figure.



We find the magnitudes of the individual fields:

$E_1 = E_2 = kQ/L^2$.

For the components of the resultant field we have

$E_x = -E_2 \sin 60° = -0.866kQ/L^2$;

$E_y = -E_1 - E_2 \cos 60° = -kQ/L^2 - 0.500kQ/L^2 = -1.50kQ/L^2$.

We find the direction from

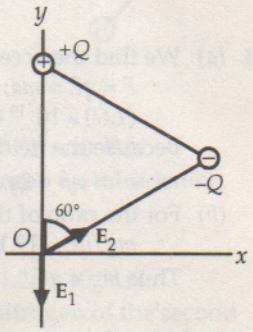
$\tan\theta = E_y/E_x = (-1.50kQ/L^2)/(-0.866kQ/L^2) = 1.73$, or $\theta = 60°$.

We find the magnitude from

$E = E_x/\cos\theta = (0.866kQ/L^2)/\cos 60° = 1.73kQ/L^2$.

Thus the field is $\boxed{1.73kQ/L^2 \text{ 60° below the } -x\text{-axis.}}$

(*b*) The directions of the individual fields are shown in the figure.



The magnitudes of the individual fields will be the same:

$E_1 = E_2 = kQ/L^2$.

For the components of the resultant field we have

$E_x = +E_2 \sin 60° = +0.866kQ/L^2$;

$E_y = -E_1 + E_2 \cos 60° = -kQ/L^2 + 0.500kQ/L^2 = -0.500kQ/L^2$.

We find the direction from

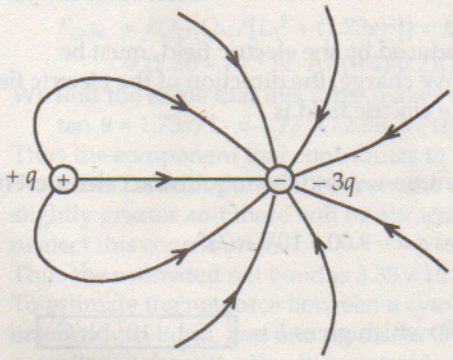
$\tan\theta = E_y/E_x = (-0.500kQ/L^2)/(+0.866kQ/L^2) = -0.577$, or $\theta = -30°$.

We find the magnitude from

$E = E_x/\cos\theta = (0.866kQ/L^2)/\cos 30° = kQ/L^2$.

Thus the field is $\boxed{kQ/L^2 \text{ 30° below the } +x\text{-axis.}}$

34.



35. The acceleration is produced by the force from the electric field:

$F = qE = ma$;

$(1.60 \times 10^{-19}\text{ C})E = (1.67 \times 10^{-27}\text{ kg})(1 \times 10^6)(9.80\text{ m/s}^2)$, which gives $E = \boxed{0.10\text{ N/C}}$.

36. If we let x be the distance from the center of the Earth, we have

$GM_{\text{Moon}}/(D-x)^2 = GM_{\text{Earth}}/x^2 = 81GM_{\text{Moon}}/x^2$, or $81(D-x)^2 = x^2$.

When we take the square root of both sides, we get

$x = 9D/10 = 9(3.80 \times 10^5\text{ km})/10 = \boxed{3.42 \times 10^5\text{ km from the center of the Earth.}}$

Note that taking a negative square root gives $x = 9D/8$, the point on the other side of the Moon where the magnitudes are equal, but the fields have the same direction.