21. Studying Sample Problem 23-3, we see that the field evaluated at the center of curvature due to a charged distribution on a circular arc is given by

$$\vec{E} = \frac{\lambda}{4\pi\varepsilon_0 r}\left[\sin\theta\right]_{-\theta/2}^{\theta/2} \qquad \text{along the symmetry axis}$$

where $\lambda = q/r\theta$ with θ in radians. In this problem, each charged quarter-circle produces a field of magnitude

$$\left|\vec{E}\right| = \frac{|q|}{r\pi/2}\frac{1}{4\pi\varepsilon_0 r}\left[\sin\theta\right]_{-\pi/4}^{\pi/4} = \frac{|q|}{\varepsilon_0\pi^2 r^2\sqrt{2}} \ .$$

That produced by the positive quarter-circle points at $-45°$, and that of the negative quarter-circle points at $+45°$. By symmetry, we conclude that their net field is horizontal (and rightward in the textbook figure) with magnitude

$$E_x = 2\left(\frac{|q|}{\varepsilon_0\pi^2 r^2\sqrt{2}}\right)\cos 45° = \frac{|q|}{\varepsilon_0\pi^2 r^2} \ .$$