

49. We consider pairs of diametrically opposed charges. The net field due to just the charges in the one o'clock ( $-q$ ) and seven o'clock ( $-7q$ ) positions is clearly equivalent to that of a single  $-6q$  charge sitting at the seven o'clock position. Similarly, the net field due to just the charges in the six o'clock ( $-6q$ ) and twelve o'clock ( $-12q$ ) positions is the same as that due to a single  $-6q$  charge sitting at the twelve o'clock position. Continuing with this line of reasoning, we see that there are six equal-magnitude electric field vectors pointing at the seven o'clock, eight o'clock ... twelve o'clock positions. Thus, the resultant field of all of these points, by symmetry, is directed toward the position midway between seven and twelve o'clock. Therefore,  $\vec{E}_{\text{resultant}}$  points towards the nine-thirty position.