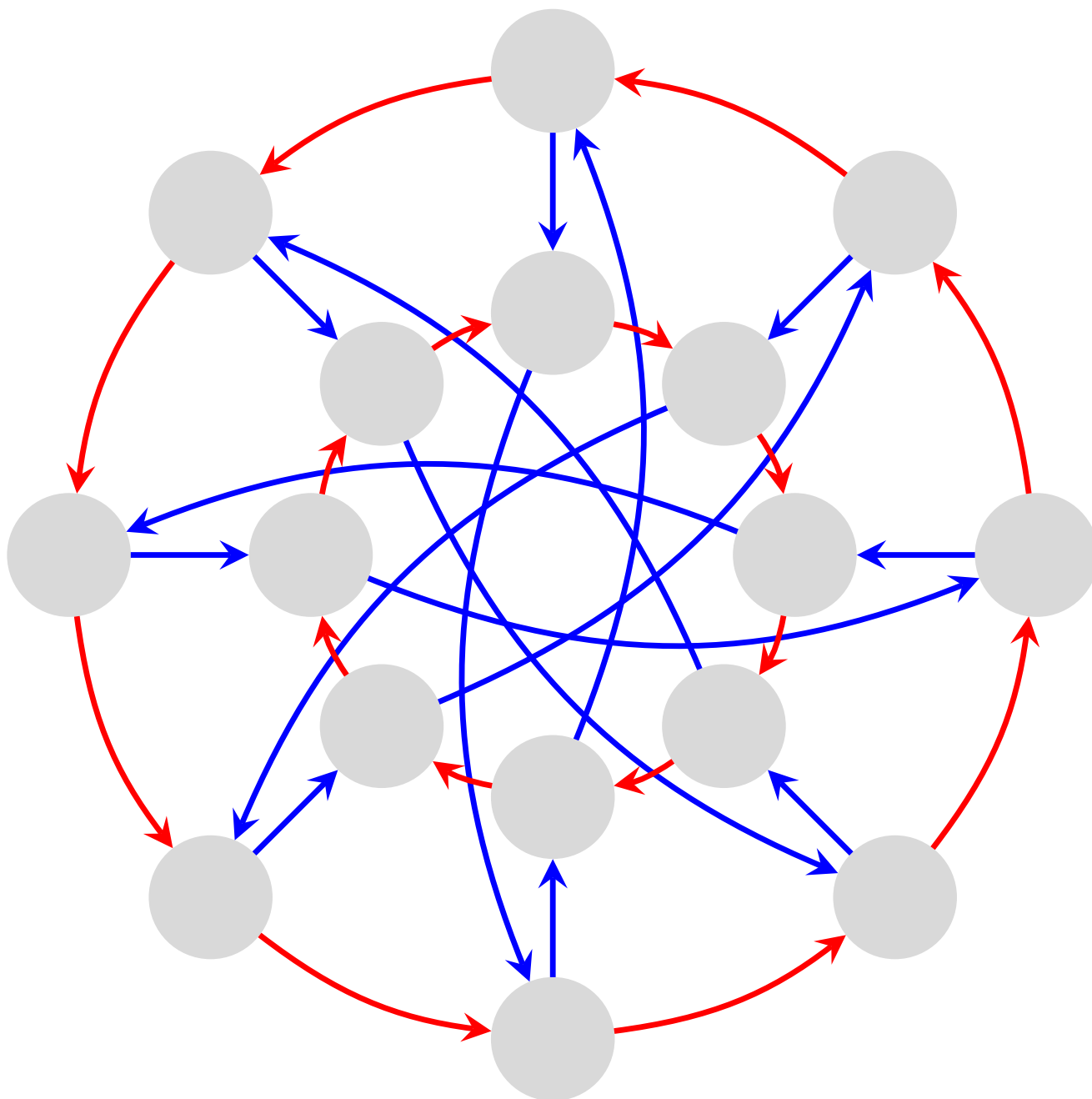


Supplemental material: Visual Algebra (Math 4120), HW 1

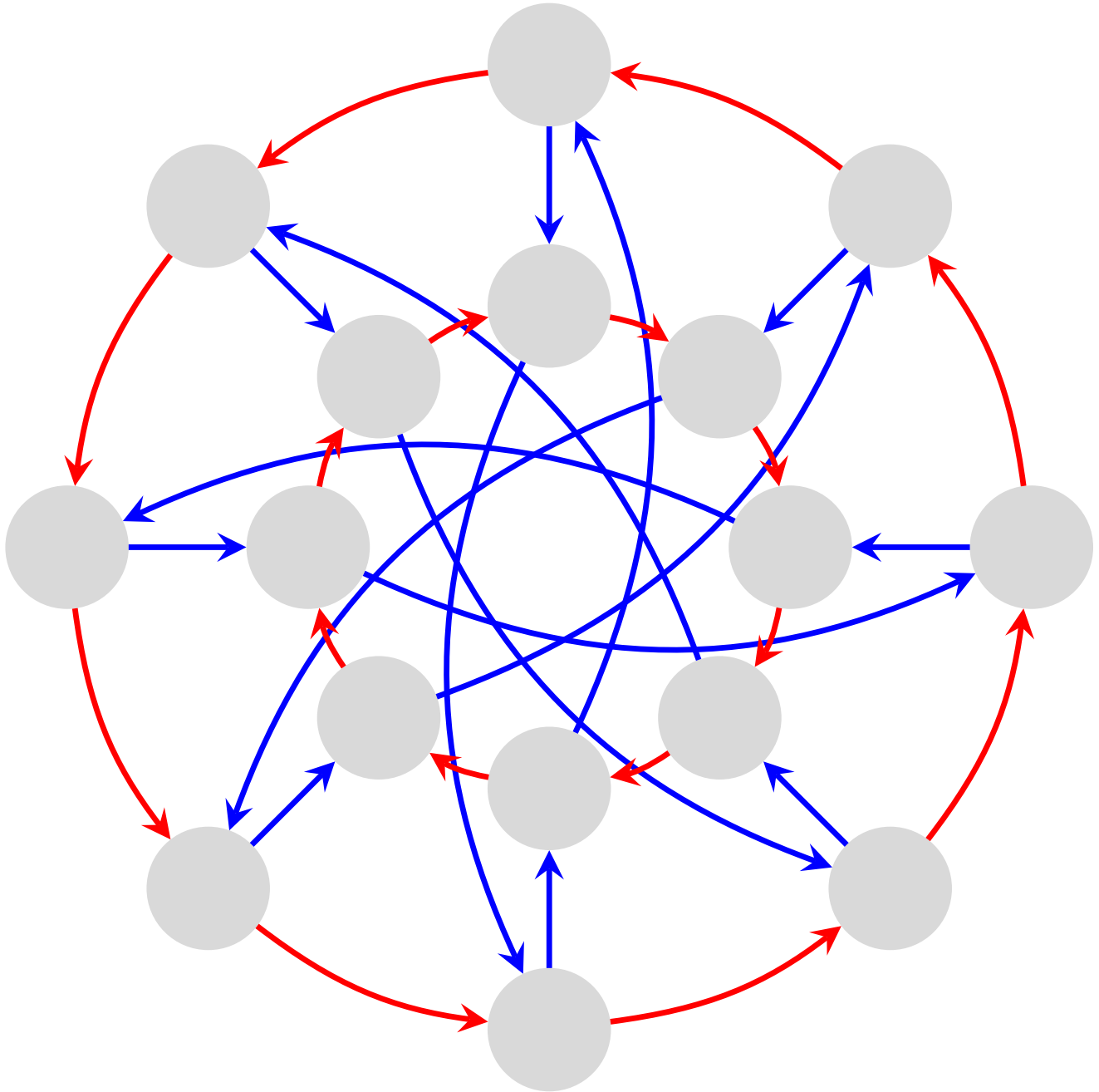
#3(a): Cayley graph for the generalized quaternion group

$$Q_{16} = \left\langle \frac{\sqrt{2}}{2} + \frac{\sqrt{2}}{2}i, j \right\rangle,$$

where $\frac{\sqrt{2}}{2} + \frac{\sqrt{2}}{2}i = e^{2\pi i/8} = \zeta_8$ is an 8th root of unity.



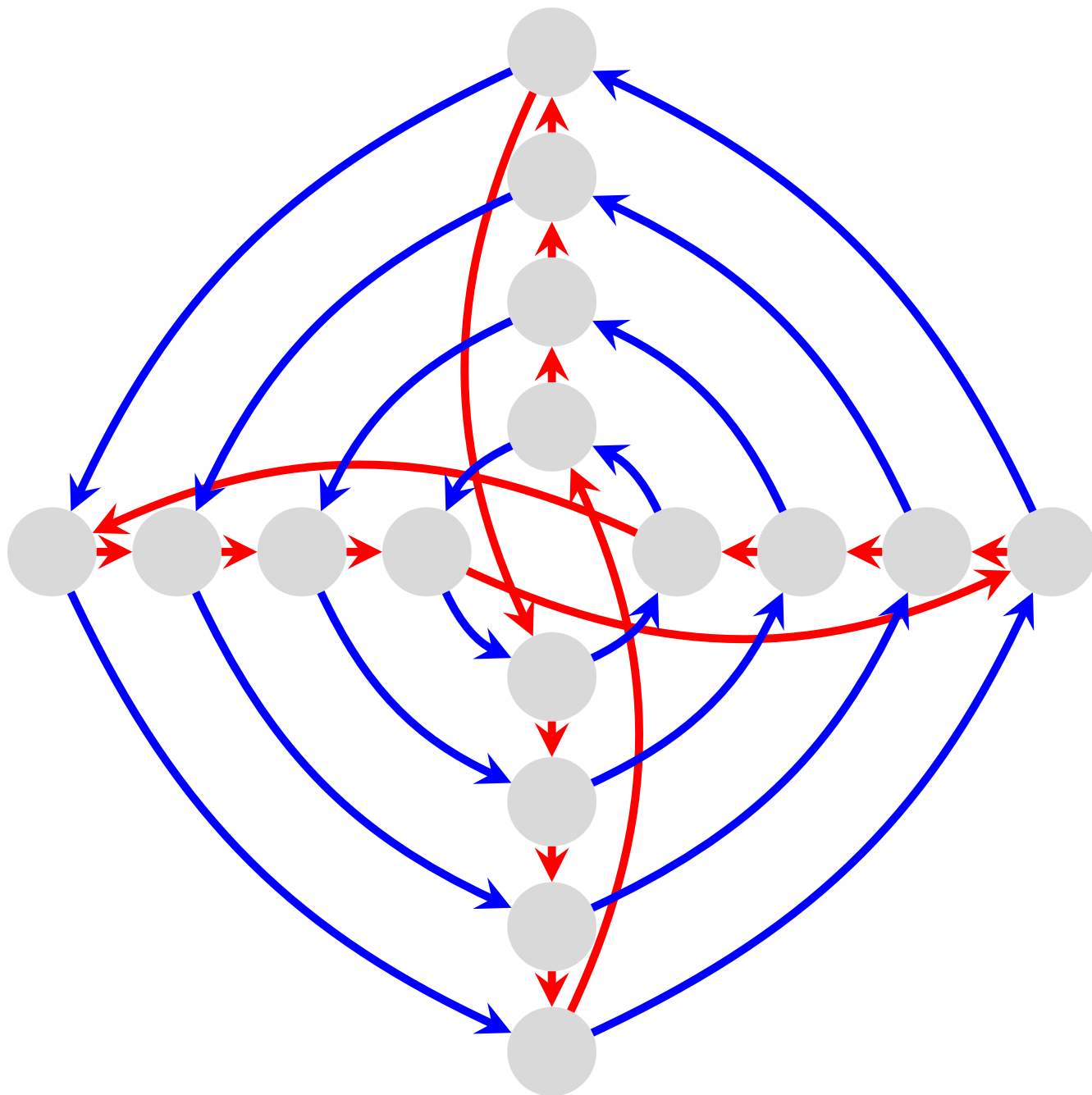
#3(a): Cayley graph for the generalized quaternion group $Q_{16} = \langle \zeta_8, j \rangle$, where $\zeta_8 = e^{2\pi i/8}$ is an 8th root of unity.



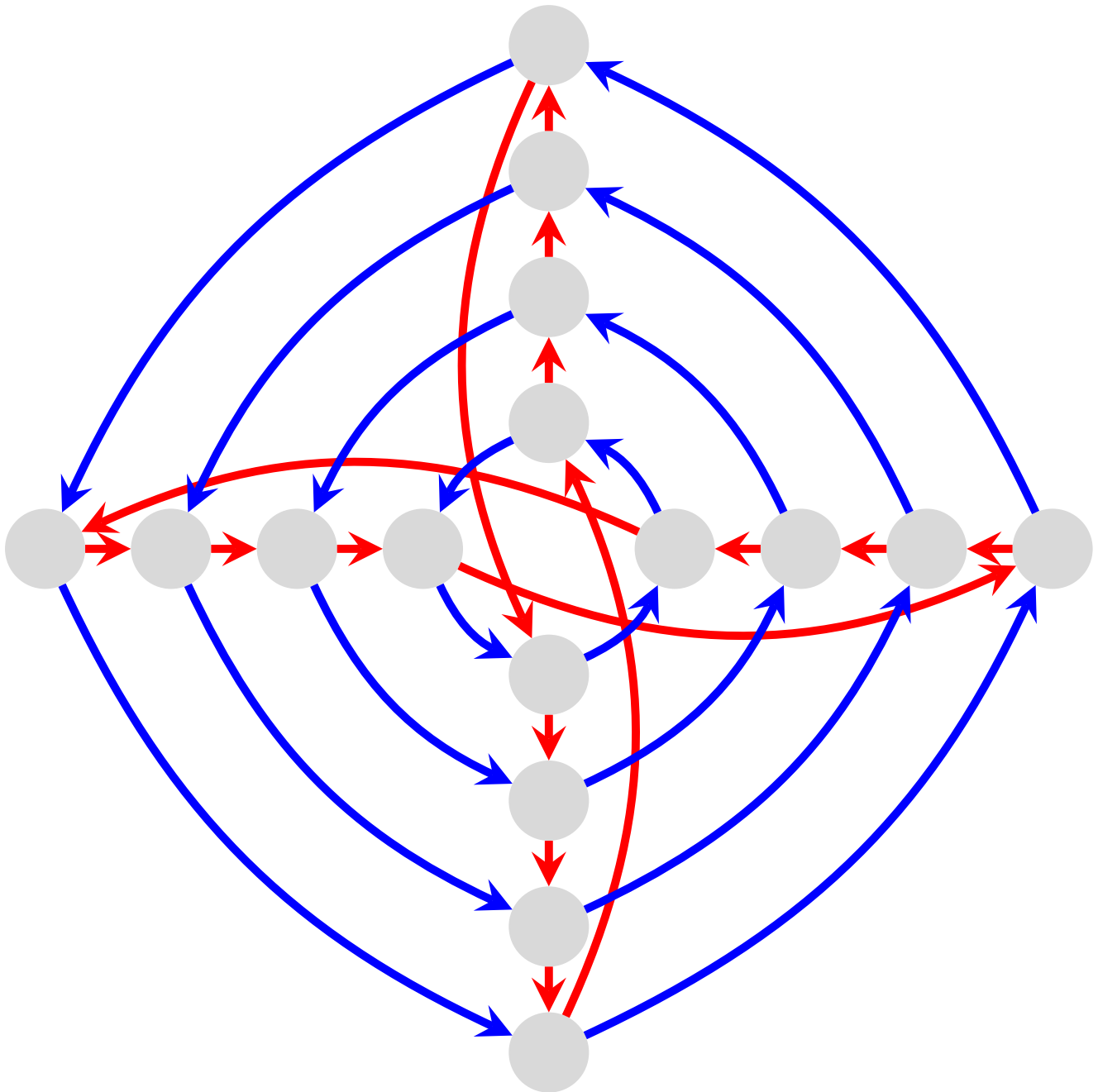
#3(a): Another way to lay out the Cayley graph for the generalized quaternion group

$$Q_{16} = \left\langle \frac{\sqrt{2}}{2} + \frac{\sqrt{2}}{2}i, j \right\rangle,$$

where $\frac{\sqrt{2}}{2} + \frac{\sqrt{2}}{2}i = e^{2\pi i/8} = \zeta_8$ is an 8th root of unity.



#3(a): Another way to lay out the Cayley graph for the generalized quaternion group $Q_{16} = \langle \zeta_8, j \rangle$, where $\zeta_8 = e^{2\pi i/8}$ is an 8th root of unity.



#**3(b)**: Cayley table of a quotient of the generalized quaternion group

$$Q_{16} = \langle \zeta_8, j \rangle, \quad \text{where} \quad \frac{\sqrt{2}}{2} + \frac{\sqrt{2}}{2}i = e^{2\pi i/8} = \zeta_8,$$

by the subgroup $\langle \zeta^4 \rangle = \langle -1 \rangle = \{1, -1\}$.

	± 1	$\pm \zeta$	$\pm \zeta^2$	$\pm \zeta^3$	$\pm j$	$\pm \zeta j$	$\pm \zeta^2 j$	$\pm \zeta^3 j$
± 1								
$\pm \zeta$								
$\pm \zeta^2$								
$\pm \zeta^3$								
$\pm j$								
$\pm \zeta j$								
$\pm \zeta^2 j$								
$\pm \zeta^3 j$								