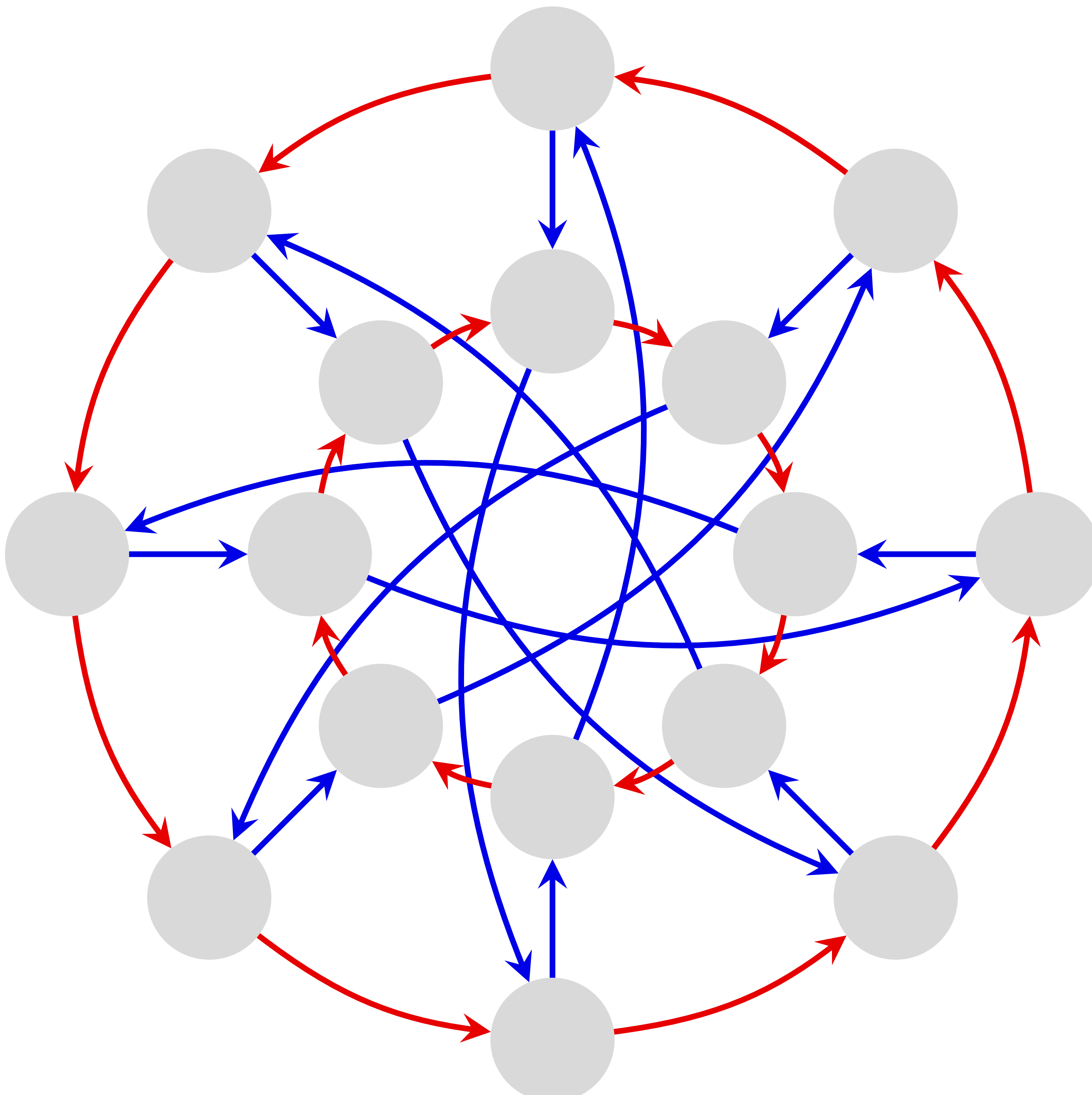
Supplemental material for Visual Algebra (Math 4120), HW 2

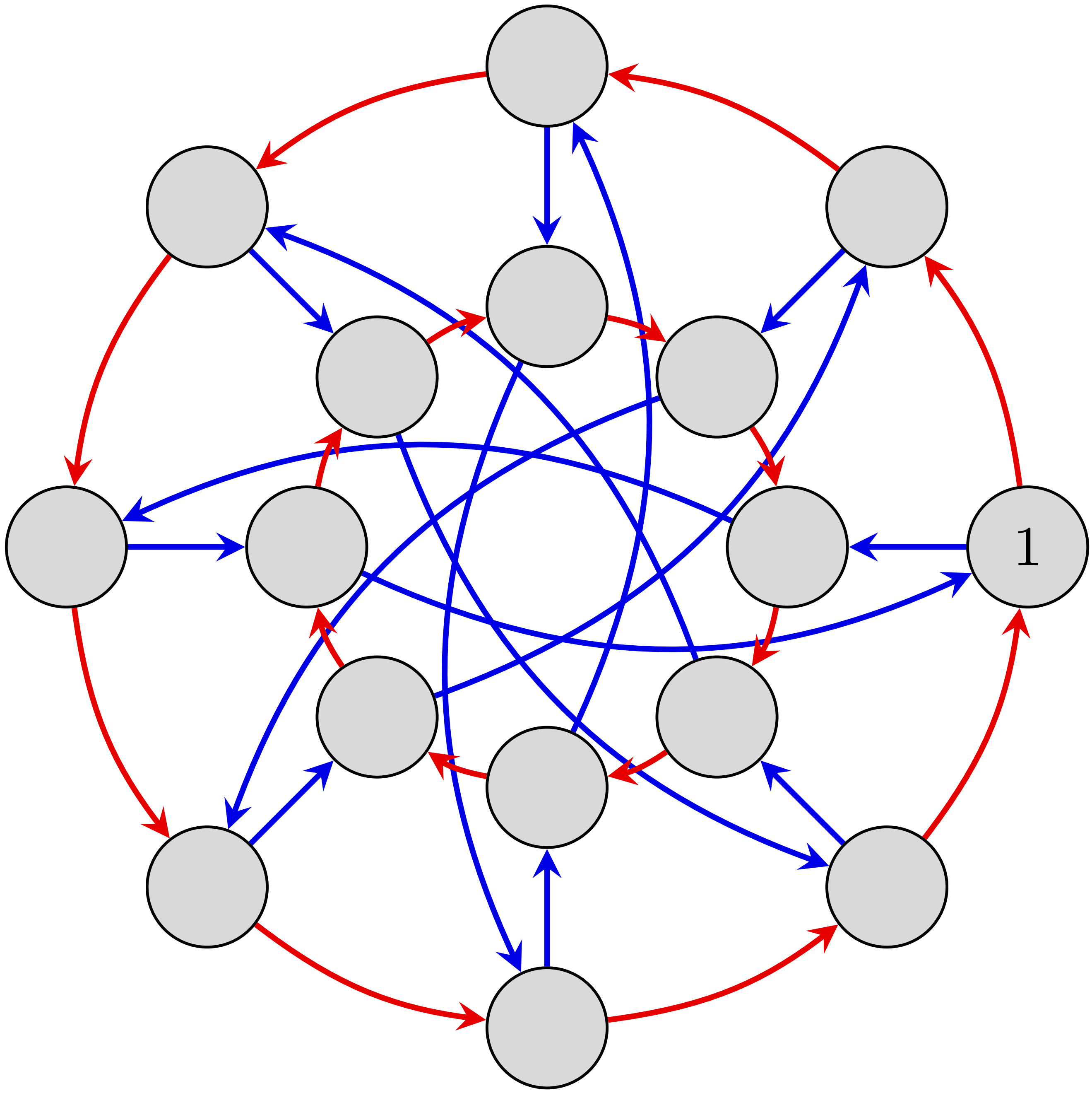
#3(a): Cayley graph for the generalized quaternion group

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

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



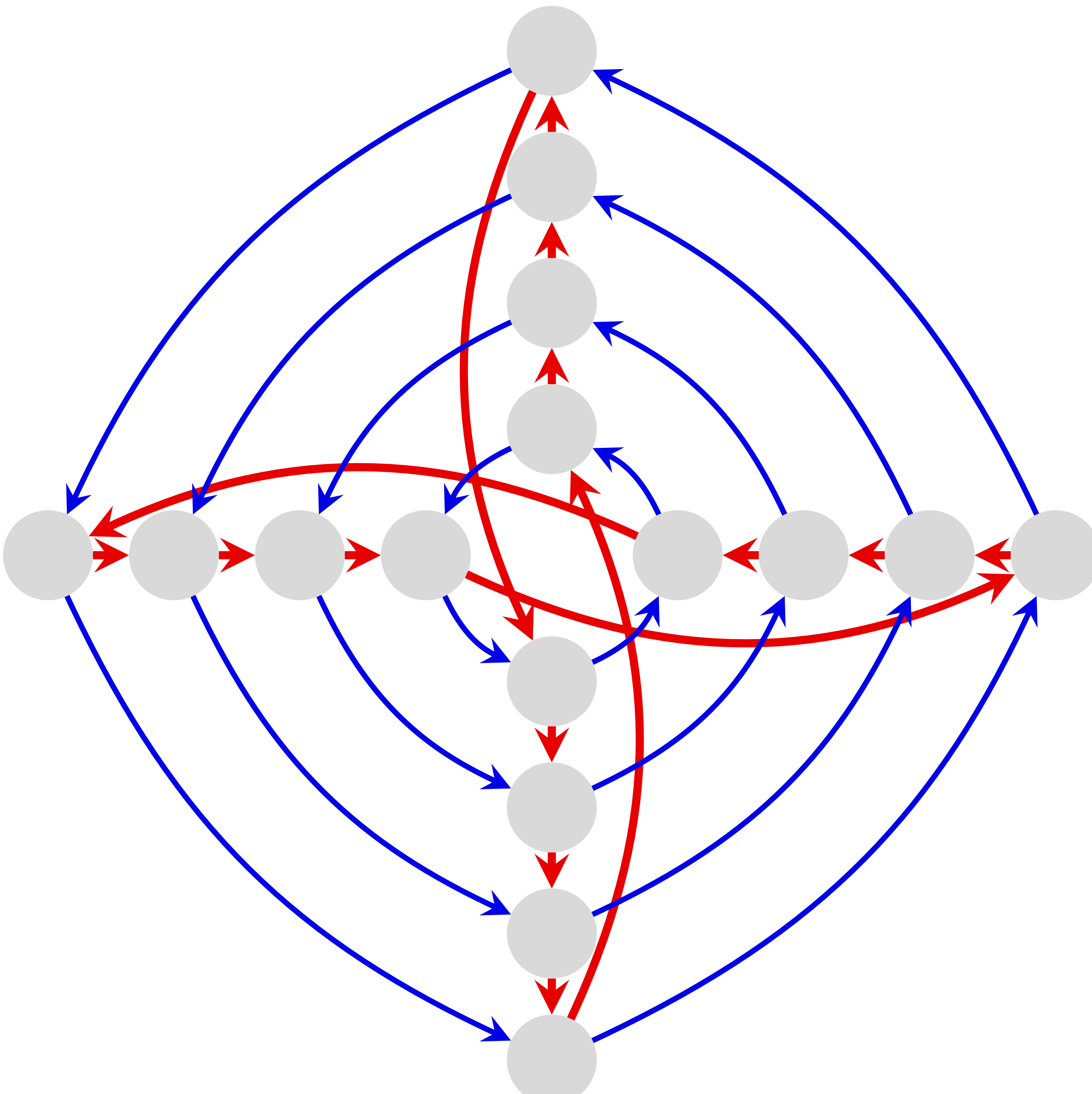
#3(a): Cayley graph for the generalized quaternion group $Q_{16} = \langle \zeta_8, j \rangle$, where $\zeta_8 = e^{2\pi i/8}$ is an 8^{th} root of unity.



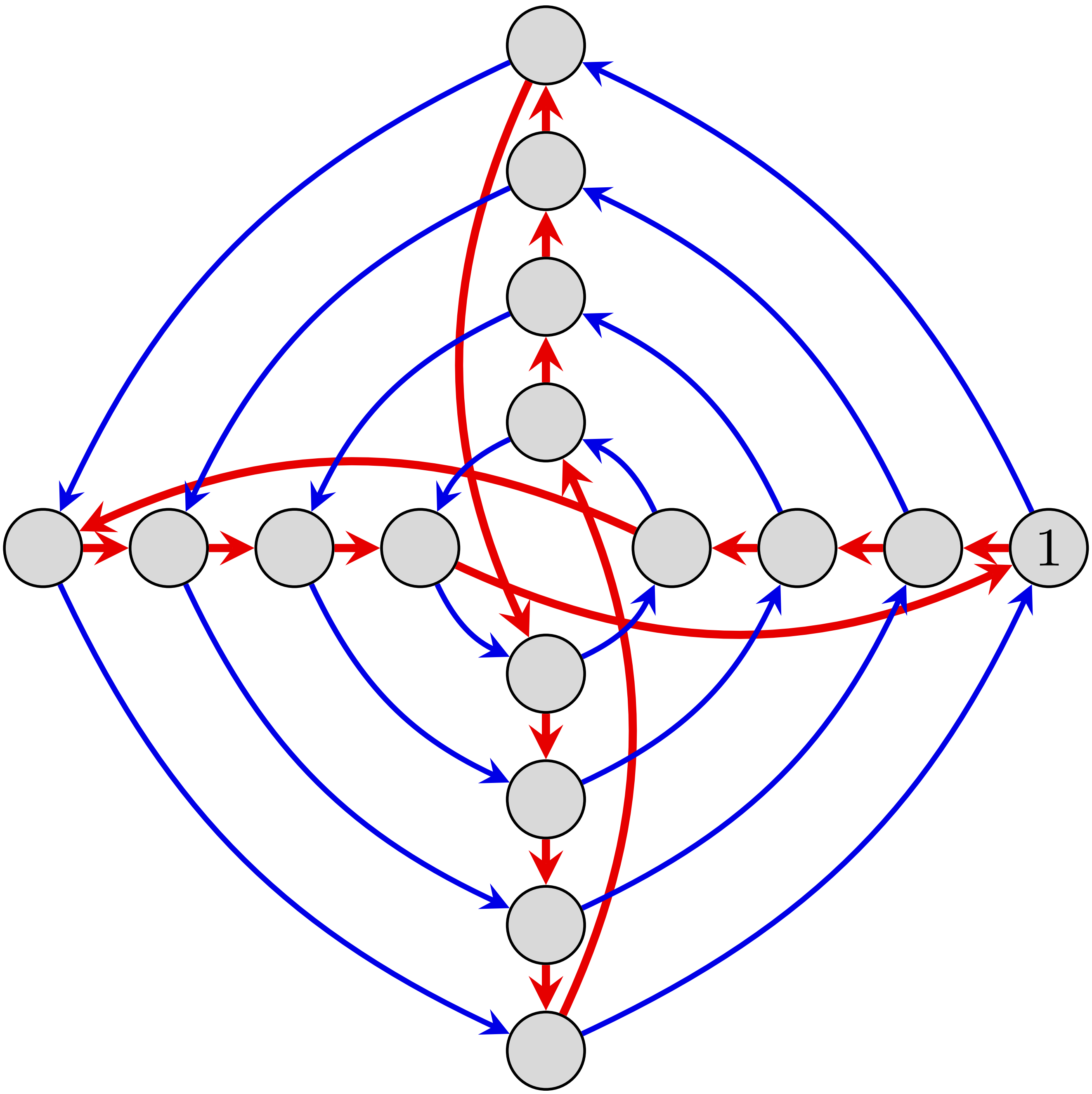
#3(a): Another way to lay out the Cayley graph for the generalized quaternion group

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

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



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

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

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