

Below is a giant list of "nice" orthogonal matrices (i.e., the rare ones having all rational components). The columns (or rows) of an orthogonal matrix form a set of orthonormal vectors. This sort of list is useful to professors who want to make up homework or exam questions that involve simple numbers instead of a bunch of square roots.

$$\begin{pmatrix} -\frac{79}{81} & \frac{8}{81} & \frac{16}{81} \\ \frac{8}{81} & -\frac{49}{81} & \frac{64}{81} \\ \frac{16}{81} & \frac{64}{81} & \frac{47}{81} \end{pmatrix}
 \begin{pmatrix} -\frac{39}{41} & -\frac{4}{41} & \frac{12}{41} \\ \frac{12}{41} & -\frac{24}{41} & \frac{31}{41} \\ \frac{4}{41} & \frac{33}{41} & \frac{24}{41} \end{pmatrix}
 \begin{pmatrix} -\frac{39}{41} & \frac{12}{41} & \frac{4}{41} \\ -\frac{4}{41} & -\frac{24}{41} & \frac{33}{41} \\ \frac{12}{41} & \frac{31}{41} & \frac{24}{41} \end{pmatrix}$$

$$\begin{pmatrix} -\frac{307}{333} & -\frac{64}{333} & \frac{112}{333} \\ \frac{128}{333} & -\frac{187}{333} & \frac{244}{333} \\ \frac{16}{333} & \frac{268}{333} & \frac{197}{333} \end{pmatrix}
 \begin{pmatrix} -\frac{307}{333} & \frac{128}{333} & \frac{16}{333} \\ -\frac{64}{333} & -\frac{187}{333} & \frac{268}{333} \\ \frac{112}{333} & \frac{244}{333} & \frac{197}{333} \end{pmatrix}
 \begin{pmatrix} -\frac{41}{49} & \frac{12}{49} & \frac{24}{49} \\ \frac{12}{49} & -\frac{31}{49} & \frac{36}{49} \\ \frac{24}{49} & \frac{36}{49} & \frac{23}{49} \end{pmatrix}$$

$$\begin{pmatrix} -\frac{4}{5} & 0 & \frac{3}{5} \\ \frac{12}{25} & -\frac{3}{5} & \frac{16}{25} \\ \frac{9}{25} & \frac{4}{5} & \frac{12}{25} \end{pmatrix}
 \begin{pmatrix} -\frac{4}{5} & \frac{12}{25} & \frac{9}{25} \\ 0 & -\frac{3}{5} & \frac{4}{5} \\ \frac{3}{5} & \frac{16}{25} & \frac{12}{25} \end{pmatrix}
 \begin{pmatrix} -\frac{7}{9} & -\frac{4}{9} & \frac{4}{9} \\ \frac{28}{45} & -\frac{4}{9} & \frac{29}{45} \\ -\frac{4}{45} & \frac{7}{9} & \frac{28}{45} \end{pmatrix}$$

$$\begin{pmatrix} -\frac{7}{9} & \frac{4}{9} & \frac{4}{9} \\ \frac{4}{9} & -\frac{1}{9} & \frac{8}{9} \\ \frac{4}{9} & \frac{8}{9} & -\frac{1}{9} \end{pmatrix}
 \begin{pmatrix} -\frac{7}{9} & \frac{28}{45} & -\frac{4}{45} \\ -\frac{4}{9} & -\frac{4}{9} & \frac{7}{9} \\ \frac{4}{9} & \frac{29}{45} & \frac{28}{45} \end{pmatrix}
 \begin{pmatrix} -\frac{488}{637} & \frac{360}{637} & \frac{15}{49} \\ -\frac{60}{637} & -\frac{363}{637} & \frac{40}{49} \\ \frac{405}{637} & \frac{380}{637} & \frac{24}{49} \end{pmatrix}$$

$$\begin{pmatrix} -\frac{31}{41} & \frac{24}{41} & \frac{12}{41} \\ \frac{12}{41} & -\frac{4}{41} & \frac{39}{41} \\ \frac{24}{41} & \frac{33}{41} & -\frac{4}{41} \end{pmatrix}
 \begin{pmatrix} -\frac{167}{225} & \frac{56}{225} & \frac{28}{45} \\ \frac{28}{45} & -\frac{4}{45} & \frac{7}{9} \\ \frac{56}{225} & \frac{217}{225} & -\frac{4}{45} \end{pmatrix}
 \begin{pmatrix} -\frac{167}{225} & \frac{28}{45} & \frac{56}{225} \\ \frac{56}{225} & -\frac{4}{45} & \frac{217}{225} \\ \frac{28}{45} & \frac{7}{9} & -\frac{4}{45} \end{pmatrix}$$

$$\begin{pmatrix} -\frac{27}{37} & \frac{8}{37} & \frac{24}{37} \\ \frac{24}{37} & -\frac{3}{37} & \frac{28}{37} \\ \frac{8}{37} & \frac{36}{37} & -\frac{3}{37} \end{pmatrix}
 \begin{pmatrix} -\frac{27}{37} & \frac{24}{37} & \frac{8}{37} \\ \frac{8}{37} & -\frac{3}{37} & \frac{36}{37} \\ \frac{24}{37} & \frac{28}{37} & -\frac{3}{37} \end{pmatrix}
 \begin{pmatrix} -\frac{83}{117} & \frac{20}{117} & \frac{80}{117} \\ \frac{80}{117} & -\frac{8}{117} & \frac{85}{117} \\ \frac{20}{117} & \frac{115}{117} & -\frac{8}{117} \end{pmatrix}$$

$$\begin{pmatrix} -\frac{83}{117} & \frac{80}{117} & \frac{20}{117} \\ \frac{20}{117} & -\frac{8}{117} & \frac{115}{117} \\ \frac{80}{117} & \frac{85}{117} & -\frac{8}{117} \end{pmatrix}
 \begin{pmatrix} -\frac{37}{53} & -\frac{12}{53} & \frac{36}{53} \\ \frac{36}{53} & -\frac{27}{53} & \frac{28}{53} \\ \frac{12}{53} & \frac{44}{53} & \frac{27}{53} \end{pmatrix}
 \begin{pmatrix} -\frac{37}{53} & \frac{36}{53} & \frac{12}{53} \\ -\frac{12}{53} & -\frac{27}{53} & \frac{44}{53} \\ \frac{36}{53} & \frac{28}{53} & \frac{27}{53} \end{pmatrix}$$

$$\begin{pmatrix} -\frac{219}{325} & \frac{8}{325} & \frac{48}{65} \\ \frac{16}{25} & -\frac{12}{25} & \frac{3}{5} \\ \frac{24}{65} & \frac{57}{65} & \frac{4}{13} \end{pmatrix}
 \begin{pmatrix} -\frac{219}{325} & \frac{16}{25} & \frac{24}{65} \\ \frac{8}{325} & -\frac{12}{25} & \frac{57}{65} \\ \frac{48}{65} & \frac{3}{5} & \frac{4}{13} \end{pmatrix}
 \begin{pmatrix} -\frac{32}{49} & -\frac{72}{245} & \frac{171}{245} \\ \frac{36}{49} & -\frac{23}{49} & \frac{24}{49} \\ \frac{9}{49} & \frac{204}{245} & \frac{128}{245} \end{pmatrix}$$

$$\begin{pmatrix} -\frac{32}{49} & \frac{36}{49} & \frac{9}{49} \\ -\frac{72}{245} & -\frac{23}{49} & \frac{204}{245} \\ \frac{171}{245} & \frac{24}{49} & \frac{128}{245} \end{pmatrix}
 \begin{pmatrix} -\frac{31}{49} & \frac{36}{49} & \frac{12}{49} \\ \frac{36}{49} & \frac{23}{49} & \frac{24}{49} \\ \frac{12}{49} & \frac{24}{49} & -\frac{41}{49} \end{pmatrix}
 \begin{pmatrix} -\frac{49}{81} & \frac{32}{81} & \frac{56}{81} \\ \frac{32}{81} & -\frac{49}{81} & \frac{56}{81} \\ \frac{56}{81} & \frac{56}{81} & \frac{17}{81} \end{pmatrix}$$

$$\begin{pmatrix} -\frac{49}{81} & \frac{56}{81} & \frac{32}{81} \\ \frac{56}{81} & \frac{17}{81} & \frac{56}{81} \\ \frac{32}{81} & \frac{56}{81} & -\frac{49}{81} \end{pmatrix}
 \begin{pmatrix} -\frac{49}{81} & \frac{64}{81} & \frac{8}{81} \\ \frac{64}{81} & \frac{47}{81} & \frac{16}{81} \\ \frac{8}{81} & \frac{16}{81} & -\frac{79}{81} \end{pmatrix}
 \begin{pmatrix} -\frac{3}{5} & 0 & \frac{4}{5} \\ \frac{4}{5} & 0 & \frac{3}{5} \\ 0 & 1 & 0 \end{pmatrix}$$

$$\begin{pmatrix} -\frac{3}{5} & \frac{16}{25} & \frac{12}{25} \\ \frac{4}{5} & \frac{12}{25} & \frac{9}{25} \\ 0 & \frac{3}{5} & -\frac{4}{5} \end{pmatrix}
 \begin{pmatrix} -\frac{3}{5} & \frac{4}{5} & 0 \\ 0 & 0 & 1 \\ \frac{4}{5} & \frac{3}{5} & 0 \end{pmatrix}
 \begin{pmatrix} -\frac{3}{5} & \frac{4}{5} & 0 \\ \frac{16}{25} & \frac{12}{25} & \frac{3}{5} \\ \frac{12}{25} & \frac{9}{25} & -\frac{4}{5} \end{pmatrix}$$

$$\begin{pmatrix} -\frac{24}{41} & \frac{9}{41} & \frac{32}{41} \\ \frac{23}{41} & -\frac{24}{41} & \frac{24}{41} \\ \frac{24}{41} & \frac{32}{41} & \frac{9}{41} \end{pmatrix}
 \begin{pmatrix} -\frac{24}{41} & \frac{23}{41} & \frac{24}{41} \\ \frac{9}{41} & -\frac{24}{41} & \frac{32}{41} \\ \frac{32}{41} & \frac{24}{41} & \frac{9}{41} \end{pmatrix}
 \begin{pmatrix} -\frac{24}{41} & \frac{24}{41} & \frac{23}{41} \\ \frac{32}{41} & \frac{9}{41} & \frac{24}{41} \\ \frac{9}{41} & \frac{32}{41} & -\frac{24}{41} \end{pmatrix}$$

$$\begin{pmatrix} -\frac{24}{41} & \frac{31}{41} & \frac{12}{41} \\ \frac{33}{41} & \frac{24}{41} & \frac{4}{41} \\ -\frac{4}{41} & \frac{12}{41} & -\frac{39}{41} \end{pmatrix}
 \begin{pmatrix} -\frac{24}{41} & \frac{32}{41} & \frac{9}{41} \\ \frac{24}{41} & \frac{9}{41} & \frac{32}{41} \\ \frac{23}{41} & \frac{24}{41} & -\frac{24}{41} \end{pmatrix}
 \begin{pmatrix} -\frac{24}{41} & \frac{33}{41} & -\frac{4}{41} \\ \frac{31}{41} & \frac{24}{41} & \frac{12}{41} \\ \frac{12}{41} & \frac{4}{41} & -\frac{39}{41} \end{pmatrix}$$

$$\begin{pmatrix} -\frac{47}{81} & -\frac{256}{405} & \frac{208}{405} \\ \frac{64}{81} & -\frac{23}{81} & \frac{44}{81} \\ -\frac{16}{81} & \frac{292}{405} & \frac{269}{405} \end{pmatrix} \quad \begin{pmatrix} -\frac{47}{81} & \frac{64}{81} & -\frac{16}{81} \\ -\frac{256}{405} & -\frac{23}{81} & \frac{292}{405} \\ \frac{208}{405} & \frac{44}{81} & \frac{269}{405} \end{pmatrix} \quad \begin{pmatrix} -\frac{363}{637} & \frac{380}{637} & \frac{360}{637} \\ \frac{40}{49} & \frac{24}{49} & \frac{15}{49} \\ -\frac{60}{637} & \frac{405}{637} & -\frac{488}{637} \end{pmatrix}$$

$$\begin{pmatrix} -\frac{363}{637} & \frac{40}{49} & -\frac{60}{637} \\ \frac{380}{637} & \frac{24}{49} & \frac{405}{637} \\ \frac{360}{637} & \frac{15}{49} & -\frac{488}{637} \end{pmatrix} \quad \begin{pmatrix} -\frac{187}{333} & \frac{44}{333} & \frac{272}{333} \\ \frac{212}{333} & -\frac{187}{333} & \frac{176}{333} \\ \frac{176}{333} & \frac{272}{333} & \frac{77}{333} \end{pmatrix} \quad \begin{pmatrix} -\frac{187}{333} & \frac{176}{333} & \frac{212}{333} \\ -\frac{187}{333} & \frac{44}{333} & \frac{272}{333} \\ \frac{272}{333} & \frac{77}{333} & \frac{176}{333} \end{pmatrix}$$

$$\begin{pmatrix} -\frac{187}{333} & \frac{212}{333} & \frac{176}{333} \\ \frac{44}{333} & -\frac{187}{333} & \frac{272}{333} \\ \frac{272}{333} & \frac{176}{333} & \frac{77}{333} \end{pmatrix} \quad \begin{pmatrix} -\frac{187}{333} & \frac{244}{333} & \frac{128}{333} \\ \frac{268}{333} & \frac{197}{333} & \frac{16}{333} \\ -\frac{64}{333} & \frac{112}{333} & -\frac{307}{333} \end{pmatrix} \quad \begin{pmatrix} -\frac{187}{333} & \frac{268}{333} & -\frac{64}{333} \\ \frac{244}{333} & \frac{197}{333} & \frac{112}{333} \\ \frac{128}{333} & \frac{16}{333} & -\frac{307}{333} \end{pmatrix}$$

$$\begin{pmatrix} -\frac{187}{333} & \frac{272}{333} & \frac{44}{333} \\ \frac{176}{333} & \frac{77}{333} & \frac{272}{333} \\ \frac{212}{333} & \frac{176}{333} & -\frac{187}{333} \end{pmatrix} \quad \begin{pmatrix} -\frac{16}{29} & -\frac{12}{29} & \frac{21}{29} \\ \frac{24}{29} & -\frac{11}{29} & \frac{12}{29} \\ \frac{3}{29} & \frac{24}{29} & \frac{16}{29} \end{pmatrix} \quad \begin{pmatrix} -\frac{16}{29} & \frac{24}{29} & \frac{3}{29} \\ -\frac{12}{29} & -\frac{11}{29} & \frac{24}{29} \\ \frac{21}{29} & \frac{12}{29} & \frac{16}{29} \end{pmatrix}$$

$$\begin{pmatrix} -\frac{44}{81} & \frac{85}{1053} & \frac{880}{1053} \\ \frac{55}{81} & -\frac{44}{81} & \frac{40}{81} \\ \frac{40}{81} & \frac{880}{1053} & \frac{253}{1053} \end{pmatrix} \quad \begin{pmatrix} -\frac{337}{625} & \frac{72}{125} & \frac{384}{625} \\ \frac{72}{125} & -\frac{7}{25} & \frac{96}{125} \\ \frac{384}{625} & \frac{96}{125} & -\frac{113}{625} \end{pmatrix} \quad \begin{pmatrix} -\frac{337}{625} & \frac{96}{125} & \frac{216}{625} \\ \frac{96}{125} & \frac{7}{25} & \frac{72}{125} \\ \frac{216}{625} & \frac{72}{125} & -\frac{463}{625} \end{pmatrix}$$

$$\begin{pmatrix} -\frac{139}{261} & -\frac{20}{261} & \frac{220}{261} \\ \frac{220}{261} & \frac{11}{261} & \frac{140}{261} \\ -\frac{20}{261} & \frac{260}{261} & \frac{11}{261} \end{pmatrix} \quad \begin{pmatrix} -\frac{139}{261} & \frac{220}{261} & -\frac{20}{261} \\ -\frac{20}{261} & \frac{11}{261} & \frac{260}{261} \\ \frac{220}{261} & \frac{140}{261} & \frac{11}{261} \end{pmatrix} \quad \begin{pmatrix} -\frac{27}{53} & -\frac{36}{53} & \frac{28}{53} \\ \frac{44}{53} & -\frac{12}{53} & \frac{27}{53} \\ -\frac{12}{53} & \frac{37}{53} & \frac{36}{53} \end{pmatrix}$$

$$\begin{pmatrix} -\frac{27}{53} & \frac{28}{53} & \frac{36}{53} \\ \frac{44}{53} & \frac{27}{53} & \frac{12}{53} \\ -\frac{12}{53} & \frac{36}{53} & -\frac{37}{53} \end{pmatrix} \quad \begin{pmatrix} -\frac{27}{53} & \frac{44}{53} & -\frac{12}{53} \\ -\frac{36}{53} & -\frac{12}{53} & \frac{37}{53} \\ \frac{28}{53} & \frac{27}{53} & \frac{36}{53} \end{pmatrix} \quad \begin{pmatrix} -\frac{27}{53} & \frac{44}{53} & -\frac{12}{53} \\ \frac{28}{53} & \frac{27}{53} & \frac{36}{53} \\ \frac{36}{53} & \frac{12}{53} & -\frac{37}{53} \end{pmatrix}$$

$$\begin{pmatrix} -\frac{131}{261} & -\frac{28}{261} & \frac{224}{261} \\ \frac{224}{261} & \frac{16}{261} & \frac{133}{261} \\ -\frac{28}{261} & \frac{259}{261} & \frac{16}{261} \end{pmatrix} \quad \begin{pmatrix} -\frac{131}{261} & \frac{224}{261} & -\frac{28}{261} \\ -\frac{28}{261} & \frac{16}{261} & \frac{259}{261} \\ \frac{224}{261} & \frac{133}{261} & \frac{16}{261} \end{pmatrix} \quad \begin{pmatrix} -\frac{363}{725} & -\frac{184}{725} & \frac{24}{29} \\ \frac{616}{725} & -\frac{237}{725} & \frac{12}{29} \\ \frac{24}{145} & \frac{132}{145} & \frac{11}{29} \end{pmatrix}$$

$$\begin{pmatrix} -\frac{363}{725} & \frac{616}{725} & \frac{24}{145} \\ -\frac{184}{725} & -\frac{237}{725} & \frac{132}{145} \\ \frac{24}{29} & \frac{12}{29} & \frac{11}{29} \end{pmatrix} \quad \begin{pmatrix} -\frac{12}{25} & \frac{4}{13} & \frac{267}{325} \\ \frac{4}{5} & -\frac{3}{13} & \frac{36}{65} \\ \frac{9}{25} & \frac{12}{13} & -\frac{44}{325} \end{pmatrix} \quad \begin{pmatrix} -\frac{12}{25} & \frac{3}{5} & \frac{16}{25} \\ \frac{57}{65} & \frac{4}{13} & \frac{24}{65} \\ \frac{8}{325} & \frac{48}{65} & -\frac{219}{325} \end{pmatrix}$$

$$\begin{pmatrix} -\frac{12}{25} & \frac{4}{5} & \frac{9}{25} \\ \frac{4}{13} & -\frac{3}{13} & \frac{12}{13} \\ \frac{267}{325} & \frac{36}{65} & -\frac{44}{325} \end{pmatrix} \quad \begin{pmatrix} -\frac{12}{25} & \frac{57}{65} & \frac{8}{325} \\ \frac{3}{5} & \frac{4}{13} & \frac{48}{65} \\ \frac{16}{25} & \frac{24}{65} & -\frac{219}{325} \end{pmatrix} \quad \begin{pmatrix} -\frac{23}{49} & -\frac{24}{49} & \frac{36}{49} \\ \frac{216}{245} & -\frac{15}{49} & \frac{88}{245} \\ \frac{12}{245} & \frac{40}{49} & \frac{141}{245} \end{pmatrix}$$

$$\begin{pmatrix} -\frac{23}{49} & \frac{24}{49} & \frac{36}{49} \\ \frac{204}{245} & \frac{128}{245} & \frac{9}{49} \\ -\frac{72}{245} & \frac{171}{245} & -\frac{32}{49} \end{pmatrix} \quad \begin{pmatrix} -\frac{23}{49} & \frac{204}{245} & -\frac{72}{245} \\ \frac{24}{49} & \frac{128}{245} & \frac{171}{245} \\ \frac{36}{49} & \frac{9}{49} & -\frac{32}{49} \end{pmatrix} \quad \begin{pmatrix} -\frac{23}{49} & \frac{216}{245} & \frac{12}{245} \\ -\frac{24}{49} & -\frac{15}{49} & \frac{40}{49} \\ \frac{36}{49} & \frac{88}{245} & \frac{141}{245} \end{pmatrix}$$

$$\begin{pmatrix} -\frac{4}{9} & -\frac{1}{9} & \frac{8}{9} \\ \frac{37}{45} & -\frac{4}{9} & \frac{16}{45} \\ \frac{16}{45} & \frac{8}{9} & \frac{13}{45} \end{pmatrix} \quad \begin{pmatrix} -\frac{4}{9} & \frac{16}{45} & \frac{37}{45} \\ \frac{8}{9} & \frac{13}{45} & \frac{16}{45} \\ -\frac{1}{9} & \frac{8}{9} & -\frac{4}{9} \end{pmatrix} \quad \begin{pmatrix} -\frac{4}{9} & \frac{29}{45} & \frac{28}{45} \\ \frac{7}{9} & \frac{28}{45} & -\frac{4}{45} \\ -\frac{4}{9} & \frac{4}{9} & -\frac{7}{9} \end{pmatrix}$$

$$\begin{pmatrix} -\frac{4}{9} & \frac{7}{9} & -\frac{4}{9} \\ \frac{29}{45} & \frac{28}{45} & \frac{4}{9} \\ \frac{28}{45} & -\frac{4}{45} & -\frac{7}{9} \end{pmatrix} \quad \begin{pmatrix} -\frac{4}{9} & \frac{37}{45} & \frac{16}{45} \\ -\frac{1}{9} & -\frac{4}{9} & \frac{8}{9} \\ \frac{8}{9} & \frac{16}{45} & \frac{13}{45} \end{pmatrix} \quad \begin{pmatrix} -\frac{4}{9} & \frac{8}{9} & -\frac{1}{9} \\ \frac{16}{45} & \frac{13}{45} & \frac{8}{9} \\ \frac{37}{45} & \frac{16}{45} & -\frac{4}{9} \end{pmatrix}$$

$$\begin{pmatrix} -\frac{19}{45} & -\frac{8}{45} & \frac{8}{9} \\ \frac{8}{9} & \frac{1}{9} & \frac{4}{9} \\ -\frac{8}{45} & \frac{44}{45} & \frac{1}{9} \end{pmatrix} \quad \begin{pmatrix} -\frac{19}{45} & \frac{8}{9} & -\frac{8}{45} \\ -\frac{8}{45} & \frac{1}{9} & \frac{44}{45} \\ \frac{8}{9} & \frac{4}{9} & \frac{1}{9} \end{pmatrix} \quad \begin{pmatrix} -\frac{49}{121} & \frac{72}{121} & \frac{84}{121} \\ \frac{72}{121} & -\frac{49}{121} & \frac{84}{121} \\ \frac{84}{121} & \frac{84}{121} & -\frac{23}{121} \end{pmatrix} \\
 \begin{pmatrix} -\frac{49}{121} & \frac{84}{121} & \frac{72}{121} \\ \frac{84}{121} & -\frac{23}{121} & \frac{84}{121} \\ \frac{72}{121} & \frac{84}{121} & -\frac{49}{121} \end{pmatrix} \quad \begin{pmatrix} -\frac{11}{29} & \frac{12}{29} & \frac{24}{29} \\ \frac{24}{29} & \frac{16}{29} & \frac{3}{29} \\ -\frac{12}{29} & \frac{21}{29} & -\frac{16}{29} \end{pmatrix} \quad \begin{pmatrix} -\frac{11}{29} & \frac{24}{29} & -\frac{12}{29} \\ \frac{12}{29} & \frac{16}{29} & \frac{21}{29} \\ \frac{24}{29} & \frac{3}{29} & -\frac{16}{29} \end{pmatrix} \\
 \begin{pmatrix} -\frac{43}{117} & -\frac{88}{117} & \frac{64}{117} \\ \frac{8}{9} & -\frac{1}{9} & \frac{4}{9} \\ -\frac{32}{117} & \frac{76}{117} & \frac{83}{117} \end{pmatrix} \quad \begin{pmatrix} -\frac{19}{53} & -\frac{12}{53} & \frac{48}{53} \\ \frac{48}{53} & \frac{8}{53} & \frac{21}{53} \\ -\frac{12}{53} & \frac{51}{53} & \frac{8}{53} \end{pmatrix} \quad \begin{pmatrix} -\frac{19}{53} & \frac{48}{53} & -\frac{12}{53} \\ -\frac{12}{53} & \frac{8}{53} & \frac{51}{53} \\ \frac{48}{53} & \frac{21}{53} & \frac{8}{53} \end{pmatrix} \\
 \begin{pmatrix} -\frac{237}{725} & \frac{8}{145} & \frac{684}{725} \\ \frac{136}{145} & -\frac{3}{29} & \frac{48}{145} \\ \frac{84}{725} & \frac{144}{145} & -\frac{13}{725} \end{pmatrix} \quad \begin{pmatrix} -\frac{237}{725} & \frac{12}{29} & \frac{616}{725} \\ \frac{132}{145} & \frac{11}{29} & \frac{24}{145} \\ -\frac{184}{725} & \frac{24}{29} & -\frac{363}{725} \end{pmatrix} \quad \begin{pmatrix} -\frac{47}{153} & -\frac{40}{153} & \frac{140}{153} \\ \frac{140}{153} & \frac{28}{153} & \frac{55}{153} \\ -\frac{40}{153} & \frac{145}{153} & \frac{28}{153} \end{pmatrix} \\
 \begin{pmatrix} -\frac{47}{153} & \frac{140}{153} & -\frac{40}{153} \\ -\frac{40}{153} & \frac{28}{153} & \frac{145}{153} \\ \frac{140}{153} & \frac{55}{153} & \frac{28}{153} \end{pmatrix} \quad \begin{pmatrix} -\frac{15}{49} & \frac{40}{49} & -\frac{24}{49} \\ \frac{88}{245} & \frac{141}{245} & \frac{36}{49} \\ \frac{216}{245} & \frac{12}{245} & -\frac{23}{49} \end{pmatrix} \quad \begin{pmatrix} -\frac{23}{81} & -\frac{124}{405} & \frac{368}{405} \\ \frac{76}{81} & -\frac{23}{81} & \frac{16}{81} \\ \frac{16}{81} & \frac{368}{405} & \frac{149}{405} \end{pmatrix} \\
 \begin{pmatrix} -\frac{23}{81} & \frac{16}{81} & \frac{76}{81} \\ \frac{368}{405} & \frac{149}{405} & \frac{16}{81} \\ -\frac{124}{405} & \frac{368}{405} & -\frac{23}{81} \end{pmatrix} \quad \begin{pmatrix} -\frac{23}{81} & \frac{44}{81} & \frac{64}{81} \\ \frac{292}{405} & \frac{269}{405} & -\frac{16}{81} \\ -\frac{256}{405} & \frac{208}{405} & -\frac{47}{81} \end{pmatrix} \quad \begin{pmatrix} -\frac{23}{81} & \frac{292}{405} & -\frac{256}{405} \\ \frac{44}{81} & \frac{269}{405} & \frac{208}{405} \\ \frac{64}{81} & -\frac{16}{81} & -\frac{47}{81} \end{pmatrix} \\
 \begin{pmatrix} -\frac{23}{81} & \frac{368}{405} & -\frac{124}{405} \\ \frac{16}{81} & \frac{149}{405} & \frac{368}{405} \\ \frac{76}{81} & \frac{16}{81} & -\frac{23}{81} \end{pmatrix} \quad \begin{pmatrix} -\frac{23}{81} & \frac{76}{81} & \frac{16}{81} \\ -\frac{124}{405} & -\frac{23}{81} & \frac{368}{405} \\ \frac{368}{405} & \frac{16}{81} & \frac{149}{405} \end{pmatrix} \quad \begin{pmatrix} -\frac{7}{25} & -\frac{192}{425} & \frac{72}{85} \\ \frac{24}{25} & -\frac{56}{425} & \frac{21}{85} \\ 0 & \frac{15}{17} & \frac{8}{17} \end{pmatrix} \\
 \begin{pmatrix} -\frac{7}{25} & \frac{96}{125} & \frac{72}{125} \\ \frac{96}{125} & -\frac{113}{625} & \frac{384}{625} \\ \frac{72}{125} & \frac{384}{625} & -\frac{337}{625} \end{pmatrix} \quad \begin{pmatrix} -\frac{7}{25} & \frac{24}{25} & 0 \\ -\frac{192}{425} & -\frac{56}{425} & \frac{15}{17} \\ \frac{72}{85} & \frac{21}{85} & \frac{8}{17} \end{pmatrix} \quad \begin{pmatrix} -\frac{173}{637} & \frac{612}{637} & -\frac{36}{637} \\ -\frac{396}{637} & -\frac{83}{637} & \frac{492}{637} \\ \frac{36}{49} & \frac{12}{49} & \frac{31}{49} \end{pmatrix} \\
 \begin{pmatrix} -\frac{3}{13} & -\frac{4}{13} & \frac{12}{13} \\ \frac{12}{13} & \frac{3}{13} & \frac{4}{13} \\ -\frac{4}{13} & \frac{12}{13} & \frac{3}{13} \end{pmatrix} \quad \begin{pmatrix} -\frac{3}{13} & \frac{36}{65} & \frac{4}{5} \\ \frac{12}{13} & -\frac{44}{325} & \frac{9}{25} \\ \frac{4}{13} & \frac{267}{325} & -\frac{12}{25} \end{pmatrix} \quad \begin{pmatrix} -\frac{3}{13} & \frac{12}{13} & -\frac{4}{13} \\ -\frac{4}{13} & \frac{3}{13} & \frac{12}{13} \\ \frac{12}{13} & \frac{4}{13} & \frac{3}{13} \end{pmatrix} \\
 \begin{pmatrix} -\frac{3}{13} & \frac{12}{13} & \frac{4}{13} \\ \frac{36}{65} & -\frac{44}{325} & \frac{267}{325} \\ \frac{4}{5} & \frac{9}{25} & -\frac{12}{25} \end{pmatrix} \quad \begin{pmatrix} -\frac{12}{53} & -\frac{19}{53} & \frac{48}{53} \\ \frac{51}{53} & -\frac{12}{53} & \frac{8}{53} \\ \frac{8}{53} & \frac{48}{53} & \frac{21}{53} \end{pmatrix} \quad \begin{pmatrix} -\frac{12}{53} & \frac{8}{53} & \frac{51}{53} \\ \frac{48}{53} & \frac{21}{53} & \frac{8}{53} \\ -\frac{19}{53} & \frac{48}{53} & -\frac{12}{53} \end{pmatrix} \\
 \begin{pmatrix} -\frac{12}{53} & \frac{27}{53} & \frac{44}{53} \\ \frac{37}{53} & \frac{36}{53} & -\frac{12}{53} \\ -\frac{36}{53} & \frac{28}{53} & -\frac{27}{53} \end{pmatrix} \quad \begin{pmatrix} -\frac{12}{53} & \frac{37}{53} & -\frac{36}{53} \\ \frac{27}{53} & \frac{36}{53} & \frac{28}{53} \\ \frac{44}{53} & -\frac{12}{53} & -\frac{27}{53} \end{pmatrix} \quad \begin{pmatrix} -\frac{12}{53} & \frac{48}{53} & -\frac{19}{53} \\ \frac{8}{53} & \frac{21}{53} & \frac{48}{53} \\ \frac{51}{53} & \frac{8}{53} & -\frac{12}{53} \end{pmatrix} \\
 \begin{pmatrix} -\frac{12}{53} & \frac{51}{53} & \frac{8}{53} \\ -\frac{19}{53} & -\frac{12}{53} & \frac{48}{53} \\ \frac{48}{53} & \frac{8}{53} & \frac{21}{53} \end{pmatrix} \quad \begin{pmatrix} -\frac{8}{37} & -\frac{24}{37} & \frac{27}{37} \\ \frac{36}{37} & -\frac{3}{37} & \frac{8}{37} \\ -\frac{3}{37} & \frac{28}{37} & \frac{24}{37} \end{pmatrix} \quad \begin{pmatrix} -\frac{8}{37} & \frac{36}{37} & -\frac{3}{37} \\ -\frac{24}{37} & -\frac{3}{37} & \frac{28}{37} \\ \frac{27}{37} & \frac{8}{37} & \frac{24}{37} \end{pmatrix} \\
 \begin{pmatrix} -\frac{167}{833} & \frac{240}{833} & \frac{780}{833} \\ \frac{660}{833} & \frac{508}{833} & -\frac{15}{833} \\ -\frac{480}{833} & \frac{615}{833} & -\frac{292}{833} \end{pmatrix} \quad \begin{pmatrix} -\frac{113}{625} & \frac{384}{625} & \frac{96}{125} \\ \frac{384}{625} & -\frac{337}{625} & \frac{72}{125} \\ \frac{96}{125} & \frac{72}{125} & -\frac{7}{25} \end{pmatrix} \quad \begin{pmatrix} -\frac{59}{333} & -\frac{112}{333} & \frac{308}{333} \\ \frac{308}{333} & \frac{88}{333} & \frac{91}{333} \\ -\frac{112}{333} & \frac{301}{333} & \frac{88}{333} \end{pmatrix}
 \end{pmatrix}$$

$$\begin{pmatrix} -\frac{59}{333} & \frac{308}{333} & -\frac{112}{333} \\ -\frac{112}{333} & \frac{88}{333} & \frac{301}{333} \\ \frac{308}{333} & \frac{91}{333} & \frac{88}{333} \end{pmatrix}
 \quad
 \begin{pmatrix} -\frac{503}{3025} & \frac{1596}{3025} & \frac{504}{605} \\ \frac{504}{605} & -\frac{228}{605} & \frac{49}{121} \\ \frac{1596}{3025} & \frac{2303}{3025} & -\frac{228}{605} \end{pmatrix}
 \quad
 \begin{pmatrix} -\frac{31}{225} & -\frac{16}{45} & \frac{208}{225} \\ \frac{208}{225} & \frac{13}{45} & \frac{56}{225} \\ -\frac{16}{45} & \frac{8}{9} & \frac{13}{45} \end{pmatrix}$$

$$\begin{pmatrix} -\frac{31}{225} & \frac{208}{225} & -\frac{16}{45} \\ -\frac{16}{45} & \frac{13}{45} & \frac{8}{9} \\ \frac{208}{225} & \frac{56}{225} & \frac{13}{45} \end{pmatrix}
 \quad
 \begin{pmatrix} -\frac{44}{325} & \frac{9}{25} & \frac{12}{13} \\ \frac{267}{325} & -\frac{12}{25} & \frac{4}{13} \\ \frac{36}{65} & \frac{4}{5} & -\frac{3}{13} \end{pmatrix}
 \quad
 \begin{pmatrix} -\frac{44}{325} & \frac{267}{325} & \frac{36}{65} \\ \frac{9}{25} & -\frac{12}{25} & \frac{4}{5} \\ \frac{12}{13} & \frac{4}{13} & -\frac{3}{13} \end{pmatrix}$$

$$\begin{pmatrix} -\frac{56}{425} & -\frac{12}{85} & \frac{417}{425} \\ \frac{84}{85} & \frac{1}{17} & \frac{12}{85} \\ -\frac{33}{425} & \frac{84}{85} & \frac{56}{425} \end{pmatrix}
 \quad
 \begin{pmatrix} -\frac{56}{425} & \frac{21}{85} & \frac{24}{25} \\ \frac{15}{17} & \frac{8}{17} & 0 \\ -\frac{192}{425} & \frac{72}{85} & -\frac{7}{25} \end{pmatrix}
 \quad
 \begin{pmatrix} -\frac{56}{425} & \frac{15}{17} & -\frac{192}{425} \\ \frac{21}{85} & \frac{8}{17} & \frac{72}{85} \\ \frac{24}{25} & 0 & -\frac{7}{25} \end{pmatrix}$$

$$\begin{pmatrix} -\frac{56}{425} & \frac{84}{85} & -\frac{33}{425} \\ -\frac{12}{85} & \frac{1}{17} & \frac{84}{85} \\ \frac{417}{425} & \frac{12}{85} & \frac{56}{425} \end{pmatrix}
 \quad
 \begin{pmatrix} -\frac{83}{637} & \frac{12}{49} & \frac{612}{637} \\ \frac{492}{637} & \frac{31}{49} & -\frac{36}{637} \\ -\frac{396}{637} & \frac{36}{49} & -\frac{173}{637} \end{pmatrix}
 \quad
 \begin{pmatrix} -\frac{83}{637} & \frac{492}{637} & -\frac{396}{637} \\ \frac{12}{49} & \frac{31}{49} & \frac{36}{49} \\ \frac{612}{637} & -\frac{36}{637} & -\frac{173}{637} \end{pmatrix}$$

$$\begin{pmatrix} -\frac{15}{121} & -\frac{4}{121} & \frac{120}{121} \\ \frac{596}{605} & -\frac{15}{121} & \frac{72}{605} \\ \frac{72}{605} & \frac{120}{121} & \frac{29}{605} \end{pmatrix}
 \quad
 \begin{pmatrix} -\frac{15}{121} & \frac{72}{605} & \frac{596}{605} \\ \frac{120}{121} & \frac{29}{605} & \frac{72}{605} \\ -\frac{4}{121} & \frac{120}{121} & -\frac{15}{121} \end{pmatrix}
 \quad
 \begin{pmatrix} -\frac{1}{9} & -\frac{4}{9} & \frac{8}{9} \\ \frac{116}{117} & -\frac{1}{9} & \frac{8}{117} \\ \frac{8}{117} & \frac{8}{9} & \frac{53}{117} \end{pmatrix}$$

$$\begin{pmatrix} -\frac{1}{9} & \frac{8}{117} & \frac{116}{117} \\ \frac{8}{9} & \frac{53}{117} & \frac{8}{117} \\ -\frac{4}{9} & \frac{8}{9} & -\frac{1}{9} \end{pmatrix}
 \quad
 \begin{pmatrix} -\frac{1}{9} & \frac{4}{9} & \frac{8}{9} \\ \frac{4}{9} & -\frac{7}{9} & \frac{4}{9} \\ \frac{8}{9} & \frac{4}{9} & -\frac{1}{9} \end{pmatrix}
 \quad
 \begin{pmatrix} -\frac{1}{9} & \frac{4}{9} & \frac{8}{9} \\ \frac{76}{117} & \frac{83}{117} & -\frac{32}{117} \\ -\frac{88}{117} & \frac{64}{117} & -\frac{43}{117} \end{pmatrix}$$

$$\begin{pmatrix} -\frac{1}{9} & \frac{8}{9} & \frac{4}{9} \\ \frac{8}{9} & -\frac{1}{9} & \frac{4}{9} \\ \frac{4}{9} & \frac{4}{9} & -\frac{7}{9} \end{pmatrix}
 \quad
 \begin{pmatrix} -\frac{1}{9} & \frac{116}{117} & \frac{8}{117} \\ -\frac{4}{9} & -\frac{1}{9} & \frac{8}{9} \\ \frac{8}{9} & \frac{8}{117} & \frac{53}{117} \end{pmatrix}
 \quad
 \begin{pmatrix} -\frac{3}{29} & \frac{48}{145} & \frac{136}{145} \\ \frac{144}{145} & -\frac{13}{725} & \frac{84}{725} \\ \frac{8}{145} & -\frac{13}{725} & \frac{84}{725} \end{pmatrix}$$

$$\begin{pmatrix} -\frac{3}{29} & \frac{144}{145} & \frac{8}{145} \\ \frac{48}{145} & -\frac{13}{725} & \frac{684}{725} \\ \frac{136}{145} & \frac{84}{725} & -\frac{237}{725} \end{pmatrix}
 \quad
 \begin{pmatrix} -\frac{4}{41} & \frac{12}{41} & \frac{39}{41} \\ \frac{24}{41} & -\frac{31}{41} & \frac{12}{41} \\ \frac{33}{41} & \frac{24}{41} & -\frac{4}{41} \end{pmatrix}
 \quad
 \begin{pmatrix} -\frac{4}{41} & \frac{24}{41} & \frac{33}{41} \\ \frac{12}{41} & -\frac{31}{41} & \frac{24}{41} \\ \frac{39}{41} & \frac{12}{41} & -\frac{4}{41} \end{pmatrix}$$

$$\begin{pmatrix} -\frac{4}{41} & \frac{33}{41} & \frac{24}{41} \\ \frac{39}{41} & -\frac{4}{41} & \frac{12}{41} \\ \frac{12}{41} & \frac{24}{41} & -\frac{31}{41} \end{pmatrix}
 \quad
 \begin{pmatrix} -\frac{4}{41} & \frac{39}{41} & \frac{12}{41} \\ \frac{33}{41} & -\frac{4}{41} & \frac{24}{41} \\ \frac{24}{41} & \frac{12}{41} & -\frac{31}{41} \end{pmatrix}
 \quad
 \begin{pmatrix} -\frac{4}{45} & \frac{56}{225} & \frac{217}{225} \\ \frac{28}{45} & -\frac{167}{225} & \frac{56}{225} \\ \frac{7}{9} & \frac{28}{45} & -\frac{4}{45} \end{pmatrix}$$

$$\begin{pmatrix} -\frac{4}{45} & \frac{28}{45} & \frac{7}{9} \\ \frac{56}{225} & -\frac{167}{225} & \frac{28}{45} \\ \frac{217}{225} & \frac{56}{225} & -\frac{4}{45} \end{pmatrix}
 \quad
 \begin{pmatrix} -\frac{4}{45} & \frac{7}{9} & \frac{28}{45} \\ \frac{217}{225} & -\frac{4}{45} & \frac{56}{225} \\ \frac{56}{225} & \frac{28}{45} & -\frac{167}{225} \end{pmatrix}
 \quad
 \begin{pmatrix} -\frac{4}{45} & \frac{217}{225} & \frac{56}{225} \\ \frac{7}{9} & -\frac{4}{45} & \frac{28}{45} \\ \frac{28}{45} & \frac{56}{225} & -\frac{167}{225} \end{pmatrix}$$

$$\begin{pmatrix} -\frac{31}{369} & -\frac{140}{369} & \frac{340}{369} \\ \frac{340}{369} & \frac{119}{369} & \frac{80}{369} \\ -\frac{140}{369} & \frac{320}{369} & \frac{119}{369} \end{pmatrix}
 \quad
 \begin{pmatrix} -\frac{3}{37} & \frac{8}{37} & \frac{36}{37} \\ \frac{24}{37} & -\frac{27}{37} & \frac{8}{37} \\ \frac{28}{37} & \frac{24}{37} & -\frac{3}{37} \end{pmatrix}
 \quad
 \begin{pmatrix} -\frac{3}{37} & \frac{8}{37} & \frac{36}{37} \\ \frac{28}{37} & \frac{24}{37} & -\frac{3}{37} \\ -\frac{24}{37} & \frac{27}{37} & -\frac{8}{37} \end{pmatrix}$$

$$\begin{pmatrix} -\frac{3}{37} & \frac{24}{37} & \frac{28}{37} \\ \frac{8}{37} & -\frac{27}{37} & \frac{24}{37} \\ \frac{36}{37} & \frac{8}{37} & -\frac{3}{37} \end{pmatrix}
 \quad
 \begin{pmatrix} -\frac{3}{37} & \frac{28}{37} & -\frac{24}{37} \\ \frac{8}{37} & \frac{24}{37} & \frac{27}{37} \\ \frac{36}{37} & -\frac{3}{37} & -\frac{8}{37} \end{pmatrix}
 \quad
 \begin{pmatrix} -\frac{3}{37} & \frac{28}{37} & \frac{24}{37} \\ \frac{36}{37} & -\frac{3}{37} & \frac{8}{37} \\ \frac{8}{37} & \frac{24}{37} & -\frac{27}{37} \end{pmatrix}$$

$$\begin{pmatrix} -\frac{3}{37} & \frac{36}{37} & \frac{8}{37} \\ \frac{28}{37} & -\frac{3}{37} & \frac{24}{37} \\ \frac{24}{37} & \frac{8}{37} & -\frac{27}{37} \end{pmatrix}
 \quad
 \begin{pmatrix} -\frac{43}{605} & \frac{36}{121} & \frac{576}{605} \\ \frac{576}{605} & -\frac{32}{121} & \frac{93}{605} \\ \frac{36}{121} & \frac{111}{121} & -\frac{32}{121} \end{pmatrix}
 \quad
 \begin{pmatrix} -\frac{8}{117} & \frac{20}{117} & \frac{115}{117} \\ \frac{80}{117} & -\frac{83}{117} & \frac{20}{117} \\ \frac{85}{117} & \frac{80}{117} & -\frac{8}{117} \end{pmatrix}$$

$$\begin{pmatrix} -\frac{8}{117} & \frac{80}{117} & \frac{85}{117} \\ \frac{20}{117} & -\frac{83}{117} & \frac{80}{117} \\ \frac{115}{117} & \frac{20}{117} & -\frac{8}{117} \end{pmatrix} \quad
 \begin{pmatrix} -\frac{8}{117} & \frac{85}{117} & \frac{80}{117} \\ \frac{115}{117} & -\frac{8}{117} & \frac{20}{117} \\ \frac{20}{117} & \frac{80}{117} & -\frac{83}{117} \end{pmatrix} \quad
 \begin{pmatrix} -\frac{8}{117} & \frac{115}{117} & \frac{20}{117} \\ \frac{85}{117} & -\frac{8}{117} & \frac{80}{117} \\ \frac{80}{117} & \frac{20}{117} & -\frac{83}{117} \end{pmatrix}$$

$$\begin{pmatrix} -\frac{13}{477} & \frac{364}{477} & \frac{308}{477} \\ \frac{28}{477} & -\frac{307}{477} & \frac{364}{477} \\ \frac{476}{477} & \frac{28}{477} & -\frac{13}{477} \end{pmatrix} \quad
 \begin{pmatrix} -\frac{11}{405} & \frac{2024}{2025} & \frac{32}{2025} \\ -\frac{40}{81} & -\frac{11}{405} & \frac{352}{405} \\ \frac{352}{405} & \frac{32}{2025} & \frac{1001}{2025} \end{pmatrix} \quad
 \begin{pmatrix} -\frac{3}{125} & \frac{144}{625} & \frac{608}{625} \\ \frac{624}{625} & \frac{173}{3125} & \frac{36}{3125} \\ -\frac{32}{625} & \frac{3036}{3125} & -\frac{723}{3125} \end{pmatrix}$$

$$\begin{pmatrix} -\frac{13}{725} & \frac{84}{725} & \frac{144}{145} \\ \frac{684}{725} & -\frac{237}{725} & \frac{8}{145} \\ \frac{48}{145} & \frac{136}{145} & -\frac{3}{29} \end{pmatrix} \quad
 \begin{pmatrix} -\frac{13}{725} & \frac{684}{725} & \frac{48}{145} \\ \frac{84}{725} & -\frac{237}{725} & \frac{136}{145} \\ \frac{144}{145} & \frac{8}{145} & -\frac{3}{29} \end{pmatrix} \quad
 \begin{pmatrix} 0 & 0 & 1 \\ \frac{4}{5} & -\frac{3}{5} & 0 \\ \frac{3}{5} & \frac{4}{5} & 0 \end{pmatrix}$$

$$\begin{pmatrix} 0 & \frac{3}{5} & \frac{4}{5} \\ 1 & 0 & 0 \\ 0 & \frac{4}{5} & -\frac{3}{5} \end{pmatrix} \quad
 \begin{pmatrix} 0 & \frac{4}{5} & \frac{3}{5} \\ 0 & -\frac{3}{5} & \frac{4}{5} \\ 1 & 0 & 0 \end{pmatrix} \quad
 \begin{pmatrix} 0 & 1 & 0 \\ \frac{3}{5} & 0 & \frac{4}{5} \\ \frac{4}{5} & 0 & -\frac{3}{5} \end{pmatrix}$$

$$\begin{pmatrix} \frac{1}{81} & -\frac{68}{81} & \frac{44}{81} \\ \frac{76}{81} & \frac{16}{81} & \frac{23}{81} \\ -\frac{28}{81} & \frac{41}{81} & \frac{64}{81} \end{pmatrix} \quad
 \begin{pmatrix} \frac{1}{81} & \frac{76}{81} & -\frac{28}{81} \\ -\frac{68}{81} & \frac{16}{81} & \frac{41}{81} \\ \frac{44}{81} & \frac{23}{81} & \frac{64}{81} \end{pmatrix} \quad
 \begin{pmatrix} \frac{11}{261} & -\frac{20}{261} & \frac{260}{261} \\ \frac{220}{261} & -\frac{139}{261} & -\frac{20}{261} \\ \frac{140}{261} & \frac{220}{261} & \frac{11}{261} \end{pmatrix}$$

$$\begin{pmatrix} \frac{11}{261} & \frac{140}{261} & \frac{220}{261} \\ \frac{260}{261} & \frac{11}{261} & -\frac{20}{261} \\ -\frac{20}{261} & \frac{220}{261} & -\frac{139}{261} \end{pmatrix} \quad
 \begin{pmatrix} \frac{11}{261} & \frac{220}{261} & \frac{140}{261} \\ -\frac{20}{261} & -\frac{139}{261} & \frac{220}{261} \\ \frac{260}{261} & -\frac{20}{261} & \frac{11}{261} \end{pmatrix} \quad
 \begin{pmatrix} \frac{11}{261} & \frac{260}{261} & -\frac{20}{261} \\ \frac{140}{261} & \frac{11}{261} & \frac{220}{261} \\ \frac{220}{261} & -\frac{20}{261} & -\frac{139}{261} \end{pmatrix}$$

$$\begin{pmatrix} \frac{29}{605} & \frac{72}{605} & \frac{120}{121} \\ \frac{120}{121} & -\frac{15}{121} & -\frac{4}{121} \\ \frac{72}{605} & \frac{596}{605} & -\frac{15}{121} \end{pmatrix} \quad
 \begin{pmatrix} \frac{29}{605} & \frac{120}{121} & \frac{72}{605} \\ \frac{72}{605} & -\frac{15}{121} & \frac{596}{605} \\ \frac{120}{121} & -\frac{4}{121} & -\frac{15}{121} \end{pmatrix} \quad
 \begin{pmatrix} \frac{1}{17} & \frac{12}{85} & \frac{84}{85} \\ \frac{84}{85} & \frac{56}{425} & -\frac{33}{425} \\ -\frac{12}{85} & \frac{417}{425} & -\frac{56}{425} \end{pmatrix}$$

$$\begin{pmatrix} \frac{1}{17} & \frac{84}{85} & -\frac{12}{85} \\ \frac{12}{85} & \frac{56}{425} & \frac{417}{425} \\ \frac{84}{85} & -\frac{33}{425} & -\frac{56}{425} \end{pmatrix} \quad
 \begin{pmatrix} \frac{16}{261} & -\frac{28}{261} & \frac{259}{261} \\ \frac{224}{261} & -\frac{131}{261} & -\frac{28}{261} \\ \frac{133}{261} & \frac{224}{261} & \frac{16}{261} \end{pmatrix} \quad
 \begin{pmatrix} \frac{16}{261} & \frac{133}{261} & \frac{224}{261} \\ \frac{259}{261} & \frac{16}{261} & -\frac{28}{261} \\ -\frac{28}{261} & \frac{224}{261} & -\frac{131}{261} \end{pmatrix}$$

$$\begin{pmatrix} \frac{16}{261} & \frac{224}{261} & \frac{133}{261} \\ -\frac{28}{261} & -\frac{131}{261} & \frac{224}{261} \\ \frac{259}{261} & -\frac{28}{261} & \frac{16}{261} \end{pmatrix} \quad
 \begin{pmatrix} \frac{63}{1025} & -\frac{56}{205} & \frac{24}{25} \\ \frac{40}{41} & \frac{9}{41} & 0 \\ -\frac{216}{1025} & \frac{192}{205} & \frac{7}{25} \end{pmatrix} \quad
 \begin{pmatrix} \frac{63}{1025} & \frac{24}{205} & \frac{1016}{1025} \\ \frac{168}{205} & \frac{23}{41} & -\frac{24}{205} \\ -\frac{584}{1025} & \frac{168}{205} & -\frac{63}{1025} \end{pmatrix}$$

$$\begin{pmatrix} \frac{63}{1025} & \frac{40}{41} & -\frac{216}{1025} \\ -\frac{56}{205} & \frac{9}{41} & \frac{192}{205} \\ \frac{24}{25} & 0 & \frac{7}{25} \end{pmatrix} \quad
 \begin{pmatrix} \frac{4}{49} & -\frac{36}{49} & \frac{33}{49} \\ \frac{48}{49} & \frac{9}{49} & \frac{4}{49} \\ -\frac{9}{49} & \frac{32}{49} & \frac{36}{49} \end{pmatrix} \quad
 \begin{pmatrix} \frac{4}{49} & \frac{48}{49} & -\frac{9}{49} \\ -\frac{36}{49} & \frac{9}{49} & \frac{32}{49} \\ \frac{33}{49} & \frac{4}{49} & \frac{36}{49} \end{pmatrix}$$

$$\begin{pmatrix} \frac{1}{9} & -\frac{4}{9} & \frac{8}{9} \\ \frac{8}{9} & \frac{4}{9} & \frac{1}{9} \\ -\frac{4}{9} & \frac{7}{9} & \frac{4}{9} \end{pmatrix} \quad
 \begin{pmatrix} \frac{1}{9} & -\frac{8}{45} & \frac{44}{45} \\ \frac{8}{9} & -\frac{19}{45} & -\frac{8}{45} \\ \frac{4}{9} & \frac{8}{9} & \frac{1}{9} \end{pmatrix} \quad
 \begin{pmatrix} \frac{1}{9} & \frac{4}{9} & \frac{8}{9} \\ \frac{44}{45} & \frac{1}{9} & -\frac{8}{45} \\ -\frac{8}{45} & \frac{8}{9} & -\frac{19}{45} \end{pmatrix}$$

$$\begin{pmatrix} \frac{1}{9} & \frac{8}{9} & -\frac{4}{9} \\ -\frac{4}{9} & \frac{4}{9} & \frac{7}{9} \\ \frac{8}{9} & \frac{1}{9} & \frac{4}{9} \end{pmatrix} \quad
 \begin{pmatrix} \frac{1}{9} & \frac{8}{9} & \frac{4}{9} \\ -\frac{8}{45} & -\frac{19}{45} & \frac{8}{9} \\ \frac{44}{45} & -\frac{8}{45} & \frac{1}{9} \end{pmatrix} \quad
 \begin{pmatrix} \frac{1}{9} & \frac{44}{45} & -\frac{8}{45} \\ \frac{4}{9} & \frac{1}{9} & \frac{8}{9} \\ \frac{8}{9} & -\frac{8}{45} & -\frac{19}{45} \end{pmatrix}$$

$$\begin{pmatrix} \frac{81}{625} & \frac{608}{625} & -\frac{24}{125} \\ -\frac{392}{625} & \frac{144}{625} & \frac{93}{125} \\ \frac{96}{125} & \frac{3}{125} & \frac{16}{25} \end{pmatrix} \quad
 \begin{pmatrix} \frac{56}{425} & -\frac{33}{425} & \frac{84}{85} \\ \frac{417}{425} & -\frac{56}{425} & -\frac{12}{85} \\ \frac{12}{85} & \frac{84}{85} & \frac{1}{17} \end{pmatrix} \quad
 \begin{pmatrix} \frac{56}{425} & \frac{417}{425} & \frac{12}{85} \\ -\frac{33}{425} & -\frac{56}{425} & \frac{84}{85} \\ \frac{84}{85} & -\frac{12}{85} & \frac{1}{17} \end{pmatrix}$$

$$\begin{pmatrix} \frac{8}{53} & -\frac{12}{53} & \frac{51}{53} \\ \frac{48}{53} & -\frac{19}{53} & -\frac{12}{53} \\ \frac{21}{53} & \frac{48}{53} & \frac{8}{53} \end{pmatrix}
 \begin{pmatrix} \frac{8}{53} & \frac{21}{53} & \frac{48}{53} \\ \frac{51}{53} & \frac{8}{53} & -\frac{12}{53} \\ -\frac{12}{53} & \frac{48}{53} & -\frac{19}{53} \end{pmatrix}
 \begin{pmatrix} \frac{8}{53} & \frac{48}{53} & \frac{21}{53} \\ -\frac{12}{53} & -\frac{19}{53} & \frac{48}{53} \\ \frac{51}{53} & -\frac{12}{53} & \frac{8}{53} \end{pmatrix}$$

$$\begin{pmatrix} \frac{8}{53} & \frac{51}{53} & -\frac{12}{53} \\ \frac{21}{53} & \frac{8}{53} & \frac{48}{53} \\ \frac{48}{53} & -\frac{12}{53} & -\frac{19}{53} \end{pmatrix}
 \begin{pmatrix} \frac{9}{49} & \frac{4}{49} & \frac{48}{49} \\ \frac{32}{49} & \frac{36}{49} & -\frac{9}{49} \\ -\frac{36}{49} & \frac{33}{49} & \frac{4}{49} \end{pmatrix}
 \begin{pmatrix} \frac{9}{49} & \frac{32}{49} & -\frac{36}{49} \\ \frac{4}{49} & \frac{36}{49} & \frac{33}{49} \\ \frac{48}{49} & -\frac{9}{49} & \frac{4}{49} \end{pmatrix}$$

$$\begin{pmatrix} \frac{16}{81} & -\frac{47}{81} & \frac{64}{81} \\ \frac{79}{81} & \frac{16}{81} & -\frac{8}{81} \\ -\frac{8}{81} & \frac{64}{81} & \frac{49}{81} \end{pmatrix}
 \begin{pmatrix} \frac{16}{81} & -\frac{8}{81} & \frac{79}{81} \\ \frac{64}{81} & \frac{49}{81} & -\frac{8}{81} \\ -\frac{47}{81} & \frac{64}{81} & \frac{16}{81} \end{pmatrix}
 \begin{pmatrix} \frac{16}{81} & \frac{23}{81} & \frac{76}{81} \\ \frac{41}{81} & \frac{64}{81} & -\frac{28}{81} \\ -\frac{68}{81} & \frac{44}{81} & \frac{1}{81} \end{pmatrix}$$

$$\begin{pmatrix} \frac{16}{81} & \frac{41}{81} & -\frac{68}{81} \\ \frac{23}{81} & \frac{64}{81} & \frac{44}{81} \\ \frac{76}{81} & -\frac{28}{81} & \frac{1}{81} \end{pmatrix}
 \begin{pmatrix} \frac{16}{81} & \frac{64}{81} & -\frac{47}{81} \\ -\frac{8}{81} & \frac{49}{81} & \frac{64}{81} \\ \frac{79}{81} & -\frac{8}{81} & \frac{16}{81} \end{pmatrix}
 \begin{pmatrix} \frac{16}{81} & \frac{79}{81} & -\frac{8}{81} \\ -\frac{47}{81} & \frac{16}{81} & \frac{64}{81} \\ \frac{64}{81} & -\frac{8}{81} & \frac{49}{81} \end{pmatrix}$$

$$\begin{pmatrix} \frac{17}{81} & \frac{56}{81} & \frac{56}{81} \\ \frac{56}{81} & -\frac{49}{81} & \frac{32}{81} \\ \frac{56}{81} & \frac{32}{81} & -\frac{49}{81} \end{pmatrix}
 \begin{pmatrix} \frac{9}{41} & 0 & \frac{40}{41} \\ \frac{192}{205} & \frac{7}{25} & -\frac{216}{1025} \\ -\frac{56}{205} & \frac{24}{25} & \frac{63}{1025} \end{pmatrix}
 \begin{pmatrix} \frac{9}{41} & \frac{24}{41} & \frac{32}{41} \\ \frac{32}{41} & -\frac{24}{41} & \frac{9}{41} \\ \frac{24}{41} & \frac{23}{41} & -\frac{24}{41} \end{pmatrix}$$

$$\begin{pmatrix} \frac{9}{41} & \frac{32}{41} & \frac{24}{41} \\ \frac{24}{41} & -\frac{24}{41} & \frac{23}{41} \\ \frac{32}{41} & \frac{9}{41} & -\frac{24}{41} \end{pmatrix}
 \begin{pmatrix} \frac{9}{41} & \frac{192}{205} & -\frac{56}{205} \\ 0 & \frac{7}{25} & \frac{24}{25} \\ \frac{40}{41} & -\frac{216}{1025} & \frac{63}{1025} \end{pmatrix}
 \begin{pmatrix} \frac{144}{625} & -\frac{44}{125} & \frac{567}{625} \\ \frac{116}{125} & \frac{9}{25} & -\frac{12}{125} \\ -\frac{183}{625} & \frac{108}{125} & \frac{256}{625} \end{pmatrix}$$

$$\begin{pmatrix} \frac{3}{13} & -\frac{4}{13} & \frac{12}{13} \\ \frac{12}{13} & -\frac{3}{13} & -\frac{4}{13} \\ \frac{4}{13} & \frac{12}{13} & \frac{3}{13} \end{pmatrix}
 \begin{pmatrix} \frac{3}{13} & \frac{4}{13} & \frac{12}{13} \\ \frac{12}{13} & \frac{3}{13} & -\frac{4}{13} \\ -\frac{4}{13} & \frac{12}{13} & -\frac{3}{13} \end{pmatrix}
 \begin{pmatrix} \frac{3}{13} & \frac{12}{13} & -\frac{4}{13} \\ \frac{4}{13} & \frac{3}{13} & \frac{12}{13} \\ \frac{12}{13} & -\frac{4}{13} & -\frac{3}{13} \end{pmatrix}$$

$$\begin{pmatrix} \frac{3}{13} & \frac{12}{13} & \frac{4}{13} \\ -\frac{4}{13} & -\frac{3}{13} & \frac{12}{13} \\ \frac{12}{13} & -\frac{4}{13} & \frac{3}{13} \end{pmatrix}
 \begin{pmatrix} \frac{77}{333} & \frac{272}{333} & \frac{176}{333} \\ \frac{176}{333} & -\frac{187}{333} & \frac{212}{333} \\ \frac{272}{333} & \frac{44}{333} & -\frac{187}{333} \end{pmatrix}
 \begin{pmatrix} \frac{88}{333} & \frac{301}{333} & -\frac{112}{333} \\ \frac{91}{333} & \frac{88}{333} & \frac{308}{333} \\ \frac{308}{333} & -\frac{112}{333} & -\frac{59}{333} \end{pmatrix}$$

$$\begin{pmatrix} \frac{7}{25} & -\frac{216}{1025} & \frac{192}{205} \\ \frac{24}{25} & \frac{63}{1025} & -\frac{56}{205} \\ 0 & \frac{40}{41} & \frac{9}{41} \end{pmatrix}
 \begin{pmatrix} \frac{7}{25} & \frac{72}{125} & \frac{96}{125} \\ \frac{72}{125} & -\frac{463}{625} & \frac{216}{625} \\ \frac{96}{125} & \frac{216}{625} & -\frac{337}{625} \end{pmatrix}
 \begin{pmatrix} \frac{7}{25} & \frac{24}{25} & 0 \\ -\frac{216}{1025} & \frac{63}{1025} & \frac{40}{41} \\ \frac{192}{205} & -\frac{56}{205} & \frac{9}{41} \end{pmatrix}$$

$$\begin{pmatrix} \frac{13}{45} & -\frac{184}{225} & \frac{112}{225} \\ \frac{8}{9} & \frac{19}{45} & \frac{8}{45} \\ -\frac{16}{45} & \frac{88}{225} & \frac{191}{225} \end{pmatrix}
 \begin{pmatrix} \frac{13}{45} & -\frac{16}{45} & \frac{8}{9} \\ \frac{208}{225} & -\frac{31}{225} & -\frac{16}{45} \\ \frac{56}{225} & \frac{208}{225} & \frac{13}{45} \end{pmatrix}
 \begin{pmatrix} \frac{13}{45} & \frac{56}{225} & \frac{208}{225} \\ \frac{8}{9} & \frac{13}{45} & -\frac{16}{45} \\ -\frac{16}{45} & \frac{208}{225} & -\frac{31}{225} \end{pmatrix}$$

$$\begin{pmatrix} \frac{13}{45} & \frac{16}{45} & \frac{8}{9} \\ \frac{8}{9} & -\frac{4}{9} & -\frac{1}{9} \\ \frac{16}{45} & \frac{37}{45} & -\frac{4}{9} \end{pmatrix}
 \begin{pmatrix} \frac{13}{45} & \frac{8}{9} & -\frac{16}{45} \\ -\frac{184}{225} & \frac{19}{45} & \frac{88}{225} \\ \frac{112}{225} & \frac{8}{45} & \frac{191}{225} \end{pmatrix}
 \begin{pmatrix} \frac{13}{45} & \frac{8}{9} & -\frac{16}{45} \\ \frac{56}{225} & \frac{13}{45} & \frac{208}{225} \\ \frac{208}{225} & -\frac{16}{45} & -\frac{31}{225} \end{pmatrix}$$

$$\begin{pmatrix} \frac{13}{45} & \frac{8}{9} & \frac{16}{45} \\ \frac{16}{45} & -\frac{4}{9} & \frac{37}{45} \\ \frac{8}{9} & -\frac{1}{9} & -\frac{4}{9} \end{pmatrix}
 \begin{pmatrix} \frac{13}{45} & \frac{208}{225} & \frac{56}{225} \\ -\frac{16}{45} & -\frac{31}{225} & \frac{208}{225} \\ \frac{8}{9} & -\frac{16}{45} & \frac{13}{45} \end{pmatrix}
 \begin{pmatrix} \frac{36}{121} & -\frac{41}{121} & \frac{108}{121} \\ \frac{113}{121} & \frac{36}{121} & -\frac{24}{121} \\ -\frac{24}{121} & \frac{108}{121} & \frac{49}{121} \end{pmatrix}$$

$$\begin{pmatrix} \frac{36}{121} & -\frac{24}{121} & \frac{113}{121} \\ \frac{108}{121} & \frac{49}{121} & -\frac{24}{121} \\ -\frac{41}{121} & \frac{108}{121} & \frac{36}{121} \end{pmatrix}
 \begin{pmatrix} \frac{36}{121} & \frac{108}{121} & -\frac{41}{121} \\ -\frac{24}{121} & \frac{49}{121} & \frac{108}{121} \\ \frac{113}{121} & -\frac{24}{121} & \frac{36}{121} \end{pmatrix}
 \begin{pmatrix} \frac{36}{121} & \frac{113}{121} & -\frac{24}{121} \\ -\frac{41}{121} & \frac{36}{121} & \frac{108}{121} \\ \frac{108}{121} & -\frac{24}{121} & \frac{49}{121} \end{pmatrix}$$

$$\begin{pmatrix} \frac{113}{369} & -\frac{176}{369} & \frac{304}{369} \\ \frac{304}{369} & \frac{209}{369} & \frac{8}{369} \\ -\frac{176}{369} & \frac{248}{369} & \frac{209}{369} \end{pmatrix} \quad \begin{pmatrix} \frac{113}{369} & \frac{304}{369} & -\frac{176}{369} \\ -\frac{176}{369} & \frac{209}{369} & \frac{248}{369} \\ \frac{304}{369} & \frac{8}{369} & \frac{209}{369} \end{pmatrix} \quad \begin{pmatrix} \frac{4}{13} & \frac{24}{65} & \frac{57}{65} \\ \frac{48}{65} & -\frac{219}{325} & \frac{8}{325} \\ \frac{3}{5} & \frac{16}{25} & -\frac{12}{25} \end{pmatrix}$$

$$\begin{pmatrix} \frac{4}{13} & \frac{48}{65} & \frac{3}{5} \\ \frac{24}{65} & -\frac{219}{325} & \frac{16}{25} \\ \frac{57}{65} & \frac{8}{325} & -\frac{12}{25} \end{pmatrix} \quad \begin{pmatrix} \frac{137}{425} & \frac{672}{2125} & \frac{1896}{2125} \\ \frac{96}{125} & -\frac{399}{625} & -\frac{32}{625} \\ \frac{1176}{2125} & \frac{7456}{10625} & -\frac{4767}{10625} \end{pmatrix} \quad \begin{pmatrix} \frac{119}{369} & \frac{320}{369} & -\frac{140}{369} \\ \frac{80}{369} & \frac{119}{369} & \frac{340}{369} \\ \frac{340}{369} & -\frac{140}{369} & -\frac{31}{369} \end{pmatrix}$$

$$\begin{pmatrix} \frac{9}{25} & -\frac{12}{25} & \frac{4}{5} \\ \frac{4}{5} & \frac{3}{5} & 0 \\ -\frac{12}{25} & \frac{16}{25} & \frac{3}{5} \end{pmatrix} \quad \begin{pmatrix} \frac{9}{25} & \frac{4}{5} & -\frac{12}{25} \\ -\frac{12}{25} & \frac{3}{5} & \frac{16}{25} \\ \frac{4}{5} & 0 & \frac{3}{5} \end{pmatrix} \quad \begin{pmatrix} \frac{149}{405} & \frac{16}{81} & \frac{368}{405} \\ \frac{368}{405} & -\frac{23}{81} & -\frac{124}{405} \\ \frac{16}{81} & \frac{76}{81} & -\frac{23}{81} \end{pmatrix}$$

$$\begin{pmatrix} \frac{149}{405} & \frac{368}{405} & \frac{16}{81} \\ \frac{16}{81} & -\frac{23}{81} & \frac{76}{81} \\ \frac{368}{405} & -\frac{124}{405} & -\frac{23}{81} \end{pmatrix} \quad \begin{pmatrix} \frac{11}{29} & \frac{24}{145} & \frac{132}{145} \\ \frac{24}{29} & -\frac{363}{725} & -\frac{184}{725} \\ \frac{12}{29} & \frac{616}{725} & -\frac{237}{725} \end{pmatrix} \quad \begin{pmatrix} \frac{11}{29} & \frac{24}{29} & \frac{12}{29} \\ \frac{24}{145} & -\frac{363}{725} & \frac{616}{725} \\ \frac{132}{145} & -\frac{184}{725} & -\frac{237}{725} \end{pmatrix}$$

$$\begin{pmatrix} \frac{21}{53} & \frac{8}{53} & \frac{48}{53} \\ \frac{48}{53} & -\frac{12}{53} & -\frac{19}{53} \\ \frac{8}{53} & \frac{51}{53} & -\frac{12}{53} \end{pmatrix} \quad \begin{pmatrix} \frac{21}{53} & \frac{48}{53} & \frac{8}{53} \\ \frac{8}{53} & -\frac{12}{53} & \frac{51}{53} \\ \frac{48}{53} & -\frac{19}{53} & -\frac{12}{53} \end{pmatrix} \quad \begin{pmatrix} \frac{133}{333} & -\frac{160}{333} & \frac{260}{333} \\ \frac{260}{333} & \frac{208}{333} & -\frac{5}{333} \\ -\frac{160}{333} & \frac{205}{333} & \frac{208}{333} \end{pmatrix}$$

$$\begin{pmatrix} \frac{133}{333} & \frac{260}{333} & -\frac{160}{333} \\ -\frac{160}{333} & \frac{208}{333} & \frac{205}{333} \\ \frac{260}{333} & -\frac{5}{333} & \frac{208}{333} \end{pmatrix} \quad \begin{pmatrix} \frac{49}{121} & -\frac{24}{121} & \frac{108}{121} \\ \frac{108}{121} & \frac{36}{121} & -\frac{41}{121} \\ -\frac{24}{121} & \frac{113}{121} & \frac{36}{121} \end{pmatrix} \quad \begin{pmatrix} \frac{49}{121} & \frac{108}{121} & -\frac{24}{121} \\ -\frac{24}{121} & \frac{36}{121} & \frac{113}{121} \\ \frac{108}{121} & -\frac{41}{121} & \frac{36}{121} \end{pmatrix}$$

$$\begin{pmatrix} \frac{256}{625} & -\frac{183}{625} & \frac{108}{125} \\ \frac{567}{625} & \frac{144}{625} & -\frac{44}{125} \\ -\frac{12}{125} & \frac{116}{125} & \frac{9}{25} \end{pmatrix} \quad \begin{pmatrix} \frac{256}{625} & \frac{567}{625} & -\frac{12}{125} \\ -\frac{183}{625} & \frac{144}{625} & \frac{116}{125} \\ \frac{108}{125} & -\frac{44}{125} & \frac{9}{25} \end{pmatrix} \quad \begin{pmatrix} \frac{381}{925} & -\frac{16}{25} & \frac{24}{37} \\ \frac{808}{925} & \frac{12}{25} & -\frac{3}{37} \\ -\frac{48}{185} & \frac{3}{5} & \frac{28}{37} \end{pmatrix}$$

$$\begin{pmatrix} \frac{256}{625} & -\frac{183}{625} & \frac{108}{125} \\ \frac{567}{625} & \frac{144}{625} & -\frac{44}{125} \\ -\frac{12}{125} & \frac{116}{125} & \frac{9}{25} \end{pmatrix} \quad \begin{pmatrix} \frac{19}{45} & -\frac{136}{225} & \frac{152}{225} \\ \frac{8}{9} & \frac{19}{45} & -\frac{8}{45} \\ -\frac{8}{45} & \frac{152}{225} & \frac{161}{225} \end{pmatrix} \quad \begin{pmatrix} \frac{19}{45} & -\frac{8}{45} & \frac{8}{9} \\ \frac{152}{225} & \frac{161}{225} & -\frac{8}{45} \\ -\frac{136}{225} & \frac{152}{225} & \frac{19}{45} \end{pmatrix}$$

$$\begin{pmatrix} \frac{19}{45} & \frac{8}{45} & \frac{8}{9} \\ \frac{88}{225} & \frac{191}{225} & -\frac{16}{45} \\ -\frac{184}{225} & \frac{112}{225} & \frac{13}{45} \end{pmatrix} \quad \begin{pmatrix} \frac{19}{45} & \frac{88}{225} & -\frac{184}{225} \\ \frac{8}{45} & \frac{191}{225} & \frac{112}{225} \\ \frac{8}{9} & -\frac{16}{45} & \frac{13}{45} \end{pmatrix} \quad \begin{pmatrix} \frac{19}{45} & \frac{152}{225} & -\frac{136}{225} \\ -\frac{8}{45} & \frac{161}{225} & \frac{152}{225} \\ \frac{8}{9} & -\frac{8}{45} & \frac{19}{45} \end{pmatrix}$$

$$\begin{pmatrix} \frac{19}{45} & \frac{8}{9} & -\frac{8}{45} \\ -\frac{136}{225} & \frac{19}{45} & \frac{152}{225} \\ \frac{152}{225} & -\frac{8}{45} & \frac{161}{225} \end{pmatrix} \quad \begin{pmatrix} \frac{4}{9} & -\frac{4}{9} & \frac{7}{9} \\ \frac{8}{9} & \frac{1}{9} & -\frac{4}{9} \\ \frac{1}{9} & \frac{8}{9} & \frac{4}{9} \end{pmatrix} \quad \begin{pmatrix} \frac{4}{9} & \frac{1}{9} & \frac{8}{9} \\ \frac{7}{9} & \frac{4}{9} & -\frac{4}{9} \\ -\frac{4}{9} & \frac{8}{9} & \frac{1}{9} \end{pmatrix}$$

$$\begin{pmatrix} \frac{4}{9} & \frac{8}{9} & \frac{1}{9} \\ -\frac{4}{9} & \frac{1}{9} & \frac{8}{9} \\ \frac{7}{9} & -\frac{4}{9} & \frac{4}{9} \end{pmatrix} \quad \begin{pmatrix} \frac{53}{117} & \frac{8}{117} & \frac{8}{9} \\ \frac{8}{9} & -\frac{1}{9} & -\frac{4}{9} \\ \frac{8}{117} & \frac{116}{117} & -\frac{1}{9} \end{pmatrix} \quad \begin{pmatrix} \frac{53}{117} & \frac{88}{117} & -\frac{56}{117} \\ -\frac{56}{117} & \frac{77}{117} & \frac{68}{117} \\ \frac{88}{117} & -\frac{4}{117} & \frac{77}{117} \end{pmatrix}$$

$$\begin{pmatrix} \frac{53}{117} & \frac{8}{9} & \frac{8}{117} \\ \frac{8}{117} & -\frac{1}{9} & \frac{116}{117} \\ \frac{8}{9} & -\frac{4}{9} & -\frac{1}{9} \end{pmatrix} \quad \begin{pmatrix} \frac{23}{49} & \frac{24}{49} & \frac{36}{49} \\ \frac{24}{49} & -\frac{41}{49} & \frac{12}{49} \\ \frac{36}{49} & \frac{12}{49} & -\frac{31}{49} \end{pmatrix} \quad \begin{pmatrix} \frac{8}{17} & 0 & \frac{15}{17} \\ \frac{72}{85} & -\frac{7}{25} & -\frac{192}{425} \\ \frac{21}{85} & \frac{24}{25} & -\frac{56}{425} \end{pmatrix}$$

$$\begin{pmatrix} \frac{8}{17} & \frac{72}{85} & \frac{21}{85} \\ 0 & -\frac{7}{25} & \frac{24}{25} \\ \frac{15}{17} & -\frac{192}{425} & -\frac{56}{425} \end{pmatrix} \quad \begin{pmatrix} \frac{73}{153} & -\frac{116}{153} & \frac{4}{9} \\ \frac{124}{153} & \frac{88}{153} & \frac{1}{9} \\ -\frac{52}{153} & \frac{47}{153} & \frac{8}{9} \end{pmatrix} \quad \begin{pmatrix} \frac{73}{153} & \frac{124}{153} & -\frac{52}{153} \\ -\frac{116}{153} & \frac{88}{153} & \frac{47}{153} \\ \frac{4}{9} & \frac{1}{9} & \frac{8}{9} \end{pmatrix}$$

$$\begin{pmatrix} \frac{12}{25} & -\frac{76}{185} & \frac{717}{925} \\ \frac{4}{5} & \frac{21}{37} & -\frac{36}{185} \\ -\frac{9}{25} & \frac{132}{185} & \frac{556}{925} \end{pmatrix} \quad \begin{pmatrix} \frac{12}{25} & -\frac{3}{37} & \frac{808}{925} \\ \frac{3}{5} & \frac{28}{37} & -\frac{48}{185} \\ -\frac{16}{25} & \frac{24}{37} & \frac{381}{925} \end{pmatrix} \quad \begin{pmatrix} \frac{12}{25} & \frac{9}{25} & \frac{4}{5} \\ \frac{3}{5} & -\frac{4}{5} & 0 \\ \frac{16}{25} & \frac{12}{25} & -\frac{3}{5} \end{pmatrix}$$

$$\begin{pmatrix} \frac{12}{25} & \frac{3}{5} & -\frac{16}{25} \\ -\frac{3}{37} & \frac{28}{37} & \frac{24}{37} \\ \frac{808}{925} & -\frac{48}{185} & \frac{381}{925} \end{pmatrix} \quad \begin{pmatrix} \frac{12}{25} & \frac{3}{5} & \frac{16}{25} \\ \frac{9}{25} & -\frac{4}{5} & \frac{12}{25} \\ \frac{4}{5} & 0 & -\frac{3}{5} \end{pmatrix} \quad \begin{pmatrix} \frac{12}{25} & \frac{4}{5} & -\frac{9}{25} \\ -\frac{76}{185} & \frac{21}{37} & \frac{132}{185} \\ \frac{717}{925} & -\frac{36}{185} & \frac{556}{925} \end{pmatrix}$$

$$\begin{pmatrix} \frac{24}{49} & \frac{15}{49} & \frac{40}{49} \\ \frac{405}{637} & -\frac{488}{637} & -\frac{60}{637} \\ \frac{380}{637} & \frac{360}{637} & -\frac{363}{637} \end{pmatrix} \quad \begin{pmatrix} \frac{24}{49} & \frac{405}{637} & \frac{380}{637} \\ \frac{15}{49} & -\frac{488}{637} & \frac{360}{637} \\ \frac{40}{49} & -\frac{60}{637} & -\frac{363}{637} \end{pmatrix} \quad \begin{pmatrix} \frac{317}{637} & -\frac{24}{637} & \frac{552}{637} \\ \frac{24}{49} & \frac{41}{49} & -\frac{12}{49} \\ -\frac{456}{637} & \frac{348}{637} & \frac{277}{637} \end{pmatrix}$$

$$\begin{pmatrix} \frac{41}{81} & \frac{68}{81} & -\frac{16}{81} \\ -\frac{628}{1053} & \frac{41}{81} & \frac{656}{1053} \\ \frac{656}{1053} & -\frac{16}{81} & \frac{797}{1053} \end{pmatrix} \quad \begin{pmatrix} \frac{27}{53} & \frac{12}{53} & \frac{44}{53} \\ \frac{36}{53} & -\frac{37}{53} & -\frac{12}{53} \\ \frac{28}{53} & \frac{36}{53} & -\frac{27}{53} \end{pmatrix} \quad \begin{pmatrix} \frac{27}{53} & \frac{36}{53} & \frac{28}{53} \\ \frac{12}{53} & -\frac{37}{53} & \frac{36}{53} \\ \frac{44}{53} & -\frac{12}{53} & -\frac{27}{53} \end{pmatrix}$$

$$\begin{pmatrix} \frac{428}{833} & -\frac{576}{833} & \frac{423}{833} \\ \frac{684}{833} & \frac{473}{833} & -\frac{48}{833} \\ -\frac{207}{833} & \frac{372}{833} & \frac{716}{833} \end{pmatrix} \quad \begin{pmatrix} \frac{128}{245} & \frac{9}{49} & \frac{204}{245} \\ \frac{171}{245} & -\frac{32}{49} & -\frac{72}{245} \\ \frac{24}{49} & \frac{36}{49} & -\frac{23}{49} \end{pmatrix} \quad \begin{pmatrix} \frac{128}{245} & \frac{171}{245} & \frac{24}{49} \\ \frac{9}{49} & -\frac{32}{49} & \frac{36}{49} \\ \frac{204}{245} & -\frac{72}{245} & -\frac{23}{49} \end{pmatrix}$$

$$\begin{pmatrix} \frac{9}{17} & -\frac{8}{17} & \frac{12}{17} \\ \frac{12}{17} & \frac{12}{17} & -\frac{1}{17} \\ -\frac{8}{17} & \frac{9}{17} & \frac{12}{17} \end{pmatrix} \quad \begin{pmatrix} \frac{9}{17} & \frac{12}{17} & -\frac{8}{17} \\ -\frac{8}{17} & \frac{12}{17} & \frac{9}{17} \\ \frac{12}{17} & -\frac{1}{17} & \frac{12}{17} \end{pmatrix} \quad \begin{pmatrix} \frac{209}{369} & -\frac{176}{369} & \frac{248}{369} \\ \frac{304}{369} & \frac{113}{369} & -\frac{176}{369} \\ \frac{8}{369} & \frac{304}{369} & \frac{209}{369} \end{pmatrix}$$

$$\begin{pmatrix} \frac{21}{37} & -\frac{36}{185} & \frac{4}{5} \\ \frac{132}{185} & \frac{556}{925} & -\frac{9}{25} \\ -\frac{76}{185} & \frac{717}{925} & \frac{12}{25} \end{pmatrix} \quad \begin{pmatrix} \frac{21}{37} & \frac{132}{185} & -\frac{76}{185} \\ -\frac{36}{185} & \frac{556}{925} & \frac{717}{925} \\ \frac{4}{5} & -\frac{9}{25} & \frac{12}{25} \end{pmatrix} \quad \begin{pmatrix} \frac{473}{833} & -\frac{48}{833} & \frac{684}{833} \\ \frac{372}{833} & \frac{716}{833} & -\frac{207}{833} \\ -\frac{576}{833} & \frac{423}{833} & \frac{428}{833} \end{pmatrix}$$

$$\begin{pmatrix} \frac{88}{153} & \frac{1}{9} & \frac{124}{153} \\ \frac{47}{153} & \frac{8}{9} & -\frac{52}{153} \\ -\frac{116}{153} & \frac{4}{9} & \frac{73}{153} \end{pmatrix} \quad \begin{pmatrix} \frac{88}{153} & \frac{47}{153} & -\frac{116}{153} \\ \frac{1}{9} & \frac{8}{9} & \frac{4}{9} \\ \frac{124}{153} & -\frac{52}{153} & \frac{73}{153} \end{pmatrix} \quad \begin{pmatrix} \frac{88}{153} & \frac{88}{153} & -\frac{89}{153} \\ -\frac{32}{153} & \frac{121}{153} & \frac{88}{153} \\ \frac{121}{153} & -\frac{32}{153} & \frac{88}{153} \end{pmatrix}$$

$$\begin{pmatrix} \frac{141}{245} & \frac{12}{245} & \frac{40}{49} \\ \frac{36}{49} & -\frac{23}{49} & -\frac{24}{49} \\ \frac{88}{245} & \frac{216}{245} & -\frac{15}{49} \end{pmatrix} \quad \begin{pmatrix} \frac{141}{245} & \frac{36}{49} & \frac{88}{245} \\ \frac{12}{245} & -\frac{23}{49} & \frac{216}{245} \\ \frac{40}{49} & -\frac{24}{49} & -\frac{15}{49} \end{pmatrix} \quad \begin{pmatrix} \frac{47}{81} & \frac{16}{81} & \frac{64}{81} \\ \frac{16}{81} & -\frac{79}{81} & \frac{8}{81} \\ \frac{64}{81} & \frac{8}{81} & -\frac{49}{81} \end{pmatrix}$$

$$\begin{pmatrix} \frac{24}{41} & \frac{4}{41} & \frac{33}{41} \\ \frac{12}{41} & -\frac{39}{41} & -\frac{4}{41} \\ \frac{31}{41} & \frac{12}{41} & -\frac{24}{41} \end{pmatrix} \quad \begin{pmatrix} \frac{24}{41} & \frac{12}{41} & \frac{31}{41} \\ \frac{4}{41} & -\frac{39}{41} & \frac{12}{41} \\ \frac{33}{41} & -\frac{4}{41} & -\frac{24}{41} \end{pmatrix} \quad \begin{pmatrix} \frac{197}{333} & \frac{16}{333} & \frac{268}{333} \\ \frac{112}{333} & -\frac{307}{333} & -\frac{64}{333} \\ \frac{244}{333} & \frac{128}{333} & -\frac{187}{333} \end{pmatrix}$$

$$\begin{pmatrix} \frac{3}{5} & -\frac{12}{25} & \frac{16}{25} \\ \frac{4}{5} & \frac{9}{25} & -\frac{12}{25} \\ 0 & \frac{4}{5} & \frac{3}{5} \end{pmatrix} \quad \begin{pmatrix} \frac{3}{5} & 0 & \frac{4}{5} \\ \frac{16}{25} & \frac{3}{5} & -\frac{12}{25} \\ -\frac{12}{25} & \frac{4}{5} & \frac{9}{25} \end{pmatrix} \quad \begin{pmatrix} \frac{3}{5} & \frac{16}{25} & -\frac{12}{25} \\ 0 & \frac{3}{5} & \frac{4}{5} \\ \frac{4}{5} & -\frac{12}{25} & \frac{9}{25} \end{pmatrix}$$

$$\begin{pmatrix} \frac{3}{5} & \frac{4}{5} & 0 \\ -\frac{12}{25} & \frac{9}{25} & \frac{4}{5} \\ \frac{16}{25} & -\frac{12}{25} & \frac{3}{5} \end{pmatrix} \quad \begin{pmatrix} \frac{556}{925} & -\frac{9}{25} & \frac{132}{185} \\ \frac{717}{925} & \frac{12}{25} & -\frac{76}{185} \\ -\frac{36}{185} & \frac{4}{5} & \frac{21}{37} \end{pmatrix} \quad \begin{pmatrix} \frac{556}{925} & \frac{717}{925} & -\frac{36}{185} \\ -\frac{9}{25} & \frac{12}{25} & \frac{4}{5} \\ \frac{132}{185} & -\frac{76}{185} & \frac{21}{37} \end{pmatrix}$$

$$\begin{pmatrix} \frac{49}{81} & -\frac{8}{81} & \frac{64}{81} \\ \frac{64}{81} & \frac{16}{81} & -\frac{47}{81} \\ -\frac{8}{81} & \frac{79}{81} & \frac{16}{81} \end{pmatrix} \quad \begin{pmatrix} \frac{49}{81} & \frac{296}{405} & -\frac{128}{405} \\ -\frac{56}{81} & \frac{55}{81} & \frac{20}{81} \\ \frac{32}{81} & \frac{28}{405} & \frac{371}{405} \end{pmatrix} \quad \begin{pmatrix} \frac{49}{81} & \frac{64}{81} & -\frac{8}{81} \\ -\frac{8}{81} & \frac{16}{81} & \frac{79}{81} \\ \frac{64}{81} & -\frac{47}{81} & \frac{16}{81} \end{pmatrix}$$

$$\begin{pmatrix} \frac{508}{833} & -\frac{15}{833} & \frac{660}{833} \\ \frac{615}{833} & -\frac{292}{833} & -\frac{480}{833} \\ \frac{240}{833} & \frac{780}{833} & -\frac{167}{833} \end{pmatrix} \quad \begin{pmatrix} \frac{28}{45} & -\frac{4}{45} & \frac{7}{9} \\ \frac{4}{9} & -\frac{7}{9} & -\frac{4}{9} \\ \frac{29}{45} & \frac{28}{45} & -\frac{4}{9} \end{pmatrix} \quad \begin{pmatrix} \frac{28}{45} & \frac{4}{9} & \frac{29}{45} \\ -\frac{4}{45} & -\frac{7}{9} & \frac{28}{45} \\ \frac{7}{9} & -\frac{4}{9} & -\frac{4}{9} \end{pmatrix}$$

$$\begin{pmatrix} \frac{31}{49} & -\frac{156}{245} & \frac{108}{245} \\ \frac{36}{49} & \frac{33}{49} & -\frac{4}{49} \\ -\frac{12}{49} & \frac{92}{245} & \frac{219}{245} \end{pmatrix} \quad \begin{pmatrix} \frac{16}{25} & -\frac{24}{125} & \frac{93}{125} \\ \frac{96}{125} & \frac{81}{625} & -\frac{392}{625} \\ \frac{3}{125} & \frac{608}{625} & \frac{144}{625} \end{pmatrix} \quad \begin{pmatrix} \frac{16}{25} & \frac{96}{125} & \frac{3}{125} \\ -\frac{24}{125} & \frac{81}{625} & \frac{608}{625} \\ \frac{93}{125} & -\frac{392}{625} & \frac{144}{625} \end{pmatrix}$$

$$\begin{pmatrix} \frac{29}{45} & -\frac{4}{9} & \frac{28}{45} \\ \frac{28}{45} & \frac{7}{9} & -\frac{4}{45} \\ -\frac{4}{9} & \frac{4}{9} & \frac{7}{9} \end{pmatrix} \quad \begin{pmatrix} \frac{29}{45} & \frac{28}{45} & -\frac{4}{9} \\ -\frac{4}{9} & \frac{7}{9} & \frac{4}{9} \\ \frac{28}{45} & -\frac{4}{45} & \frac{7}{9} \end{pmatrix} \quad \begin{pmatrix} \frac{24}{37} & -\frac{3}{37} & \frac{28}{37} \\ \frac{27}{37} & -\frac{8}{37} & -\frac{24}{37} \\ \frac{8}{37} & \frac{36}{37} & -\frac{3}{37} \end{pmatrix}$$

$$\begin{pmatrix} \frac{24}{37} & \frac{27}{37} & \frac{8}{37} \\ -\frac{3}{37} & -\frac{8}{37} & \frac{36}{37} \\ \frac{28}{37} & -\frac{24}{37} & -\frac{3}{37} \end{pmatrix} \quad \begin{pmatrix} \frac{77}{117} & -\frac{56}{117} & \frac{68}{117} \\ \frac{88}{117} & \frac{53}{117} & -\frac{56}{117} \\ -\frac{4}{117} & \frac{88}{117} & \frac{77}{117} \end{pmatrix} \quad \begin{pmatrix} \frac{77}{117} & -\frac{4}{117} & \frac{88}{117} \\ \frac{68}{117} & \frac{77}{117} & -\frac{56}{117} \\ -\frac{56}{117} & \frac{88}{117} & \frac{53}{117} \end{pmatrix}$$

$$\begin{pmatrix} \frac{269}{405} & -\frac{16}{81} & \frac{292}{405} \\ \frac{208}{405} & -\frac{47}{81} & -\frac{256}{405} \\ \frac{44}{81} & \frac{64}{81} & -\frac{23}{81} \end{pmatrix} \quad \begin{pmatrix} \frac{33}{49} & -\frac{4}{49} & \frac{36}{49} \\ \frac{92}{245} & \frac{219}{245} & -\frac{12}{49} \\ -\frac{156}{245} & \frac{108}{245} & \frac{31}{49} \end{pmatrix} \quad \begin{pmatrix} \frac{33}{49} & \frac{92}{245} & -\frac{156}{245} \\ -\frac{4}{49} & \frac{219}{245} & \frac{108}{245} \\ \frac{36}{49} & -\frac{12}{49} & \frac{31}{49} \end{pmatrix}$$

$$\begin{pmatrix} \frac{55}{81} & -\frac{44}{81} & \frac{40}{81} \\ \frac{284}{405} & \frac{55}{81} & -\frac{88}{405} \\ -\frac{88}{405} & \frac{40}{81} & \frac{341}{405} \end{pmatrix} \quad \begin{pmatrix} \frac{55}{81} & -\frac{88}{405} & \frac{284}{405} \\ \frac{40}{81} & \frac{341}{405} & -\frac{88}{405} \\ -\frac{44}{81} & \frac{40}{81} & \frac{55}{81} \end{pmatrix} \quad \begin{pmatrix} \frac{55}{81} & \frac{284}{405} & -\frac{88}{405} \\ -\frac{44}{81} & \frac{55}{81} & \frac{40}{81} \\ \frac{40}{81} & -\frac{88}{405} & \frac{341}{405} \end{pmatrix}$$

$$\begin{pmatrix} \frac{36}{53} & \frac{28}{53} & \frac{27}{53} \\ -\frac{12}{53} & -\frac{27}{53} & \frac{44}{53} \\ \frac{37}{53} & -\frac{36}{53} & -\frac{12}{53} \end{pmatrix} \quad \begin{pmatrix} \frac{12}{17} & -\frac{8}{17} & \frac{9}{17} \\ \frac{12}{17} & \frac{9}{17} & -\frac{8}{17} \\ -\frac{1}{17} & \frac{12}{17} & \frac{12}{17} \end{pmatrix} \quad \begin{pmatrix} \frac{12}{17} & -\frac{1}{17} & \frac{12}{17} \\ \frac{9}{17} & \frac{12}{17} & -\frac{8}{17} \\ -\frac{8}{17} & \frac{12}{17} & \frac{9}{17} \end{pmatrix}$$

$$\begin{pmatrix} \frac{12}{17} & \frac{9}{17} & -\frac{8}{17} \\ -\frac{1}{17} & \frac{12}{17} & \frac{12}{17} \\ \frac{12}{17} & -\frac{8}{17} & \frac{9}{17} \end{pmatrix} \quad \begin{pmatrix} \frac{12}{17} & \frac{12}{17} & -\frac{1}{17} \\ -\frac{8}{17} & \frac{9}{17} & \frac{12}{17} \\ \frac{9}{17} & -\frac{8}{17} & \frac{12}{17} \end{pmatrix} \quad \begin{pmatrix} \frac{83}{117} & -\frac{32}{117} & \frac{76}{117} \\ \frac{64}{117} & -\frac{43}{117} & -\frac{88}{117} \\ \frac{4}{9} & \frac{8}{9} & -\frac{1}{9} \end{pmatrix}$$

$$\begin{pmatrix} \frac{161}{225} & -\frac{8}{45} & \frac{152}{225} \\ \frac{152}{225} & \frac{19}{45} & -\frac{136}{225} \\ -\frac{8}{45} & \frac{8}{9} & \frac{19}{45} \end{pmatrix} \quad \begin{pmatrix} \frac{161}{225} & \frac{152}{225} & -\frac{8}{45} \\ -\frac{8}{45} & \frac{19}{45} & \frac{8}{9} \\ \frac{152}{225} & -\frac{136}{225} & \frac{19}{45} \end{pmatrix} \quad \begin{pmatrix} \frac{21}{29} & -\frac{12}{29} & \frac{16}{29} \\ \frac{16}{29} & \frac{24}{29} & -\frac{3}{29} \\ -\frac{12}{29} & \frac{11}{29} & \frac{24}{29} \end{pmatrix}$$

$$\begin{pmatrix} \frac{21}{29} & \frac{16}{29} & -\frac{12}{29} \\ -\frac{12}{29} & \frac{24}{29} & \frac{11}{29} \\ \frac{16}{29} & -\frac{3}{29} & \frac{24}{29} \end{pmatrix} \quad \begin{pmatrix} \frac{36}{49} & -\frac{9}{49} & \frac{32}{49} \\ \frac{33}{49} & \frac{4}{49} & -\frac{36}{49} \\ \frac{4}{49} & \frac{48}{49} & \frac{9}{49} \end{pmatrix} \quad \begin{pmatrix} \frac{36}{49} & \frac{33}{49} & \frac{4}{49} \\ -\frac{9}{49} & \frac{4}{49} & \frac{48}{49} \\ \frac{32}{49} & -\frac{36}{49} & \frac{9}{49} \end{pmatrix}$$

$$\begin{pmatrix} \frac{196}{261} & \frac{163}{261} & -\frac{56}{261} \\ -\frac{131}{261} & \frac{196}{261} & \frac{112}{261} \\ \frac{112}{261} & -\frac{56}{261} & \frac{229}{261} \end{pmatrix} \quad \begin{pmatrix} \frac{7}{9} & -\frac{4}{9} & \frac{4}{9} \\ \frac{28}{45} & \frac{29}{45} & -\frac{4}{9} \\ -\frac{4}{45} & \frac{28}{45} & \frac{7}{9} \end{pmatrix} \quad \begin{pmatrix} \frac{7}{9} & -\frac{4}{45} & \frac{28}{45} \\ \frac{4}{9} & \frac{7}{9} & -\frac{4}{9} \\ -\frac{4}{9} & \frac{28}{45} & \frac{29}{45} \end{pmatrix}$$

$$\begin{pmatrix} \frac{7}{9} & \frac{4}{9} & -\frac{4}{9} \\ -\frac{4}{45} & \frac{7}{9} & \frac{28}{45} \\ \frac{28}{45} & -\frac{4}{9} & \frac{29}{45} \end{pmatrix} \quad \begin{pmatrix} \frac{7}{9} & \frac{28}{45} & -\frac{4}{45} \\ -\frac{4}{9} & \frac{29}{45} & \frac{28}{45} \\ \frac{4}{9} & -\frac{4}{9} & \frac{7}{9} \end{pmatrix} \quad \begin{pmatrix} \frac{64}{81} & -\frac{28}{81} & \frac{41}{81} \\ \frac{44}{81} & \frac{1}{81} & -\frac{68}{81} \\ \frac{23}{81} & \frac{76}{81} & \frac{16}{81} \end{pmatrix}$$

$$\begin{pmatrix} \frac{64}{81} & \frac{44}{81} & \frac{23}{81} \\ -\frac{28}{81} & \frac{1}{81} & \frac{76}{81} \\ \frac{41}{81} & -\frac{68}{81} & \frac{16}{81} \end{pmatrix} \quad \begin{pmatrix} \frac{65}{81} & -\frac{212}{405} & \frac{116}{405} \\ \frac{44}{81} & \frac{68}{81} & \frac{1}{81} \\ -\frac{20}{81} & \frac{59}{405} & \frac{388}{405} \end{pmatrix} \quad \begin{pmatrix} \frac{65}{81} & \frac{44}{81} & -\frac{20}{81} \\ -\frac{212}{405} & \frac{68}{81} & \frac{59}{405} \\ \frac{116}{405} & \frac{1}{81} & \frac{388}{405} \end{pmatrix}$$

$$\begin{pmatrix} \frac{40}{49} & -\frac{24}{49} & \frac{15}{49} \\ \frac{132}{245} & \frac{41}{49} & -\frac{24}{245} \\ -\frac{51}{245} & \frac{12}{49} & \frac{232}{245} \end{pmatrix} \quad \begin{pmatrix} \frac{40}{49} & \frac{132}{245} & -\frac{51}{245} \\ -\frac{24}{49} & \frac{41}{49} & \frac{12}{49} \\ \frac{15}{49} & -\frac{24}{245} & \frac{232}{245} \end{pmatrix} \quad \begin{pmatrix} \frac{37}{45} & -\frac{16}{45} & \frac{4}{9} \\ \frac{4}{9} & \frac{8}{9} & -\frac{1}{9} \\ -\frac{16}{45} & \frac{13}{45} & \frac{8}{9} \end{pmatrix}$$

$$\begin{pmatrix} \frac{37}{45} & \frac{4}{9} & -\frac{16}{45} \\ -\frac{16}{45} & \frac{8}{9} & \frac{13}{45} \\ \frac{4}{9} & -\frac{1}{9} & \frac{8}{9} \end{pmatrix} \quad \begin{pmatrix} \frac{24}{29} & -\frac{12}{29} & \frac{11}{29} \\ \frac{16}{29} & \frac{21}{29} & -\frac{12}{29} \\ -\frac{3}{29} & \frac{16}{29} & \frac{24}{29} \end{pmatrix} \quad \begin{pmatrix} \frac{24}{29} & -\frac{3}{29} & \frac{16}{29} \\ \frac{11}{29} & \frac{24}{29} & -\frac{12}{29} \\ -\frac{12}{29} & \frac{16}{29} & \frac{21}{29} \end{pmatrix}$$

$$\begin{pmatrix} \frac{24}{29} & \frac{11}{29} & -\frac{12}{29} \\ -\frac{3}{29} & \frac{24}{29} & \frac{16}{29} \\ \frac{16}{29} & -\frac{12}{29} & \frac{21}{29} \end{pmatrix} \quad \begin{pmatrix} \frac{24}{29} & \frac{16}{29} & -\frac{3}{29} \\ -\frac{12}{29} & \frac{21}{29} & \frac{16}{29} \\ \frac{11}{29} & -\frac{12}{29} & \frac{24}{29} \end{pmatrix} \quad \begin{pmatrix} \frac{41}{49} & \frac{12}{49} & -\frac{24}{49} \\ -\frac{24}{245} & \frac{232}{245} & \frac{15}{49} \\ \frac{132}{245} & -\frac{51}{245} & \frac{40}{49} \end{pmatrix}$$

$$\begin{pmatrix} \frac{41}{49} & \frac{348}{637} & -\frac{24}{637} \\ -\frac{12}{49} & \frac{277}{637} & \frac{552}{637} \\ \frac{24}{49} & -\frac{456}{637} & \frac{317}{637} \end{pmatrix} \quad \begin{pmatrix} \frac{68}{81} & -\frac{173}{405} & \frac{136}{405} \\ \frac{41}{81} & \frac{68}{81} & -\frac{16}{81} \\ -\frac{16}{81} & \frac{136}{405} & \frac{373}{405} \end{pmatrix} \quad \begin{pmatrix} \frac{341}{405} & \frac{40}{81} & -\frac{88}{405} \\ -\frac{88}{405} & \frac{55}{81} & \frac{284}{405} \\ \frac{40}{81} & -\frac{44}{81} & \frac{55}{81} \end{pmatrix}$$

$$\begin{pmatrix} \frac{191}{225} & -\frac{16}{45} & \frac{88}{225} \\ \frac{112}{225} & \frac{13}{45} & -\frac{184}{225} \\ \frac{8}{45} & \frac{8}{9} & \frac{19}{45} \end{pmatrix} \quad \begin{pmatrix} \frac{716}{833} & \frac{423}{833} & -\frac{48}{833} \\ -\frac{207}{833} & \frac{428}{833} & \frac{684}{833} \\ \frac{372}{833} & -\frac{576}{833} & \frac{473}{833} \end{pmatrix} \quad \begin{pmatrix} \frac{917}{1053} & -\frac{368}{1053} & \frac{28}{81} \\ \frac{496}{1053} & \frac{413}{1053} & -\frac{64}{81} \\ \frac{148}{1053} & \frac{896}{1053} & \frac{41}{81} \end{pmatrix}$$

$$\begin{pmatrix} \frac{8}{9} & -\frac{16}{45} & \frac{13}{45} \\ \frac{4}{9} & \frac{37}{45} & -\frac{16}{45} \\ -\frac{1}{9} & \frac{4}{9} & \frac{8}{9} \end{pmatrix} \quad \begin{pmatrix} \frac{8}{9} & -\frac{52}{153} & \frac{47}{153} \\ \frac{4}{9} & \frac{73}{153} & -\frac{116}{153} \\ \frac{1}{9} & \frac{124}{153} & \frac{88}{153} \end{pmatrix} \quad \begin{pmatrix} \frac{8}{9} & -\frac{1}{9} & \frac{4}{9} \\ \frac{13}{45} & \frac{8}{9} & -\frac{16}{45} \\ -\frac{16}{45} & \frac{4}{9} & \frac{37}{45} \end{pmatrix}$$

$$\begin{pmatrix} \frac{8}{9} & \frac{13}{45} & -\frac{16}{45} \\ -\frac{1}{9} & \frac{8}{9} & \frac{4}{9} \\ \frac{4}{9} & -\frac{16}{45} & \frac{37}{45} \end{pmatrix} \quad \begin{pmatrix} \frac{8}{9} & \frac{4}{9} & -\frac{1}{9} \\ -\frac{16}{45} & \frac{37}{45} & \frac{4}{9} \\ \frac{13}{45} & -\frac{16}{45} & \frac{8}{9} \end{pmatrix} \quad \begin{pmatrix} \frac{219}{245} & -\frac{12}{49} & \frac{92}{245} \\ \frac{108}{245} & \frac{31}{49} & -\frac{156}{245} \\ -\frac{4}{49} & \frac{36}{49} & \frac{33}{49} \end{pmatrix}$$

$$\begin{pmatrix} \frac{219}{245} & \frac{108}{245} & -\frac{4}{49} \\ -\frac{12}{49} & \frac{31}{49} & \frac{36}{49} \\ \frac{92}{245} & -\frac{156}{245} & \frac{33}{49} \end{pmatrix} \quad \begin{pmatrix} \frac{137}{153} & -\frac{44}{153} & \frac{52}{153} \\ \frac{52}{153} & \frac{143}{153} & -\frac{16}{153} \\ -\frac{44}{153} & \frac{32}{153} & \frac{143}{153} \end{pmatrix} \quad \begin{pmatrix} \frac{371}{405} & -\frac{128}{405} & \frac{20}{81} \\ \frac{32}{81} & \frac{49}{81} & -\frac{56}{81} \\ \frac{28}{405} & \frac{296}{405} & \frac{55}{81} \end{pmatrix}$$

$$\begin{pmatrix} \frac{232}{245} & -\frac{51}{245} & \frac{12}{49} \\ \frac{15}{49} & \frac{40}{49} & -\frac{24}{49} \\ -\frac{24}{245} & \frac{132}{245} & \frac{41}{49} \end{pmatrix} \quad \begin{pmatrix} \frac{232}{245} & \frac{15}{49} & -\frac{24}{245} \\ -\frac{51}{245} & \frac{40}{49} & \frac{132}{245} \\ \frac{12}{49} & -\frac{24}{49} & \frac{41}{49} \end{pmatrix} \quad \begin{pmatrix} \frac{317}{333} & -\frac{68}{333} & \frac{76}{333} \\ \frac{76}{333} & \frac{323}{333} & -\frac{28}{333} \\ -\frac{68}{333} & \frac{44}{333} & \frac{323}{333} \end{pmatrix}$$

$$\begin{pmatrix} \frac{388}{405} & -\frac{20}{81} & \frac{59}{405} \\ \frac{116}{405} & \frac{65}{81} & -\frac{212}{405} \\ \frac{1}{81} & \frac{44}{81} & \frac{68}{81} \end{pmatrix} \quad \begin{pmatrix} \frac{388}{405} & \frac{116}{405} & \frac{1}{81} \\ -\frac{20}{81} & \frac{65}{81} & \frac{44}{81} \\ \frac{59}{405} & -\frac{212}{405} & \frac{68}{81} \end{pmatrix} \quad \begin{pmatrix} \frac{217}{225} & -\frac{8}{45} & \frac{44}{225} \\ \frac{44}{225} & \frac{44}{45} & -\frac{17}{225} \\ -\frac{8}{45} & \frac{1}{9} & \frac{44}{45} \end{pmatrix}$$

$$\begin{pmatrix} \frac{44}{45} & -\frac{8}{45} & \frac{1}{9} \\ \frac{44}{225} & \frac{217}{225} & -\frac{8}{45} \\ -\frac{17}{225} & \frac{44}{225} & \frac{44}{45} \end{pmatrix} \quad \begin{pmatrix} \frac{44}{45} & -\frac{17}{225} & \frac{44}{225} \\ \frac{1}{9} & \frac{44}{45} & -\frac{8}{45} \\ -\frac{8}{45} & \frac{44}{225} & \frac{217}{225} \end{pmatrix} \quad \begin{pmatrix} \frac{44}{45} & \frac{1}{9} & -\frac{8}{45} \\ -\frac{17}{225} & \frac{44}{45} & \frac{44}{225} \\ \frac{44}{225} & -\frac{8}{45} & \frac{217}{225} \end{pmatrix}$$

$$\begin{pmatrix} \frac{44}{45} & \frac{44}{225} & -\frac{17}{225} \\ -\frac{8}{45} & \frac{217}{225} & \frac{44}{225} \\ \frac{1}{9} & -\frac{8}{45} & \frac{44}{45} \end{pmatrix} \quad \begin{pmatrix} \frac{48}{49} & -\frac{93}{637} & \frac{88}{637} \\ \frac{9}{49} & \frac{592}{637} & -\frac{204}{637} \\ -\frac{4}{49} & \frac{216}{637} & \frac{597}{637} \end{pmatrix} \quad \begin{pmatrix} \frac{364}{369} & -\frac{52}{369} & \frac{31}{369} \\ \frac{56}{369} & \frac{361}{369} & -\frac{52}{369} \\ -\frac{23}{369} & \frac{56}{369} & \frac{364}{369} \end{pmatrix}$$