```
M = 1 / 4 ( -2          3          Sqrt[3]
            0           -2         2 Sqrt[3]
            2 Sqrt[3]   Sqrt[3]    1        )
```

```
MatrixForm[%]
```

$$\begin{pmatrix} -\frac{1}{2} & \frac{3}{4} & \frac{\sqrt{3}}{4} \\ 0 & -\frac{1}{2} & \frac{\sqrt{3}}{2} \\ \frac{\sqrt{3}}{2} & \frac{\sqrt{3}}{4} & \frac{1}{4} \end{pmatrix}$$

```
S =
 ( 1 / Sqrt[5]          1 / Sqrt[5]          Sqrt[3] / Sqrt[5]
   1 / Sqrt[2]          -1 / Sqrt[2]         0
   Sqrt[3] / Sqrt[10]   Sqrt[3] / Sqrt[10]   -2 / Sqrt[10]  )
```

```
MatrixForm[S]
```

$$\begin{pmatrix} \frac{1}{\sqrt{5}} & \frac{1}{\sqrt{5}} & \sqrt{\frac{3}{5}} \\ \frac{1}{\sqrt{2}} & -\frac{1}{\sqrt{2}} & 0 \\ \sqrt{\frac{3}{10}} & \sqrt{\frac{3}{10}} & -\sqrt{\frac{2}{5}} \end{pmatrix}$$

```
MatrixForm[Inverse[S]]
```

$$\begin{pmatrix} \frac{1}{\sqrt{5}} & \frac{1}{\sqrt{2}} & \sqrt{\frac{3}{10}} \\ \frac{1}{\sqrt{5}} & -\frac{1}{\sqrt{2}} & \sqrt{\frac{3}{10}} \\ \sqrt{\frac{3}{5}} & 0 & -\sqrt{\frac{2}{5}} \end{pmatrix}$$

```
Dr = S . M . Inverse[S]
```

$$\left\{\{1, 0, 0\}, \left\{0, -\frac{7}{8}, \frac{\sqrt{15}}{8}\right\}, \left\{0, -\frac{\sqrt{15}}{8}, -\frac{7}{8}\right\}\right\}$$

```
MatrixForm[%]
```

$$\begin{pmatrix} 1 & 0 & 0 \\ 0 & -\frac{7}{8} & \frac{\sqrt{15}}{8} \\ 0 & -\frac{\sqrt{15}}{8} & -\frac{7}{8} \end{pmatrix}$$