In[•]:=

```
F[x_, y_] := x^2 + y^2 - 2
```

In[•]:=

```
T = 1 / 2
```

Out[•]= $\frac{1}{2}$

In[•]:=

```
G[x_, y_] := y - T F[x, y]
```

In[•]:=

```
Pa[u] = G[x, u]
```

Out[•]= $u + \frac{1}{2}\left(2 - u^2 - x^2\right)$

In[•]:=

```
u[0] = 1
```

Out[•]= 1

In[•]:=

```
u[n_] := Simplify[u[n - 1] + 1 / 2 (2 - (u[n - 1])^2 - x^2)]
```

In[31]:=

```
Table[u[n], {n, 1, 6}]
```

Out[31]=

$$\left\{\frac{1}{2}\left(3 - x^2\right),\ \frac{1}{8}\left(11 - 2\,x^2 - x^4\right),\ \frac{1}{128}\left(183 - 52\,x^2 + 2\,x^4 - 4\,x^6 - x^8\right),\right.$$

$$\frac{46\,127 - 10\,664\,x^2 - 2924\,x^4 + 648\,x^6 - 310\,x^8 - 88\,x^{10} - 12\,x^{12} - 8\,x^{14} - x^{16}}{32\,768},$$

$$\frac{46\,127 - 10\,664\,x^2 - 2924\,x^4 + 648\,x^6 - 310\,x^8 - 88\,x^{10} - 12\,x^{12} - 8\,x^{14} - x^{16}}{32\,768} +$$

$$\frac{1}{2}\left(2 - x^2 - \frac{\left(-46\,127 + 10\,664\,x^2 + 2924\,x^4 - 648\,x^6 + 310\,x^8 + 88\,x^{10} + 12\,x^{12} + 8\,x^{14} + x^{16}\right)^2}{1\,073\,741\,824}\right),$$

$$\frac{46\,127 - 10\,664\,x^2 - 2924\,x^4 + 648\,x^6 - 310\,x^8 - 88\,x^{10} - 12\,x^{12} - 8\,x^{14} - x^{16}}{32\,768} +$$

$$\frac{1}{2}\left(2 - x^2 - \frac{\left(-46\,127 + 10\,664\,x^2 + 2924\,x^4 - 648\,x^6 + 310\,x^8 + 88\,x^{10} + 12\,x^{12} + 8\,x^{14} + x^{16}\right)^2}{1\,073\,741\,824}\right) +$$

$$\frac{1}{2}\left(2 - x^2 - \left(\frac{-46\,127 + 10\,664\,x^2 + 2924\,x^4 - 648\,x^6 + 310\,x^8 + 88\,x^{10} + 12\,x^{12} + 8\,x^{14} + x^{16}}{32\,768} +\right.\right.$$

$$\left.\left.\frac{1}{2}\left(-2 + x^2 + \frac{\left(-46\,127 + 10\,664\,x^2 + 2924\,x^4 - 648\,x^6 + 310\,x^8 + 88\,x^{10} + 12\,x^{12} + 8\,x^{14} + x^1\right.\right.\right.\right.$$

$$\left.\left.\left.\left.\frac{}{1\,073\,741\,824}\right.\right.\right.\right.$$

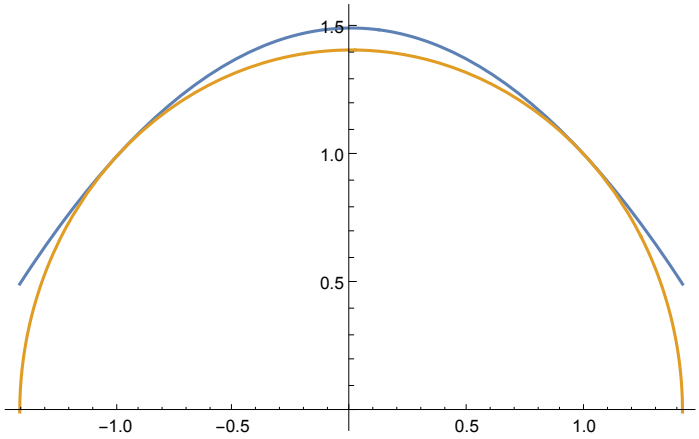
In[•]:=

```
P[1]
```

Out[•]= P[1]

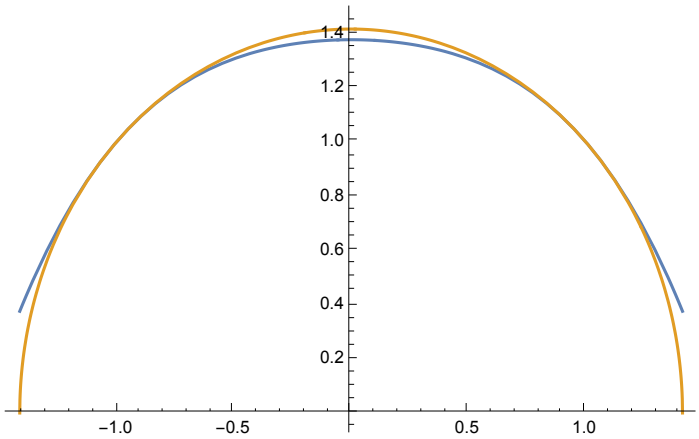
In[35]:=
```
Plot[ {u[1], Sqrt[2 - x^2]}, {x, -Sqrt[2], Sqrt[2]}]
```

Out[35]=




In[36]:=
```
Plot[ {u[2], Sqrt[2 - x^2]}, {x, -Sqrt[2], Sqrt[2]}]
```

Out[36]=




In[38]:=
```
Plot[ {u[8], Sqrt[2 - x^2]}, {x, -Sqrt[2], Sqrt[2]}]
```

Out[38]=