

$$f = \sqrt{1 - x^2};$$

```
ts = {f} ~Join~ Table[Normal[Series[f, {x, x0, 2}]], {x0, 0, 0.7, 0.1}]
```

```
{\sqrt{1 - x^2}, 1 - \frac{1}{2} (0. + x)^2, 0.994987 - 0.100504 (-0.1 + x) - 0.507595 (-0.1 + x)^2,
 0.979796 - 0.204124 (-0.2 + x) - 0.531573 (-0.2 + x)^2,
 0.953939 - 0.314485 (-0.3 + x) - 0.575981 (-0.3 + x)^2,
 0.916515 - 0.436436 (-0.4 + x) - 0.649458 (-0.4 + x)^2,
 0.866025 - 0.57735 (-0.5 + x) - 0.7698 (-0.5 + x)^2,
 0.8 - 0.75 (-0.6 + x) - 0.976563 (-0.6 + x)^2,
 0.714143 - 0.980196 (-0.7 + x) - 1.37282 (-0.7 + x)^2}
```

```
Plot[ts, {x, 0, 1}]
```

