```
with(plots):
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Trigonometric Polnomial

```
g := x→sin(x) + cos(x)
```

$$g := x \mapsto \sin(x) + \cos(x) \tag{1.1}$$

```
gp := D(g)
```

$$gp := x \mapsto \cos(x) - \sin(x) \tag{1.2}$$

```
gpp := D(gp)
```

$$gpp := x \mapsto -\sin(x) - \cos(x) \tag{1.3}$$

```
solve(g(x) = 0 )
```

$$-\frac{\pi}{4} \tag{1.4}$$

```
solve(gp(x) = 0)
```

$$\frac{\pi}{4} \tag{1.5}$$

```
solve(gpp(x) = 0)
```

$$-\frac{\pi}{4} \tag{1.6}$$

```
evalf(sqrt(2))
```

$$1.414213562 \tag{1.7}$$

```
evalf(Pi/4)
```

$$0.7853981635 \tag{1.8}$$

```
%·3
```

$$2.356194490 \tag{1.9}$$

```
evalf(7·Pi/4)
```

$$5.497787144 \tag{1.10}$$

```
evalf(2·Pi)
```

$$6.283185308 \tag{1.11}$$

```
expand((x - (3 - sqrt(3))/2)·(x - (3 + sqrt(3))/2))
```

$$x^2 - 3x + \frac{3}{2} \tag{1.12}$$

```
%·2
```

$$2x^2 - 6x + 3 \tag{1.13}$$

```
f := x→2 x^2 - 6 x + 3
```

$$f := x \mapsto 2 \cdot x^2 - 6 \cdot x + 3 \tag{1.14}$$

```
f(sin(x))
```

$$2\sin(x)^2 - 6\sin(x) + 3 \tag{1.15}$$

Rational Function

$R := x \to \dfrac{(2\cdot x^2 - x - 15)}{x^2 - 4\cdot x - 21}$

$$R := x \mapsto \frac{2\cdot x^2 - x - 15}{x^2 - 4\cdot x - 21} \tag{2.1}$$

$Rp := \mathrm{D}(R)$

$$Rp := x \mapsto \frac{4\cdot x - 1}{x^2 - 4\cdot x - 21} - \frac{(2\cdot x^2 - x - 15)\cdot(2\cdot x - 4)}{(x^2 - 4\cdot x - 21)^2} \tag{2.2}$$

$$\frac{4\cdot x - 1}{x^2 - 4\cdot x - 21} - \frac{(2\cdot x^2 - x - 15)\cdot(2\cdot x - 4)}{(x^2 - 4\cdot x - 21)^2}$$

$$\frac{4\,x - 1}{x^2 - 4\,x - 21} - \frac{(2\,x^2 - x - 15)\,(2\,x - 4)}{(x^2 - 4\,x - 21)^2} \tag{2.3}$$

$simplify(\%)$

$$\frac{-7\,x^2 - 54\,x - 39}{(x^2 - 4\,x - 21)^2} \tag{2.4}$$

$factor(\%)$

$$-\frac{7\,x^2 + 54\,x + 39}{(x+3)^2\,(x-7)^2} \tag{2.5}$$

$solve(Rp(x) = 0)$

$$-\frac{27}{7} - \frac{2\sqrt{114}}{7},\ -\frac{27}{7} + \frac{2\sqrt{114}}{7} \tag{2.6}$$

$evalf(\%)$

$$-6.907736643,\ -0.806549071 \tag{2.7}$$

$evalf\left(-\dfrac{27}{7}\right)$

$$-3.857142857 \tag{2.8}$$

$R(-6.907736643)$

$$1.607083130 \tag{2.9}$$

$Rpp := \mathrm{D}(Rp)$

$$Rpp := x \mapsto \frac{4}{x^2 - 4\cdot x - 21} - \frac{2\cdot(4\cdot x - 1)\cdot(2\cdot x - 4)}{(x^2 - 4\cdot x - 21)^2} + \frac{2\cdot(2\cdot x^2 - x - 15)\cdot(2\cdot x - 4)^2}{(x^2 - 4\cdot x - 21)^3} \tag{2.10}$$

$$- \frac{2\cdot\left(2\cdot x^2 - x - 15\right)}{\left(x^2 - 4\cdot x - 21\right)^2}$$

$$\frac{4}{x^2 - 4\cdot x - 21} - \frac{2\cdot(4\cdot x - 1)\cdot(2\cdot x - 4)}{\left(x^2 - 4\cdot x - 21\right)^2} + \frac{2\cdot\left(2\cdot x^2 - x - 15\right)\cdot(2\cdot x - 4)^2}{\left(x^2 - 4\cdot x - 21\right)^3} - \frac{2\cdot\left(2\cdot x^2 - x - 15\right)}{\left(x^2 - 4\cdot x - 21\right)^2}$$

$$\frac{4}{x^2 - 4\,x - 21} - \frac{2\,(4\,x - 1)\,(2\,x - 4)}{\left(x^2 - 4\,x - 21\right)^2} + \frac{2\,\left(2\,x^2 - x - 15\right)\,(2\,x - 4)^2}{\left(x^2 - 4\,x - 21\right)^3} - \frac{2\,\left(2\,x^2 - x - 15\right)}{\left(x^2 - 4\,x - 21\right)^2} \quad \textbf{(2.11)}$$

simplify(%)

$$\frac{14\,x^3 + 162\,x^2 + 234\,x + 822}{\left(x^2 - 4\,x - 21\right)^3} \quad \textbf{(2.12)}$$

The above is R"(x).