

Aufgabe 1

$$f(x) = 8,5x^4 - 7,5x + 1$$

$$F(x) = 1,7x^5 - 3,75x^2 + x + c \rightarrow F(1) = -1,05 + c = 2$$

$$\rightarrow c = 3,05 \rightarrow F(x) = 1,7x^5 - 3,75x^2 + x + 3,05$$

$$g(x) = \frac{1,5}{x^2} + \sqrt[5]{x}$$

$$G(x) = \frac{-1,5}{x} + \frac{5}{6}\sqrt[5]{x^6} + c \rightarrow G(1) = -\frac{3}{2} + \frac{5}{6} + c = 2$$

$$\Rightarrow c = \frac{8}{3} \Rightarrow G(x) = \frac{-1,5}{x} + \frac{5}{6}\sqrt[5]{x^6} + \frac{8}{3}$$

Aufgabe 2

$$f(x) = 3x^2(x^2 - 2) = 3 \cdot x^2 \cdot (x + \sqrt{2}) \cdot (x - \sqrt{2}) \Rightarrow N_1(-\sqrt{2}/0); N_2(0/0); N_3(\sqrt{2}/0)$$

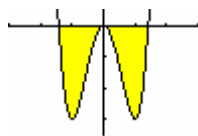
$$f'(x) = 12x^3 - 12x = 12x(x^2 - 1) = 0 \Rightarrow x_2 = 0; x_1 = -1; x_3 = 1$$

$$f''(-1) > 0 \Rightarrow T_1(-1/-3)$$

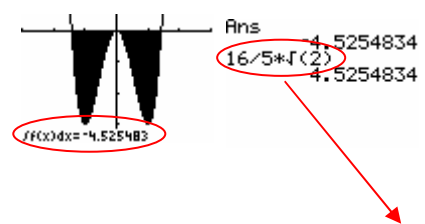
$$f''(x) = 36x^2 - 12 \Rightarrow f''(0) < 0 \Rightarrow H(0/0)$$

$$f''(1) > 0 \Rightarrow T_2(1/-3)$$

Das heißt, dass das Schaubild zwischen den Nullstellen $-\sqrt{2}$ und $\sqrt{2}$ negativ ist.



Ihr müsst die Skizze von Hand aus N und H und T zeichnen. Kontrolle des Ergebnisses mit GTR:

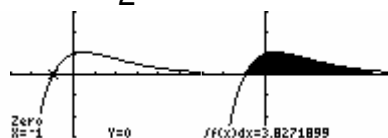


$$A = 2 \cdot \left| \left[\frac{3}{5}x^5 - 2x^3 \right]_0^{\sqrt{2}} \right| = 2 \cdot \left| \frac{3}{5}(\sqrt{2})^5 - 2(\sqrt{2})^3 \right| = 2 \cdot \left| \frac{3}{5} \cdot 4 \cdot \sqrt{2} - 2 \cdot 2 \cdot \sqrt{2} \right| = 2 \cdot \left| -\frac{8}{5} \cdot \sqrt{2} \right| = \frac{16}{5} \sqrt{2}$$

Aufgabe 3

$$f(x) = \frac{x+1}{2^x}$$

```
Plot1 Plot2 Plot3
V1 (X+1)/2^X
2=
3=
4=
5=
6=
7=
```



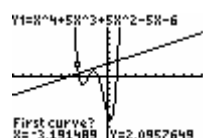
```
fnInt(V1,X,-1,5)
3.827189861
π*fnInt(V1^2,X,-1,5)
9.332383633
```

oder

$A = 3,827$ FE
 $V = 9,332$ VE

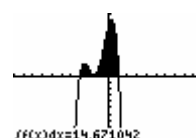
Aufgabe 4

```
Plot1 Plot2 Plot3
V1 X^4+5X^3+5X^2-5X-6
2-5X-6
3=
4=
5=
6=
```



```
X>A -3.053907197
X>B 1.095872531
```

```
Plot1 Plot2 Plot3
V1 X^4+5X^3+5X^2-5X-6
2-5X-6
3=V2-V1
4=
5=
6=
```



$Y1 = f(x); Y2 = g(x)$ Schnittpunkte (Intersect) \rightarrow Speichern

Differenzfunktion \rightarrow **Fläche A = 14,671 FE**