Pass F18

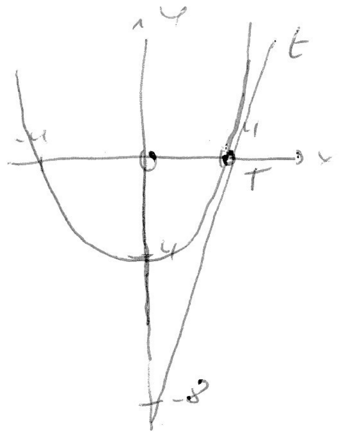
1. a) $t: y = 2x-8 \leadsto T(4|0)$

$f(x) = ax^2 + c = a(x-4)(x+4) = a(x^2-16)$

$f'(x) = 2ax$

$f'(4) = 2 \Rightarrow a = \frac{1}{4}$

$\underline{f(x) = \frac{1}{4}x^2 - 4}$



$A = -2 \cdot \int_0^4 f(x)\,dx = -2\left[\frac{1}{12}x^3 - 4x\right]_0^4 = \underline{\frac{64}{3}}$

Symm.

b) $f^*(x) = 3f(x) = \frac{3}{4}x^2 - 12$ | Streckung in y-Richtung Faktor 3

$f^{*\prime}(x) = 3f'(x) = 6x - 16$

2. a) P(alle verschieden) $= \frac{6}{6}\cdot\frac{5}{6}\cdot\frac{4}{6}\cdot\frac{3}{6} = \underline{\frac{5}{18}} = 27{,}8\%$

b) Produkt ist gerade, wenn mindestens ein Faktor gerade

$\rightarrow$ P(gerade) = P(mind. ein gerade) = 1 − P(alle ungerade) $= 1 - \left(\frac{1}{2}\right)^4 = \underline{\frac{15}{16}} = 93{,}75\%$

c) $P = 25, 50, 75 \ldots$: Teilbar durch 25 erfordert mindestens zwei '5'er. Rest ist egal, also $\underbrace{x \cdot x}_{egal} \cdot 5 \cdot 5$

$6^4 : 25 = 51{,}84$

51

x x 5 5 6 Mögl.

6 6 1 1

$\frac{6^3}{6^4} = \underline{\frac{1}{6} = 16{,}7\%}$

d) $1+1+1 = 3$ $\left(\frac{1}{6}\right)^3 \cdot \frac{3}{6} \cdot 1$

$1+1+2 = 4$ $\left(\frac{1}{6}\right)^3 \cdot \frac{2}{6} \cdot 3$

$1+1+3 = 5$ $\left(\frac{1}{6}\right)^3 \cdot \frac{1}{6} \cdot 3$

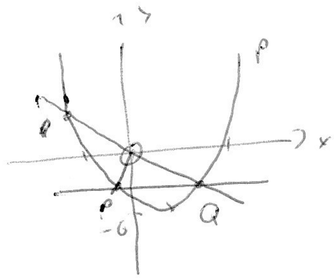
$1+2+2 = 5$ $\left(\frac{1}{6}\right)^3 \cdot \frac{1}{6} \cdot 3$

$= \left(\frac{1}{6}\right)^3 \cdot \left(\frac{3}{6} + 1 + \frac{1}{2} + \frac{1}{2}\right) = \underline{1{,}16\%}$

3. $y = x^2 + 2x - 5 = -k$ $A = \text{"}\frac{1}{2}gh\text{"}$ $\underline{h = k}$

$x^2 + 2x - 5 + k = 0$

$x_{1,2} = \frac{-b \pm \sqrt{D}}{2a}$



$x_1 - x_2 = g = \frac{-b+\sqrt{D}}{2a} - \frac{-b-\sqrt{D}}{2a} = \frac{\sqrt{D}}{a}$

$= \frac{\sqrt{2^2 - 4\cdot(-5+k)}}{2} = \sqrt{1-(-5+k)}$

$= \sqrt{-k+6}$

$D = [0;6]$

$A = \frac{1}{2}k\sqrt{-k+6} = \frac{1}{2}\sqrt{-k^3+6k^2} \rightarrow \max$

$A^2 = \frac{1}{4}(-k^3+6k^2) \rightarrow \max$

$\sqrt{\ }$ ist streng monoton

Ränder $\left.\begin{array}{l}A(0)=0\\A(6)=0\end{array}\right\}$ Min

$(A^2)' = \frac{1}{4}(-3k^2+12k) = 0$

$k = 0$

$k = 2$

$(A^2)'' = \frac{1}{4}(-6k+12)$

$(A^2)''(2) = 0$

VZW: 1 | 2 | 3 ; + | 0 | − ; ↗ max ↘

Max: $\underline{k = 2}$

4. g: $P(-2|0)$, $Q(1|1)$ $g: \vec{x} = \binom{-2}{0} + s\binom{3}{1}$

a) $\vec{CA} \cdot \vec{CB} = 0$

$\begin{pmatrix}3-3s\\3-s\end{pmatrix}\begin{pmatrix}9-3s\\11-s\end{pmatrix} = 0$

$10(s-3)(s-2) = 0$

$s_1 = 3$ $s_2 = 2$

$C_1(7|3)$ $C_2(4|2)$

b) $|\vec{CA}| = |\vec{CB}|$

$(3-3s)^2 + (3-s)^2 = (9-3s)^2 + (11-s)^2$

$10s^2 - 24s + 18 = 10s^2 - 76s + 202$

$52s - 184 = 0$

$s = 46/13$

$C(112/13 \mid 46/13)$