2) $A = \{1;\ \{2;3;4\};\ \{5\};\ \{\{6\};7\};\ 8\}$

a)

$X = \{1;\ \{5\};\ \{8\}\}$

$\{2;3;4;7\}$

$\{\{5\}\}$

$\cap = \{\{5\}\}$

3) $(x \vee \overline{(y \wedge x)}) \wedge ((z \vee x) \vee (\bar{x} \vee z))$

de Morgan

$(x \vee (\bar{y} \vee \bar{x})) \wedge ((z \vee x) \vee (\bar{x} \vee z))$

Ass. + Kom.

$((x \vee \bar{x}) \vee \bar{y}) \wedge ((x \vee \bar{x}) \vee (z \vee z))$

Idempotenz

$(w \vee \bar{y}) \wedge ((w) \vee z)$

Idempotenz

$w \wedge w \Rightarrow w$

4) Potenzmengen : Menge aller Teilmengen

$A = \{ a, b, \{c\}\} \rightarrow 2^3$

$$\mathcal{P}(A) = \{ \{\}, \\ \{a\}, \{b\}, \{\{c\}\}, \\ \{a,b\}, \{b, \{c\}\}, \{a, \{c\}\}, \\ \{a, b, \{c\}\} \}$$

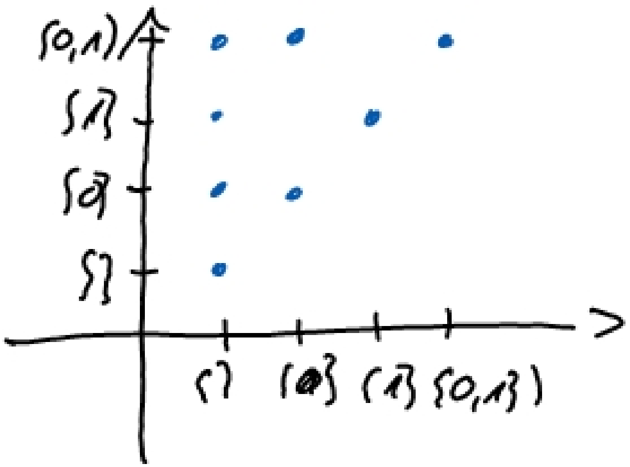
4) $\mathcal{P}(X) = \{\{\}, \{0\}, \{1\}, \{0,1\}\}$

$(\{\}, \{0\}) \in \mathcal{P}(X) \times \mathcal{P}(X)$ ✓

$a \leq b$

$(\{1\}, \{0\}) \in \mathcal{P}(X) \times \mathcal{P}(X)$ ↯

$R = \{(\{\},\{\}), (\{\},\{1\}), (\{\},\{0\}), (\{\},\{0,1\}),$
$(\{0\},\{0\}), (\{0\},\{0,1\}), (\{1\},\{0,1\}), (\{1\},\{1\}),$
$(\{0,1\},\{0,1\})\}$



6) $A(p,q) = p \rightarrow q \leftrightarrow \neg p \vee q$ Bijunktion

$$((p \rightarrow q) \wedge (\neg p \vee q)) \vee (\neg(p \rightarrow q) \wedge \neg(\neg p \vee q))$$

$$(a \wedge b) \vee (\neg a \wedge \neg b)$$

$$((\underbrace{\neg p \vee q}_{p}) \wedge (\underbrace{\neg p \vee q}_{p})) \vee (\neg(\neg p \vee q) \wedge (p \wedge \neg q))$$

$$((p \wedge \neg q) \wedge (p \wedge \neg q))$$

$$w \quad \vee \quad w$$

$$w$$

7) $\heartsuit = \{ (a,b) \in \mathbb{N} \times \mathbb{N} \mid \sqrt{a} - \sqrt{b} = 2 \cdot k \,;\, k \in \mathbb{N} \}$

$\mathbb{N} = \{0, 1, 2, \dots\}$

reflexiv: $(a,a) \in \heartsuit \,;\, a \in \mathbb{N}$

$$\sqrt{a} - \sqrt{a} = 0 = 2 \cdot k \qquad k = 0 \in \mathbb{N}$$

transitiv: $(a,b) \in \heartsuit \wedge (b,c) \in \heartsuit \Rightarrow (a,c) \in \heartsuit$

$$\sqrt{a} \cdot \sqrt{b} = 2 \cdot k_1 \quad \wedge \quad \sqrt{b} - \sqrt{c} = 2 \cdot k_2$$

$$\sqrt{b} = 2 \cdot k_2 + \sqrt{c}$$

$$\sqrt{a} - (2k_2 + \sqrt{c}) = 2k_1$$

$$\sqrt{a} - \sqrt{c} = 2 \cdot (k_1 + k_2) = 2 \cdot k_3 \quad ; k_3 \in \mathbb{N}$$

antisymmetrisch

$(4, 36) = \sqrt{4} - \sqrt{36} = 2 - 6 = 2 \cdot k$

$k \notin \mathbb{N}$

$(36, 4) = \sqrt{36} - \sqrt{4} = 4$

$(a, b) \in ♡ \Rightarrow (b, a) \notin ♡ \quad ; a \neq b$

$\sqrt{a} - \sqrt{b} = 2 \cdot k_1 \quad \wedge \quad \sqrt{b} - \sqrt{a} = 2 \cdot k_2$

$\sqrt{a} - \sqrt{b} = -2 \cdot k_2$

$2k_1 = -2k_2$

$k_1 = -k_2 \qquad ↯ \quad k_1; k_2 \in \mathbb{N}$

g) a) $f(x) = \sqrt{13-3x}$; $g(x) = x-1$; $\mathbb{D} = \mathbb{R}^{\leq 13/3}$

$\sqrt{13-3x} = x-1 \quad | \; (\;)^2$

$13-3x = (x-1)^2 = x^2-2x+1 \quad | -13+3x$

$x^2+x-12 = 0 = (x+4)(x-3) \qquad x_1 = -4 \vee x_2 = 3$

$f(-4) = \sqrt{25} = 5 \quad g(x) = -4-1 = -5 \qquad ↯$

$f(3) = \sqrt{4} = 2 \quad g(3) = 3-1 = 2 \qquad ✓$

$\mathbb{L} = \{3\} \qquad \underline{\underline{S(3/2)}}$

5) $\dfrac{2x^2}{x^2+4x} - \dfrac{5x+4}{3x+12} = i(x)$; $j(x) = \dfrac{x-5}{3x}$

$x\cdot(x+4)$ $\quad 3\cdot(x+4)$

$\mathbb{D} = \mathbb{R} \setminus \{-4; 0\}$

$$\frac{2x^2}{x(x+4)} - \frac{5x+4}{3\cdot(x+4)} = \frac{\cancel{x}-5}{3\cdot x} \quad \Big|\ 3\cdot x\ (x+4)$$

$$6x^2 - x(5x+4) = (x-5)(x+4)$$

$$6x^2 - 5x^2 - 4x = x^2 - x - 20 \quad |-x^2$$

$$-3x = -20$$

$$x = 20/3 \qquad \mathbb{L} = \{20/3\}$$

10) $\mathcal{R} = \{(x,y) \in \mathbb{R} \times \mathbb{R} \mid 2 \cdot y = e^{\alpha \cdot x} ; \alpha \in \mathbb{R}\}$

$$y = \tfrac{1}{2} \cdot e^{\alpha \cdot x}$$

$y = \pm\sqrt{x}$

Funktion: $f(x) = y_1 \wedge f(x) = y_2 \Rightarrow y_1 = y_2$

$$y_1 = \tfrac{1}{2} \cdot e^{\alpha \cdot x} = \tfrac{1}{2} e^{\alpha \cdot x} = y_2$$

$$y_1 = y_2$$

injektiv: $f(x_1) = y \wedge f(x_2) = y \Rightarrow x_1 = x_2$

$$\tfrac{1}{2} \cdot e^{\alpha x_1} = \tfrac{1}{2} \cdot e^{\alpha x_2} \qquad | \cdot 2 \quad | \ln$$

$$\alpha x_1 = \alpha x_2$$

$$x_1 = x_2 \qquad ✓$$

Surjektiv $\{ y \in \mathbb{R} \mid y = \ln e^{\alpha \cdot x} ; x \in \mathbb{R} \}$

$y \in \mathbb{R}^+ \neq \mathbb{R} \neq RAN(r)$

total : $\{ x \in \mathbb{R} \mid y = \ln e^{\alpha x} ; y \in \mathbb{R} \}$

$x \in \mathbb{R} \Leftrightarrow \mathbb{D} = DOM(r)$

11) $\boxed{9^n + 7} = 8 \cdot k \quad ; n \in \mathbb{N} ; k \in \mathbb{Z}$

$n = 1 \qquad 9^1 + 7 = 16 = 8 \cdot k \qquad ; k = 2 \in \mathbb{Z}$ ✓

$n+1 \qquad 9^{n+1} + 7 = 8 \cdot k_1$

$9^1 \cdot 9^n + 7 = 8 \cdot k_1$

$\underbrace{\boxed{9^n + 7}} + 8 \cdot 9^n = 8 \cdot k_1$

$8k_2 + 8 \cdot 9^n = 8 \cdot k_1$

$8(k_2 + 9^n) = 8 \cdot k_1$

$\mathbb{Z} + \mathbb{N} \longrightarrow \mathbb{Z}$ ✓

1)

$$1 + n \cdot a \leq \boxed{(1+a)^n} \quad ; \quad n \in \mathbb{N}$$

$n = 1$

$$1 + 1 \cdot a \leq (1+a)^1$$

$$1 + a \leq 1 + a \quad \checkmark$$

$n+1$:

$$1 + (n+1) \cdot a \leq (1+a)^{n+1}$$

$$1 + n \cdot a + a \leq \boxed{(1+a)^n} \cdot (1+a)^1$$

$$1 + n \cdot a + a \leq (1 + n \cdot a) \cdot (1+a) = 1 + n \cdot a + a + n \cdot a^2$$

$$0 \leq \underbrace{n}_{\substack{n \in \mathbb{N} \\ \geq 0}} \cdot \underbrace{a^2}_{\geq 0} \quad \Big\} \geq 0$$

13) $\underbrace{\sum (k-1)\cdot \ln}_{a_n} \left(\frac{k}{k-1}\right) = n \cdot \underbrace{\ln(n) - \ln}_{S_n}(n!)$

$n=2$: $\qquad a_2 = S_2$

$$(2-1)\cdot \ln\left(\frac{2}{2-1}\right) = 2\cdot \ln(2) - \ln(2!)$$

$$\ln 2 = 2\cdot \ln 2 - 1\cdot \ln 2 \quad \checkmark$$

$n: n+1$ $\qquad S_n + a_{n+1} = S_{n+1}$

$$\underbrace{n\cdot\ln(n)-\ln(n!)}_{S_n}+\overbrace{((n+1)-1)\cdot\ln\left(\frac{n+1}{n}\right)}^{a_{n+1}}=$$

$$\underbrace{(n+1)\cdot\ln(n+1)-\ln(n+1)!}_{S_{n+1}}$$

$$n\ln(n)-\ln(n!)+n\cdot\ln\left(\frac{n+1}{n}\right)=n\cdot\ln(n+1)+1\cdot\ln(n+1)$$

$$-\ln[(n+1)\cdot n!]$$

$$-(\ln(n+1)+\ln(n!))$$

$$-\ln(n+1)-\ln(n!)$$

$$n\cdot\ln(n)+n\cdot\ln\left(\frac{n+1}{n}\right)=n\cdot\ln(n+1)$$

$$n\cdot\left[\ln\left[n\cdot\frac{(n+1)}{n}\right]\right]=n\cdot\ln(n+1)$$

$= \checkmark$

14)

$$a_n = \sqrt{2} + e^{-2n}$$

$$a_{n+1} - a_n \begin{cases} \to > 0 \\ \to < 0 \end{cases}$$

$$\sqrt{2} + e^{-2\cdot(n+1)} - \left[\sqrt{2} + e^{-2n}\right]$$

$$e^{-2n-2} - e^{-2n} = \frac{1}{e^{2n+2}} - \frac{1}{e^{2n}}$$

$$\frac{1}{e^2 \cdot e^{2n}} - \frac{1}{e^{2n}} = \frac{1 - e^2}{e^2 e^{2n}} = \frac{<0}{>0} = < 0$$

$$\frac{\sqrt{2} + e^{-2-2n}}{\sqrt{2} + e^{-2n}}$$

$$\frac{a_{n+1}}{a_n} \begin{cases} \to |\,| > 1 \\ \to]-1;1[\end{cases}$$

$$\frac{\sqrt{2} + \frac{1}{e^{2n+2}}}{\sqrt{2} + \frac{1}{e^{2n}}} = \frac{\frac{\sqrt{2}\cdot e^{2n+2} + 1}{e^{2n+2}}}{\frac{\sqrt{2} e^{2n} + 1}{e^{2n}}} = \frac{\sqrt{2} e^{2n+2} + 1}{e^{2n+2}} \cdot \frac{e^{2n}}{\sqrt{2} e^{2n} + 1}$$

$$\frac{\sqrt{2}\, e^{2n+2} + 1}{e^{2n+2}} \cdot \frac{e^{2n}}{\sqrt{2}\, e^{2n} + 1}$$

$$\frac{\left(e^{2} \cdot e^{2n} \cdot \sqrt{2} + 1\right) \cdot \cancel{e^{2n}}}{e^{2} \cdot \cancel{e^{2n}} \cdot \left(\sqrt{2}\, e^{2n} + 1\right)} = \frac{e^{2} \cdot e^{2n} \sqrt{2} + 1}{e^{2} \cdot e^{2n} \cdot \sqrt{2} + e^{2}} < 1$$

$0,\ldots$

$$\lim_{n \to \infty} \left(\sqrt{2} + e^{-2n}\right) = \lim_{n \to \infty} \left(\sqrt{2} + \frac{1}{e^{2n}}\right) = \sqrt{2}$$

$\Rightarrow$ Beschränktheit $a_n \in [\sqrt{2}+1 ; \sqrt{2}[$

$n \geq 8$

15)

$$a_{n+1} = \sqrt{a_n} + 2 \quad ; \quad a_1 = 2{,}25 \quad ; \quad n \geq 1$$

$$a_1 = 2{,}25 \quad ; \quad a_2 = \sqrt{2{,}25} + 1 = 1{,}5 + 2 = 3{,}5$$

Behauptung: $a_{n+1} > a_n$

$n = 1$ $\qquad a_2 > a_1 \qquad 3{,}5 > 2{,}25$ ✓

$n+1$

$$a_{n+2} > a_{n+1}$$

$$\sqrt{a_{n+1}} + 2 > \sqrt{a_n} + 2 \qquad | -2$$

$$\sqrt{a_{n+1}} > \sqrt{a_n} \qquad | \uparrow^2$$

$$a_{n+1} > a_n$$

Beschränktheit: $a_1 = 2{,}25$ ist untere Schranke

$$\lim_{n\to\infty} a_n = \lim_{n\to\infty} a_{n+1}$$

$$\underbrace{\lim_{n\to\infty} a_n}_{g}$$

$$g = \sqrt{g} + 2 \quad | -2$$

$$(g-2)^2 = \sqrt{g} \quad | ()^2$$

$$g^2 - 4g + 4 = g \quad | -g$$

$$g^2 - 5g + 4 = 0$$

$$(g-4)(g-1) = 0$$

$$g_1 = 4 \quad \vee \quad g_2 = 1$$

Behauptung: $a_n < 4$

$n=1$: $a_1 = 2{,}25 < 4$ ✓

$n+1$: $a_{n+1} < 4$ (zu zeigen)

$$\sqrt{a_n} < \sqrt{4} = 2 \quad | +2$$

$$\sqrt{a_n} + 2 < 4$$

$$\underbrace{\sqrt{a_n} + 2}_{a_{n+1}} < 4$$

$$\sum_{k=2}^{\infty} (-1)^{k+1} \cdot \frac{3 \cdot 9^{k}}{(2k+1)!}$$

$$\underbrace{\sum_{k=0}^{\infty} (-1)^{k} \cdot \frac{x^{2k+1}}{(2k+1)!}}_{\sin(x)}$$

$$\sum_{k=2}^{\infty} (-1)^{k} \cdot (-1)^{1} \frac{3^{2k+1}}{(2k+1)!}$$

$$3 \cdot 9^{k} = 3 \cdot (3^{2})^{k}$$
$$= 3^{1} \cdot 3^{2k} = 3^{2k+1}$$

$$-\left[\sin(3) - \left(\underbrace{(-1)^{0} \cdot \frac{3^{0+1}}{(0+1)!}}_{a_0} + \underbrace{(-1)^{1} \cdot \frac{3^{2+1}}{(2+1)!}}_{a_1} \right) \right]$$

$$-\left[\sin(3) - \left(3 - \frac{9}{2} \right) \right] = -\sin(3) - 1{,}5$$

$$\sum \frac{k^n \cdot x^k}{\sqrt{42k!}} \quad ; \quad n \in \mathbb{N}$$

$$\lim_{k \to \infty} \frac{(k+1)^n \cdot x^{k+1}}{\sqrt{42 \cdot (k+1)!}} \cdot \frac{\sqrt{42k!}}{k^n \cdot x^k}$$

$$\left(\frac{k+1}{k}\right)^n \cdot \frac{x^{k+1}}{x^k} \cdot \sqrt{\frac{42k!}{42 \cdot (k+1)!}}$$

$$\underbrace{\left(1 + 1/k\right)^n}_{1} \cdot x \cdot \underbrace{\sqrt{\frac{1}{(k+1)}}}_{0}$$

$$1 \cdot x \cdot 0 = 0 < 1 \;\checkmark$$

$x \in \mathbb{R}$ (Konvergent)

19) a) $\lim\limits_{x\to\infty}\left(\frac{3}{x}-\left(1+\frac{3}{x}\right)^{x}\right)$

$\downarrow$

$0 - e^3 \Rightarrow -e^3$

$\left(1+\frac{r}{x}\right)^x \to e^r$

b) $\lim\limits_{x\to 2}\frac{\cos(5\pi - x\pi)}{4x-8} = \frac{-1}{0} = -\infty$

c) $\lim\limits_{x\to\infty}\left(\sqrt[x]{e}\;\frac{3x^2-5x+7}{x-8+6x^2}\right)$

$\sqrt[x]{e} \to 1$

$\frac{3x^2-5x+7}{x-8+6x^2} \to \frac{\cancel{x^2}\left(3-\frac{5}{x}+\frac{7}{x^2}\right)}{\cancel{x^2}\left(\frac{1}{x}-\frac{8}{x^2}+6\right)} = \frac{3}{6}$

$\frac{5}{x} \to 0$, $\frac{7}{x^2} \to 0$, $\frac{1}{x} \to 0$, $\frac{8}{x^2} \to 0$

$\left.\begin{matrix} 1 \\ \frac{3}{6} \end{matrix}\right\} \frac{1}{2}$

21) $$\lim_{x\to 0}\left(\frac{2x}{\frac{1}{3}\sqrt{9+2x}-1}\right)=\frac{0}{0}$$

a) $$\lim_{x\to 0}\frac{2}{\frac{1}{3}\frac{1}{2\cdot\sqrt{9+2x}}\cdot 2}=\lim_{x\to 0}\frac{2}{\frac{1}{3\cdot\sqrt{9+2x}}}=\underline{\underline{18}}$$

b) $$\frac{2x}{\frac{1}{3}\sqrt{9+2x}-1}\cdot\frac{\frac{1}{3}\sqrt{9+2x}+1}{\frac{1}{3}\sqrt{9+2x}+1}=\frac{2x\cdot\left(\frac{1}{3}\sqrt{9+2x}+1\right)}{\frac{1}{9}\cdot(9+2x)-1}$$

$$1+\frac{2}{9}x-1$$

$$\frac{2}{9}x$$

$$\lim_{x\to 0}2\cdot\left(\frac{1}{3}\sqrt{9+2x}+1\right)\cdot\frac{9}{2}=\underline{\underline{18}}$$

23)

$$f(x) = \begin{cases} x^2 + ax + b & x \geq 1 \\ x(2-b) + 2a & x < 1 \end{cases}$$

$$\lim_{x \to 1^+} f(x) = f(1) = \lim_{x \to 1^-} f(x)$$

$$1 + a + b = 1 + a + b = 2 - b + 2a$$

$$-a + 2b = 1$$

$$-(-b) + 2b = 3b = 1$$

$$\underline{\underline{b = 1/3}}$$

$$f'(x) = \begin{cases} 2x + a & ; x \geq 1 \\ 2 - b & ; x < 1 \end{cases}$$

$$\underline{\underline{a = -1/3}}$$

$$\lim_{x \to 1^+} f'(x) = f'(1) = \lim_{x \to 1^-} f'(x)$$

$$2 + a = 2 + a = 2 - b \Rightarrow a = -b$$

27)

$$f(x) = \tfrac{1}{2}x^3 - 3x^2 + \tfrac{9}{2}x + 42$$

$$f'(x) = \tfrac{3}{2}x^2 - 6x + \tfrac{9}{2}$$

$$f''(x) = 3x - 6 = 0 \quad \Rightarrow x = 2$$

$$f'(2) = 6 - 12 + \tfrac{9}{2} = -\tfrac{3}{2} = m$$

$$f(2) = 4 - 12 + 9 + 42 = 43 = y$$

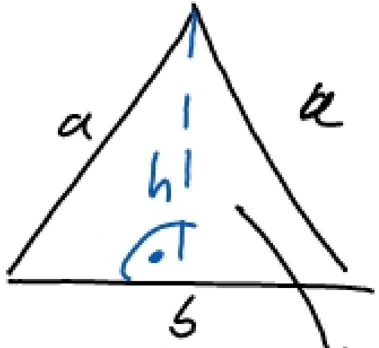
$$y = m \cdot x + s$$

$$43 = -\tfrac{3}{2} \cdot 2 + s \quad \Rightarrow s = 46$$

$$y = -\tfrac{3}{2}x + 46$$

28| $U = 6\ \text{cm}$

$A = \frac{1}{2} \cdot g \cdot h$



$6 = 2a + s$

$A = \frac{1}{2} \cdot s \cdot h$

$h^2 + \left(\frac{s}{2}\right)^2 = a^2$

$h^2 = a^2 - \frac{s^2}{4}$

$h = \sqrt{a^2 - \frac{s^2}{4}}$

$A = \underline{\frac{1}{2} \cdot s} \sqrt{a^2 - \frac{s^2}{4}}$

$(3 - \frac{1}{2} s) = a$

$A = \sqrt{\underline{\frac{1}{4} s^2} \cdot \left[\left(3 - \frac{s}{2}\right)^2 - \frac{s^2}{4}\right]}$

$A(s) = \sqrt{\frac{1}{4} s^2 \left(9 - 3s + \frac{s^2}{4} - \frac{s^2}{4}\right)}$

$$A(s) = \tfrac{1}{2} \cdot \sqrt{9s^2 - 3s^3}$$

$$A'(s) = \frac{1}{2} \cdot \frac{1}{2 \cdot \sqrt{9s^2 - 3s^3}} \cdot (18s - 9s^2)$$

$$= \frac{18s - 9s^2}{4 \cdot \sqrt{9s^2 - 3s^3}} = 0$$

$$18s - 9s^2 = 0$$

$$9s(2 - s) = 0$$

$$s = 0 \lor s = 2$$

$$f'(2) = 0$$

$s = 2$ $\quad a = 2$

$$f'(1) = \frac{18 - 9}{>0} > 0 \quad \nearrow$$

$$f'(3) = \frac{54 - 81}{>0} < 0 \quad \searrow$$

Ma

$$A(2) = \tfrac{1}{2} \cdot \sqrt{36 - 24} = \tfrac{1}{2} \cdot \sqrt{12} = \sqrt{3}$$

29)

$x = 3$: Tiefpunkt

$(2 / \tfrac{7}{3})$: Wendepunkt

↳ Steigung -2

$f(x) = ax^3 + bx^2 + cx + d$

$f'(x) = 3ax^2 + 2bx + c$

$f''(x) = 6ax + 2b$

$f'(3) = 0 \qquad 0 = 27a + 6b + c$

$f(2) = \tfrac{7}{3} \qquad \tfrac{7}{3} = 8a + 4b + 2c + d$

$f''(2) = 0 \qquad 0 = 12a + 2b \quad \Rightarrow b = -6a$

$f'(2) = -2 \qquad -2 = 12a + 4b + c$

$\ominus$

$2 = 15a + 2b \qquad 2 = 15a - 12a$

$2 = 3a \quad \Rightarrow a = \tfrac{2}{3}$

$b = -4$

$a = 2/3$ $\qquad b = -4$ $\qquad -2 = 12a + 4b + c$

$2/3 = 8a + 4b + 2c + d$

$\uparrow$

ACHT

$-2 = 8 - 16 + c$

$6 = c$

$2/3 = 16/3 - 16 + 12 + d$

$d = -2/3$

$f(x) = 2/3\, x^3 - 4x^2 + 6x - 2/3$

30) 5)

$$\int_1^3 (\underbrace{x^2 - 6x + 8}_{(x-4)(x-2)})\,dx = \int_1^2 f(x)\,dx + \int_2^3 f(x)\,dx$$

$$F(x) = \tfrac{1}{3}x^3 - 3x^2 + 8x$$

$$F(3) = 9 - 27 + 24 = 6$$

$$F(2) = \tfrac{8}{3} - 12 + 16 = \tfrac{20}{3}$$

$$F(1) = \tfrac{1}{3} - 3 + 8 = \tfrac{16}{3}$$

$$|F(3) - F(2)| + |F(2) - F(1)|$$

$$\left|\tfrac{18}{3} - \tfrac{20}{3}\right| + \left|\tfrac{20}{3} - \tfrac{16}{3}\right| = \tfrac{2}{3} + \tfrac{4}{3} = \tfrac{6}{3} = \underline{\underline{2}}$$

31) $f(x) = 2 \cdot \sqrt{2x+5}$; $g(x) = x$

1. Schnittstellen $f(x) = g(x)$

$$2\sqrt{2x+5} = x \quad |\ ^2$$
$$4 \cdot (2x+5) = x^2$$
$$x^2 - 8x - 20 = 0 \qquad x_1 = 10$$
$$(x-10)(x+2) = 0 \qquad x_2 = -2$$

2. Differenzfunktion: $2\sqrt{2x+5} - x = d(x)$

$$2 \cdot (2x+5)^{1/2}$$
$$G(x) = \tfrac{2}{3}(2x+5)^{3/2}$$
$$G'(x) = \tfrac{3}{2} \cdot \tfrac{2}{3} \cdot (2x+5)^{1/2} \cdot 2 = 2 \cdot \sqrt{2x+5}$$

$$\int_{-2}^{10} d(x)\, dx = \left| D(10) - D(-2) \right| = 8$$

$$\cancel{D(10) = 2 \cdot \sqrt{2 \cdot 10 + 5} = 2 \cdot \sqrt{25} = 10}$$

$$\cancel{D(-2) = 2 \cdot \sqrt{1} = 2 \cdot \sqrt{1} = 2}$$

$$D(x) = \frac{2}{3} \cdot \sqrt{(2x+5)^3} \Rightarrow \cancel{\frac{2}{3} \cdot \frac{3}{2}} \cdot (2x+5)^{1/2} \cdot 2$$

$$\left.\begin{aligned} D(10) &= \frac{2}{3} \cdot \sqrt{(25)^3} = \frac{250}{3} \\ D(-2) &= \frac{2}{3} \cdot \sqrt{1^3} = \frac{2}{3} \end{aligned}\right\} A = \frac{248}{3}$$