

S 96

$$a) (2x - \frac{1}{10}y)^2 = 4x^2 - 2 \cdot 2x \cdot \frac{1}{10}y + \frac{1}{100}y^2 = 4x^2 - \frac{2}{5}xy + \frac{1}{100}y^2$$

$$b) (ax + 3y)^2 = a^2x^2 + 6axy + 9y^2$$

$$c) (2x - \frac{1}{4}xy) \cdot (2x + \frac{1}{4}xy) = 4x^2 - \frac{1}{4}x^2y^2$$

$$d) (2cd - \frac{3}{c}d)^2 = (2cd)^2 - 2 \cdot 2cd \cdot \frac{3}{c}d + (\frac{3}{c}d)^2 = 4c^2d^2 - 12d^2 + 9 \frac{d^2}{c^2}$$

$$e) (\frac{x}{4} + 2xy)^2 = \frac{x^2}{16} + x^2y + 4x^2y^2$$

$$f) (\frac{1}{3}x - \frac{1}{10}y) \cdot (\frac{1}{3}x + \frac{1}{10}y) = \frac{1}{9}x^2 - \frac{1}{100}y^2$$

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$$1) 3 \cdot (\frac{1}{3}x + 2y)(\frac{1}{3}x - 2y) - 4 \cdot (2\frac{x}{y} + 3y)^2$$

$$3 \cdot (\frac{1}{9}x^2 - 4y^2) - 4 \cdot (4\frac{x^2}{y^2} + 12x + 9y^2)$$

$$\frac{1}{3}x^2 - 12y^2 - 16\frac{x^2}{y^2} - 48x - 36y^2$$

$$\frac{1}{3}x^2 - 48y^2 - 16\frac{x^2}{y^2} - 48x$$

$$g) \quad \underline{(2i-1)^4}$$

$$1(2i)^4(-1)^0 + 4(2i)^3(-1)^1 + 6(2i)^2(-1)^2 + 4(2i)^1(-1)^3 + 1(2i)^0(-1)^4$$

$$16 - 32i \underset{(-i)}{^3} + 24 \underset{(-1)}{i^2} - 8i + 1$$

$$-7 + 24i$$

$$h) \quad (0,4i + 8)^5 = \left(\frac{4}{10}i + 8\right)^5 = \left[4 \cdot \left(\frac{1}{10}i + 2\right)\right]^5 = 4^5 \cdot \underline{\left(\frac{1}{10}i + 2\right)^5}$$

$$4^5 \cdot \left[1\left(\frac{1}{10}i\right)^5 \cdot 2^0 + 5\left(\frac{1}{10}i\right)^4 \cdot 2^1 + 10\left(\frac{1}{10}i\right)^3 \cdot 2^2 + 10\left(\frac{1}{10}i\right)^2 \cdot 2^3 + 5\left(\frac{1}{10}i\right)^1 \cdot 2^4 + 1\left(\frac{1}{10}i\right)^0 \cdot 2^5\right]$$

$$4^5 \cdot \left[\frac{1}{10^5}i^5 + \frac{10}{10^4}i^4 + \frac{40}{10^3}i^3 + \frac{80}{10^2}i^2 + \frac{80}{10}i + 32\right]$$

$$4^5 \cdot \left[\frac{1}{10^5}i + \frac{1}{10^3} - \frac{4}{10^2}i - \frac{8}{10} + 8i + 32\right]$$

$$1024 \cdot \left(\frac{1 - 800 + 32000}{1000} + \frac{1 - 400 + 80.000}{10.000}i\right)$$

$$1024 \cdot \left(\frac{31201}{1000} + \frac{79601}{10.000}i\right) = 2^{10} \cdot (31,201 + 7,9601i)$$

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

$$* 3 \cdot \sqrt{x} \cdot \sqrt{3x}$$

$$\downarrow$$

$$\sqrt{3^2} \cdot \sqrt{x} \cdot \sqrt{3x}$$

$$\sqrt{3^2 \cdot x \cdot 3x} = \sqrt{27x^2}$$

$$= \frac{3\sqrt{x} - 3\sqrt{x} \cdot \sqrt{3x} + 2 - 2\sqrt{3x}}{1-3x}$$

$$= \frac{3\sqrt{x} - \sqrt{27x^2} + 2 - \sqrt{12x}}{1-3x}$$

$$4) \frac{\sqrt{x} - 2\sqrt{1-x}}{2\sqrt{3x} - 4} \cdot \frac{2\sqrt{3x} + 4}{2\sqrt{3x} + 4} = \frac{(\sqrt{x} - 2\sqrt{1-x})(2\sqrt{3x} + 4)}{4 \cdot 3x - 16}$$

$$= \frac{\sqrt{x} \cdot 2\sqrt{3x} + 4\sqrt{x} - 4\sqrt{1-x} \cdot \sqrt{3x} - 8\sqrt{1-x}}{12x - 16}$$

$$= \frac{2x \cdot \sqrt{3} + 4\sqrt{x} - 4\sqrt{3x-3x^2} - 8\sqrt{1-x}}{12x - 16}$$

$$\begin{aligned}
 5) \quad x \rightarrow -3 & : \frac{2x+6}{6-2\sqrt{3-2x}} \cdot \frac{6+2\sqrt{3-2x}}{6+2\sqrt{3-2x}} \\
 & \Downarrow \\
 & (x+3) \quad \frac{2 \cdot (x+3) \cdot (6+2\sqrt{3-2x})}{36-4(3-2x)} \\
 & \quad \quad \quad 36-12+8x = 8x+24 = 8 \cdot (x+3) \\
 & \Rightarrow \frac{2 \cdot (6+2\sqrt{3-2x})}{8} = \underline{\underline{3}}
 \end{aligned}$$

$$\begin{aligned}
 6) \quad x \rightarrow 6 & : \frac{x^2-4x-12}{2\sqrt{2x+4}-8} \cdot \frac{2\sqrt{2x+4}+8}{2\sqrt{2x+4}+8} \\
 & \Downarrow \\
 & (x-6) \quad \frac{(x-6)(x+2)(2\sqrt{2x+4}+8)}{4 \cdot (2x+4) - 64} \\
 & \quad \quad \quad 4 \cdot (2x+4) - 64 = 8x - 48 = 8 \cdot (x-6) \\
 & \Rightarrow \frac{(x+2)(2\sqrt{2x+4}+8)}{8} = \underline{\underline{16}}
 \end{aligned}$$

$$\sqrt{x+1} - 3 = x$$

$$\sqrt{x+1} = x+3$$

$$x+1 = (x+3)^2$$

$$= x^2 + 6x + 9$$

$$x^2 + 5x + 8$$

$$|+3$$

$$|\uparrow^2$$

$$|-x - 1$$

Isolierung

Neutralisation

Nullfou-

Koeffizient Variable

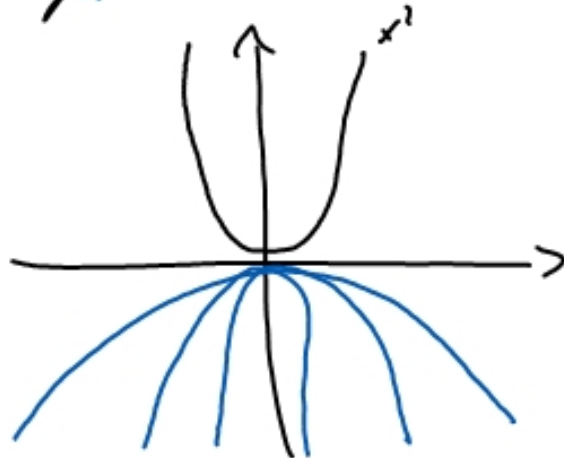
$$f(x) = 2 \cdot x^2$$

$$f_x(v) = 2 \cdot x \cdot v^2$$

↓      ↓      →  
Koeffizient    Parameter      Variable

$$f_v(x) = 2 \cdot x \cdot v^2$$

$$f(x) = a \cdot x^2$$



$a < 0$