

Ole
Westby

Obligatorisk Innleveringsoppgave Nr 1/4

Oppgave 1) a)

$$i) \sqrt{2\sqrt{8x^3} \cdot 2x^2\sqrt{2x}}$$

$$\sqrt[n]{ab} = \sqrt[n]{a} \cdot \sqrt[n]{b}$$

$$\sqrt[2]{2 \cdot \sqrt{8} \sqrt{x^3} \cdot 2x^2\sqrt{2x}} \\ \sqrt{2 \cdot \sqrt{8} (x^3) \cdot 2x^2\sqrt{2x}}$$

$$\sqrt{\frac{\sqrt{2} \cdot \sqrt{8} x^{3/2} \cdot 2x^2\sqrt{2x}}{2\sqrt{8} x^{3/2} \cdot 2x^2\sqrt{2x}}}$$

$$2 \cdot 2x^2\sqrt{8} x^{3/2} \cdot \sqrt{2} \sqrt{x}$$

$$2 \cdot 2\sqrt{8} x^{3/2} \cdot x^{1/2}$$

$$2 \cdot 2x^2\sqrt{8} x^{\frac{3}{2} + \frac{1}{2}}$$

$$2 \cdot 2x^2\sqrt{8} x^{2 + \frac{3}{2} + \frac{1}{2}}$$

rotten over hele
kommer tilbake
senere

$$\sqrt{8} = \sqrt{2^3} \\ (2^3)^{1/2}$$

$$\sqrt{\frac{\sqrt{18} \cdot 2^2\sqrt{2} x^{2 + \frac{3}{2} + \frac{1}{2}}}{2^{3/2} \cdot 2^2\sqrt{2} x^{2 + \frac{3}{2} + \frac{1}{2}}}}$$

$$2^2 2\sqrt{2} \sqrt{2} x^4$$

$$\sqrt{\frac{2^3 \cdot 2x^4}{2^4 x^4}}$$

$$\sqrt{2^4} \cdot \sqrt{x^4} = (2^4)^{1/2} \cdot (x^4)^{1/2}$$

$$2^2 \cdot x^2 = \underline{\underline{4x^2}}$$

$$\text{ii) } \sqrt[3]{\frac{e^{2x} - e^{-x}}{e^{-2x}}} : \frac{1}{e^{-x}}$$

$$e^{2x-x} = e^x$$

$$\sqrt[3]{\frac{e^x}{e^{-2x}}} \cdot e^{-x}$$

$$\sqrt[3]{e^{3x}} \cdot e^{-x}$$

$$e^x \cdot e^{-x} \\ e^{x-x} = e^0 = \underline{\underline{1}} \quad a^0 = 1$$

$$\text{b) i) } \sqrt{x+6} = 1 + 3\sqrt{x} \quad ()^2 = ()^2 \\ x+6 = (1 + 3\sqrt{x})^2 \quad (a+b)^2 = a^2 + 2ab + b^2$$

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

$$x+6 = 1 + 6\sqrt{x} + 9x$$

$$x+6-1 = 6\sqrt{x} + 9x$$

$$x-9x+5 = 6\sqrt{x}$$

$$-8x - (6\sqrt{x}) = -5$$

$$-6\sqrt{x} = -5 + 8x$$

$$(-6\sqrt{x})^2 = (-5 + 8x)^2$$

$$36x = (8x - 5)^2$$

$$a - b = a^2 - 2ab + b^2$$

$$= (8x)^2 - 2 \cdot 8x \cdot -5 + (-5)^2 \\ = 64x^2 - 16x(-5) + 25$$

$$36x = 64x^2 - 80x + 25$$

$$36x + 80x - 64x^2 - 25 = 0$$

$$64x^2 - 116x + 25 = 0$$

a b c

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$x = \frac{-(-116x) \pm \sqrt{(-116)^2 - 4 \cdot 64 \cdot 25}}{128}$$

$$x = \frac{116 \pm \sqrt{13456 - 6400}}{128} = \frac{116 \pm \sqrt{7056}}{128}$$

$$= \frac{116 \pm 84}{128} = \frac{200}{128} \quad \checkmark \quad \frac{32}{128}$$

$$\quad \quad \quad \frac{25}{16} \quad \checkmark \quad \frac{1}{4}$$

$$x = 1/4$$

$$x = \frac{25}{16}$$

$$x = \underline{\underline{\frac{1}{4}}}$$

$$ii) \left(1 + \frac{x}{100}\right)^{19} = 15000$$

$$1 + \frac{x}{100} = \sqrt[19]{15000}$$

$$100 + x = 100 \sqrt[19]{15000}$$

$$x = 100 \sqrt[19]{15000} - 100$$

Trol ikke jeg kommer lengre enn hit.

c) Tekstoppgave :

Jeg fikk 15 000 kroner i konfirmasjon,

La x være antall personer som ga penger

$\left(1 + \frac{x}{100}\right)^{19}$ Hvor mange personer ga penger?

d) $4,1252525\dots$ som et rasjonelt tall $\frac{p}{q}$

$$a = 4,1252525$$

$$1000a = 4125,2525$$

$$1000a - 10a = 4125,2525 - 41,2525 = 4084$$

$$990a = 4084$$

$$a = \frac{4084}{990} = \frac{2042}{495}$$

eller $\frac{16650101}{400000}$

16650101

400000

e) $200 \rightarrow 275$

$$\begin{array}{l} 20\% \\ 275 - 200 = 75 \\ 75 : 0,8 = 220 \end{array}$$
$$\frac{275}{200} = 1,375 \quad 37,5\%$$

$$200 \rightarrow 220 = \frac{220}{200} = \frac{110}{100} = \underline{\underline{10\%}}$$

Oppgave 2)

a) $y = f(x)$ er en funksjon
ved at man si en x verdi som vil
gi et utslag i funksjonsverdien til f i punktet x .

$y = 3x$, her vil funksjonsverdien
være tre ganger så stor
som x .

2b)

$$\text{Volum til kule} = V(r) = \frac{4\pi}{3} r^3$$

$$b) r = R_0 \quad r = 2R_0 \quad r = 3R_0$$

$$V_1 = R_0 = \frac{4\pi}{3} R_0^3$$

$$V_2 = 2R_0 = \frac{32\pi}{3} R_0^3$$

$$V_3 = 3R_0 = \frac{108\pi}{3} R_0^3$$

$$V_2 - V_1 = \frac{32\pi - 4\pi}{3} R_0^3 = \frac{28\pi}{3} R_0^3$$

$$V_3 - V_1 = \frac{108\pi - 4\pi}{3} R_0^3 = \frac{104\pi}{3} R_0^3$$

$$\frac{V_2 - V_1}{V_1} = \frac{32\pi - 4\pi}{4\pi} = \underline{\underline{7\pi}}$$

$$\frac{V_3 - V_1}{V_1} = \frac{108\pi - 4\pi}{4\pi} = \underline{\underline{26\pi}}$$

$$29) R_0 \ r = \sqrt[3]{\frac{3V}{4\pi}}$$

$$\underline{R_1 \ r = \sqrt[3]{\frac{6V}{4\pi}}}$$

$$\underline{\underline{R_3 = -\sqrt[3]{\frac{9V}{4\pi}}}}$$

$$\overset{\text{abs}}{R_2 - R_1} = \sqrt[3]{\frac{3V_1}{4\pi}} (\sqrt[3]{N_2} - 1)$$

$$\overset{\text{abs}}{R_3 - R_1} = \sqrt[3]{\frac{3V_1}{4\pi}} (\sqrt[3]{N_3} - 1)$$

rel

$$\frac{R_2 - R_1}{R_1} = \sqrt[3]{2^2 - 1} = 0.26$$

rel

$$\frac{R_3 - R_1}{R_1} = \sqrt[3]{3^2 - 1} = 0.442$$

Oppgave 3)

graf 3 er riktig fordi $f(r) = 0$ når
 $r < R_0$