

Repetition kap 1.

1101

Förenkla

$$x + (2x + 5)^2 - 4(x + 3)(x - 3) =$$

$$x + (4x^2 + 20x + 25) - 4(x^2 - 9) =$$
$$\triangle x + \cancel{4x^2} + \triangle 20x + \underline{25} - \cancel{4x^2} + \underline{36} =$$

$$21x + 61$$

1122

Förenkla med potenslagarna.

$$a) \quad 2x^{\frac{4}{3}} \cdot x^{-\frac{1}{3}} = 2 \cdot x^{\frac{4}{3} + (-\frac{1}{3})} = 2x^{\frac{4}{3} - \frac{1}{3}} = 2x^{\frac{3}{3}} = \underline{\underline{2x}}$$

$$b) \quad \frac{16^5}{8^5} = \left(\frac{16}{8}\right)^5 = 2^5 = \underline{\underline{32}}$$

$$c) \quad \frac{(-3a^{-3})^2}{a^{-4}} = \frac{(-3)^2 \cdot a^{-3 \cdot 2}}{a^{-4}} = \frac{9 \cdot a^{-6}}{1} \cdot a^4 = 9a^{-2} = \underline{\underline{\frac{9}{a^2}}}$$

$$a^x \cdot a^y = a^{x+y}$$

$$\frac{a^x}{a^y} = a^{x-y}$$

$$(a^x)^y = a^{x \cdot y}$$

$$a^x b^x = (ab)^x$$

$$\frac{a^x}{b^x} = \left(\frac{a}{b}\right)^x$$

$$a^0 = 1$$

$$a^{-x} = \frac{1}{a^x}$$

1123 a) Utveckla $(3^x + 3^{-x})^2 = \underbrace{(3^x)^2}_{3^{2x}} + \underbrace{2 \cdot 3^x \cdot 3^{-x}}_2 + \underbrace{(3^{-x})^2}_{3^{-2x}} = \underline{\underline{3^{2x} + 3^{-2x} + 2}}$

b) Byt ut 2^x ur $2^{x+h} - 2^x$, dvs skriv i faktorform.

$$\underline{\underline{2^x \cdot 2^h - 2^x = 2^x (2^h - 1)}}$$

c) Lös ekvationen

$$2^{x-1} = 4^7$$

$$2^{x-1} = (2^2)^7$$

$$2^{x-1} = 2^{14}$$

$$x-1 = 14$$

$$\underline{\underline{x = 15}}$$

$$4 = 2 \cdot 2$$

$$4 = 2^2$$

1139

Beräkna

$$a) \quad |6| + |-4| - |-7| = 6 + 4 - 7 = 3$$

$$b) \quad \sqrt{(-15)^2} = \sqrt{15^2} = 15$$

$$\sqrt{a} \geq 0$$

$$\text{om } a < 0 \Rightarrow i\sqrt{|a|}$$

1202

För vilka x-värden är uttrycket inte definierat?

a) $\frac{5x-1}{2x}$, E; def. $x=0$

$\underbrace{2x}_{=0}$

c) $\frac{2x}{x+1}$ Def. för alla $x \in \mathbb{R}$ Division med noll är problem!
 $\underbrace{x+1}_{=0}$ $x=-1$

b) $\frac{5x}{2x+4}$ E; def. $x=-2$

$\underbrace{2x+4}_{=0}$

$2x+4=0$
 $x=-2$

d) $\frac{x-10}{x^2-12x+35}$ E; def.

$\underbrace{x^2-12x+35}_{=0}$ pq-formel

$x = 6 \pm \sqrt{6^2 - 35}$

$\left[\begin{matrix} \in \\ \text{tillhör} \end{matrix} \right]$

$\begin{cases} x_1 = 7 \\ x_2 = 5 \end{cases}$

1235

Förenkle

$$a) \frac{15-5a}{a-3} = \frac{5 \cancel{(3-a)}}{-1 \cancel{(3-a)}} = -5$$

$$b) \frac{a^2-4}{6-3a} = \frac{(a+2) \cancel{(a-2)}}{-3 \cancel{(a-2)}} = \frac{a+2}{-3}$$

1256

Lös ekvationen

OBS!

$x_2 = -1$ är falsk!
pga. x_i def. termur

$$\frac{2x^2}{x+1} + 1 = \frac{2}{x+1}$$

MGN: $(x+1)$

$$(x+1) \left(\frac{2x^2}{x+1} + 1 \right) = \left(\frac{2}{x+1} \right) \cdot (x+1)$$

Multipluera VL o HL

$$2x^2 + x + 1 = 2$$

$$2x^2 + x - 1 = 0$$

$$x^2 + \frac{1}{2}x - \frac{1}{2} = 0$$

$$x = -\frac{1}{4} \pm \sqrt{\left(\frac{1}{4}\right)^2 - \left(-\frac{1}{2}\right)}$$

$$x = -\frac{1}{4} \pm \sqrt{\frac{1+8}{16}}$$

$$x = -\frac{1}{4} \pm \frac{3}{4}$$

$$\begin{cases} x_1 = \frac{1}{2} \\ x_2 = -1 \end{cases}$$