Hjemmearbeid matematikk – eksamensklassen **Ark 4**
Leveres mandag 9. september 2013

Løsningsforslag

Oppgave 1. Regn ut.

a) $10 - 20 + 30 - 40 = \mathbf{-20}$

b) $12 : (-3) - (-2) \cdot 6 = -4 - (-12) = -4 + 12 = \mathbf{8}$

c) $10^0 + 10^1 + 10^2 + 10^3 = 1 + 10 + 100 + 1\,000 = \mathbf{1\,111}$

d) $5 \cdot (6 - 4)^3 = 5 \cdot 2^3 = 5 \cdot 8 = \mathbf{40}$

e) $5 \cdot 10^2 - 4 \cdot 10^3 = 5 \cdot 100 - 4 \cdot 1\,000 = 500 - 4\,000 = \mathbf{-3\,500}$

f) $6 - (-2)^2 = 6 - (-2)\,(-2) = 6 - 4 = \mathbf{2}$

g) $3\,(7 - (-3)^2) = 3\,(7 - (-3)\,(-3)) = 3\,(7 - 9) = 3\,(-2) = \mathbf{-6}$

h) $5 - 2^2 \cdot (-2)^2 = 5 - 4 \cdot 4 = 5 - 16 = \mathbf{-11}$

i) $-2\,(6 \cdot 3 : (11 - 2) + 3) = -2\,(6 \cdot 3 : 9 + 3) = -2\,(18 : 9 + 3) = -2\,(2 + 3) = -2 \cdot 5 = \mathbf{-10}$

j) $4\,(10 - (-2)\,(12 - (-4 + 2) - 4) - 3) =$

$4\,(10 - (-2)\,(12 - (-2) - 4) - 3) =$

$4\,(10 - (-2)\,(12 + 2 - 4) - 3) =$

$4\,(10 - (-2) \cdot 10 - 3) =$

$4\,(10 + 20 - 3) = 4 \cdot 27 = \mathbf{108}$

Oppgave 2. Regn ut.

a) $10^{-1} = \mathbf{\frac{1}{10}}$

b) $100^{-2} = \frac{1}{100^2} = \mathbf{\frac{1}{10\,000}}$

c) $(-1)^0 = \mathbf{1}$

d) $(10^3)^{-2} = 1\,000^{-2} = \frac{1}{1\,000^2} = \mathbf{\frac{1}{1\,000\,000}}$

Oppgave 3. Skriv som potenser. (Eksempel : $2^3 \cdot 2^7 = 2^{10}$)

a) $4^5 \cdot 4^3 = \mathbf{4^8}$

b) $a^{10} : a^2 = \mathbf{a^8}$

c) $3^5 \cdot 3^6 : 3^{-3} = 3^{5+6-(-3)} = \mathbf{3^{14}}$

d) $a^6 : b^{-3} \cdot b^4 : a^4 = a^{6-4} \cdot b^{-(-3)+4} = \mathbf{a^2 b^7}$

Oppgave 4. Regn ut.
(Trenger du mer trening?
Gå inn på www.ma10kl.com og velg Oppgaver og Ganging med 10-potenser.)

a) $0.043 \cdot 10^5 = \mathbf{4\ 300}$

b) $0.043 \cdot 10^{-5} = \mathbf{0.00000043}$

c) $17\ 254 \cdot 10^{-4} = \mathbf{1.7254}$

d) $32.58 \cdot 10^3 = \mathbf{32\ 580}$

Oppgave 5. Skriv på standardform.

a) $0.01 = \mathbf{1 \cdot 10^{-2}}$

b) $0.00073 = \mathbf{7.3 \cdot 10^{-4}}$

c) $0.786 = \mathbf{7.86 \cdot 10^{-1}}$

d) $1\ 570\ 000 = \mathbf{1.57 \cdot 10^6}$

e) $4 \cdot 7\ 500 \cdot 10^4 = \mathbf{30\ \ 000 \cdot 10^4 = 3 \cdot 10^4 \cdot 10^4 = 3 \cdot 10^8}$

f) $20\ 000 \cdot 30\ 000 = \mathbf{2 \cdot 10^4 \cdot 3 \cdot 10^4 = 6 \cdot 10^8}$

Oppgave 6. Regn ut.

a) $y + 2z - 9z + 3y = \mathbf{4y - 7z}$

b) $3(2a + 3b) = \mathbf{6a + 9b}$

c) $5w^3 \cdot 4w^2 = \mathbf{20w^5}$

d) $4x(2x^2 - 5x + yx + 3) = \mathbf{8x^3 - 20x^2 + 4x^2y + 12x}$

e) $(2x - 5)(2y + 6x) = \mathbf{4xy + 12x^2 - 10y - 30x}$

f) $-2b(b - 2)(3a - 4b) = -2b(3ba - 4b^2 - 6a + 8b) = \mathbf{-6b^2a + 8b^3 + 12ba - 16b^2}$

g) $-c(2b - (c - b) + 2) = -c(2b - c + b + 2) = -c(3b - c + 2) = \mathbf{-3cb + c^2 - 2c}$

h) $2 - (b - a)^2 = 2 - (b - a)(b - a) = 2 - (b^2 - ba - ab + a^2) = 2 - b^2 + ba + ab - a^2$

$= \mathbf{2 - b^2 + 2ab - a^2}$

Oppgave 7. Faktoriser uttrykkene. Eksempel: $10b + 15b^2 = 5b\,(2 + 3b)$

a) $6a + 8 = \underline{2} \cdot 3 \cdot a + \underline{2} \cdot 2 \cdot 2 =$ **$2\,(3a + 4)$**

b) $14b - 10 = \underline{2} \cdot 7 \cdot b - \underline{2} \cdot 5 =$ **$2\,(7b - 5)$**

c) $4b - 2b^3 = \underline{2} \cdot 2 \cdot \underline{b} - \underline{2} \cdot \underline{b} \cdot b \cdot b =$ **$2b\,(2 - b^2)$**

d) $10c^2 - 5c + 20c^3 = 2 \cdot \underline{5} \cdot \underline{c} \cdot c - \underline{5} \cdot \underline{c} + 2 \cdot 2 \cdot \underline{5} \cdot \underline{c} \cdot c \cdot c =$ **$5c\,(2c - 1 + 4c^2)$**

e) $10a^8 - 4a^5 + 12a^6 =$ **$2a^5\,(5a^3 - 2 + 6a^1)$**

f) $6a^2b^3 + 10ab^5 + 8a^4b^2 =$ **$2ab^2\,(3ab + 5b^3 + 4a^3)$**

Oppgave 8. Sett inn a = -2 og regn ut.

a) $8 + a = 8 + (-2) = 8 - 2 =$ **6**

b) $2a - 3 = 2\,(-2) - 3 = -4 - 3 =$ **-7**

c) $3\,(5 - a) = 3\,(5 - (-2)) = 3\,(5 + 2) = 3 \cdot 7 =$ **21**

d) $a^3 - a^2 = (-2)^3 - (-2)^2 = -8 - 4 =$ **-12**