MA0001 Brukerkurs A i Matematikk

TRENINGSPROGRAM I ENKLE REGNEOPERASJONER

Oppgavene skal løses uten bruk av kalkulator!!!

BRØKREGNING:

Oppgave 1: Skriv brøken som desimaltall der du runder av etter 4 desimaler om nødvendig:

$$(a)\ \frac{1}{10},\quad (b)\ \frac{2}{5},\quad (c)\ \frac{9}{8},\quad (d)\ \frac{2}{2},\quad (e)\ \frac{2}{4},$$
$$(f)\ \frac{9}{15},\quad (g)\ \frac{3}{1},\quad (h)\ \frac{1}{3},\quad (i)\ \frac{13}{7},\quad (j)\ \frac{14}{7}$$

Oppgave 2: Beregn uttrykket og forenkle svaret.

$$(a)\ \frac{1}{4}+\frac{1}{4},\quad (b)\ \frac{x^2}{2(x^2+1)}+\frac{1}{2(x^2+1)},\quad (c)\ \frac{1}{4}+\frac{1}{2},\quad (d)\ \frac{1}{6}+\frac{1}{3},$$
$$(e)\ \frac{1}{6}+\frac{1}{2},\quad (f)\ \frac{1}{x-1}+\frac{1}{x+1}\ \text{for}\ |x|\neq 1,\quad (g)\ \frac{1}{x-1}-\frac{1}{x+1}\ \text{for}\ |x|\neq 1,$$
$$(h)\ \frac{15}{4}-1,\quad (i)\ \frac{x^2-1}{x^2+1}-1,\quad (j)\ \frac{a^2-1}{a^2+1}-2$$

Oppgave 3: Forenkle den brudne brøken.

$$(a)\ \frac{1/2}{1/2},\quad (b)\ \frac{1/2}{2},\quad (c)\ \frac{1/5}{2},\quad (d)\ \frac{1/5}{3/5},\quad (e)\ \frac{\frac{2}{15}}{\frac{3}{5}},$$
$$(f)\ \frac{\frac{a}{15}}{\frac{2a}{5}}\ \text{der}\ a\neq 0,\quad (g)\ \frac{\frac{x-1}{x^2+1}}{\frac{x^2-1}{x^2+1}}\ \text{der}\ x^2\neq 1,$$
$$(h)\ \frac{\frac{x}{x-1}}{\frac{2x}{x+1}}\ \text{der}\ x^2\neq 1,\quad (i)\ \frac{\frac{x}{x-1}}{\frac{2x}{x^2-1}}\ \text{der}\ x^2\neq 1,$$
$$(j)\ \frac{1/2}{1+1/2},\quad (k)\ \frac{2/3}{1+5/3},\quad (\ell)\ \frac{1/2}{1+5/3},\quad (m)\ \frac{1/5}{\frac{1}{3}+\frac{1}{2}},\quad (n)\ \frac{1/6}{\frac{1}{3}+\frac{1}{2}}$$

Oppgave 4: Beregn uttrykket og forenkle svaret.

$(a)\ \dfrac{1}{4}\cdot\dfrac{1}{4}$, $(b)\ \dfrac{x^2}{2(x^2+1)}\cdot\dfrac{1}{2(x^2+1)}$, $(c)\ \dfrac{2(x^2+1)}{x^2+2}\cdot\dfrac{1}{2(x^2+1)}$, $(d)\ \dfrac{1}{6}\cdot\dfrac{1}{3}$,

$(e)\ \dfrac{1}{6}\cdot 2$, $(f)\ \dfrac{1}{x-1}\cdot\dfrac{1}{x+1}$ for $|x|\neq 1$, $(g)\ \dfrac{1}{x-1}\cdot\dfrac{x^2-1}{x+1}$ for $|x|\neq 1$,

Oppgave 5: Beregn uttrykket og forenkle svaret.

$(a)\ \dfrac{1}{4}:\dfrac{1}{4}$, $(b)\ \dfrac{x^2}{2(x^2+1)}:\dfrac{1}{2(x^2+1)}$, $(c)\ \dfrac{1}{4}\Big/\dfrac{1}{2}$, $(d)\ \dfrac{1}{6}\Big/\dfrac{1}{3}$,

$(e)\ \dfrac{1}{6}:\dfrac{1}{2}$, $(f)\ \dfrac{1}{x-1}\Big/\dfrac{1}{x+1}$ for $|x|\neq 1$, $(g)\ (x-1):\dfrac{1}{x+1}$ for $x\neq -1$,

LØSNING AV LIGNINGER:

Oppgave 6: Løs ligningen, det vil si, finn verdien for x som passer i ligningen.

$(a)\ x+3=5$, $(b)\ x-3=5$, $(c)\ x+5=-1$, $(d)\ x+7=0$,

$(e)\ 2x+3=5$, $(f)\ 2x-3=5$, $(g)\ 2x+5=-1$, $(h)\ 2x+7=0$,

$(i)\ 1-3x=-5$, $(j)\ 8-2x=2$, $(k)\ (a^2+1)x+1=a^2$, $(\ell)\ \dfrac{\pi}{2}\,x-1=0$

Oppgave 7: Løs ligningen, det vil si, finn verdiene for x som passer i ligningen.

$(a)\ x^2-x-2=0$, $(b)\ x^2-2x-3=0$, $(c)\ 2x^2-5x+2=0$,

$(d)\ x^2+ax-2a^2=0$, $(e)\ x^2-9=0$, $(f)\ x^2-(a+1)^2=0$,

$(g)\ x^2-2x=3$, $(h)\ 2x^2-ax+4a=8x$, $(i)\ 3(x+p)x=2x+2p$,

$(j)\ 5x(x+2b)=2(x+2b)$, $(k)\ (a^2+1)x^2-2(a+1)x+1=0$ der $a>0$,

$(\ell)\ (a^2+1)x^2-2ax=1$

Oppgave 8: Løs ligningssystemet, det vil si, finn alle tallparene (x,y) som passer i begge ligningene.

$(a)\ x+1=0$ og $x+y=0$, $(b)\ x+y=1$ og $x-y=5$,

$(c)\ x+y=1$ og $y=x-5$, $(d)\ 2x-y=3$ og $x+y=0$,

$(e)\ 6x+y=0$ og $x+\dfrac{y}{3}=1$, $(f)\ x+y=0$ og $x^2+y^2=8$,

$(g)\ x-y=6$ og $x^2-4x=y$, $(h)\ x^2=y^2$ og $x^2-4x+3-y^2=0$,

$(i)\ x^2+y^2=5$ og $x^2-y^2=3$, $(j)\ x^2+y^2=4$ og $x^2+2x+y^2-2y=4(1+\sqrt{2})$

FASIT:

Oppgave 1:

(a) 0.1000, (b) 0.4000, (c) 1.1250, (d) 1.0000, (e) 0.5000,
(f) 0.6000, (g) 3.0000, (h) 0.3333, (i) 1.8571, (j) 2.0000

Oppgave 2:

$$(a)\ \frac{1}{2},\quad (b)\ \frac{1}{2},\quad (c)\ \frac{3}{4},\quad (d)\ \frac{1}{2},\quad (e)\ \frac{2}{3},\quad (f)\ \frac{2x}{x^2-1},$$
$$(g)\ \frac{2}{x^2-1},\quad (h)\ \frac{11}{4},\quad (i)\ \frac{-2}{x^2+1},\quad (j)\ -\frac{a^2+3}{a^2+1}$$

Oppgave 3:

$$(a)\ 1,\quad (b)\ \frac{1}{4},\quad (c)\ \frac{1}{10},\quad (d)\ \frac{1}{3},\quad (e)\ \frac{2}{9},\quad (f)\ \frac{1}{6},\quad (g)\ \frac{1}{x+1},\quad (h)\ \frac{x+1}{2(x-1)},$$
$$(i)\ \frac{x+1}{2},\quad (j)\ \frac{1}{3},\quad (k)\ \frac{1}{4},\quad (\ell)\ \frac{3}{16},\quad (m)\ \frac{6}{25},\quad (n)\ \frac{1}{5}$$

Oppgave 4:

$$(a)\ \frac{1}{16},\quad (b)\ \frac{x^2}{4(x^2+1)^2},\quad (c)\ \frac{2}{x^2+2},\quad (d)\ \frac{1}{18},\quad (e)\ \frac{1}{3},\quad (f)\ \frac{1}{x^2-1},\quad (g)\ 1$$

Oppgave 5:

$$(a)\ 1,\quad (b)\ x^2,\quad (c)\ \frac{1}{2},\quad (d)\ \frac{1}{2},\quad (e)\ \frac{1}{3},\quad (f)\ \frac{x+1}{x-1},\quad (g)\ x^2-1$$

Oppgave 6:

$$(a)\ 2,\quad (b)\ 8,\quad (c)\ -6,\quad (d)\ -7,\quad (e)\ 1,\quad (f)\ 4,\quad (g)\ -3,$$
$$(h)\ -\frac{7}{2},\quad (i)\ 2,\quad (j)\ 3,\quad (k)\ \frac{a^2-1}{a^2+1},\quad (\ell)\ \frac{2}{\pi}$$

Oppgave 7:

$$(a)\ -1,\ 2,\quad (b)\ -1,\ 3,\quad (c)\ \frac{1}{2},\ 2,\quad (d)\ -2a,\ a,\quad (e)\ -\sqrt{3},\ \sqrt{3},$$
$$(f)\ -(a+1),\ a+1,\quad (g)\ -1,\ 3,\quad (h)\ \frac{a}{2},\ 4,\quad (i)\ -p,\ \frac{2}{3},\quad (j)\ -2b,\ \frac{2}{5},$$
$$(k)\ \frac{a+1-\sqrt{2a}}{a^2+1},\ \frac{a+1+\sqrt{2a}}{a^2+1},\quad (\ell)\ \frac{a-\sqrt{2a^2+1}}{a^2+1},\ \frac{a+\sqrt{2a^2+1}}{a^2+1}$$

Oppgave 8: Tallparet (x, y) er gitt ved:

$$(a)\ (-1,1),\quad (b)\ (3,-2),\quad (c)\ (3,-2),\quad (d)\ (1,-1),\quad (e)\ (-1,6)$$
$$(f)\ (2,-2),\ (-2,2),\quad (g)\ (2,-4),\ (3,-3),\quad (h)\ \left(\frac{3}{4},-\frac{3}{4}\right),\ \left(\frac{3}{4},\frac{3}{4}\right),$$
$$(i)\ (-2,-1),\ (-2,1),\ (2,-1),\ (2,1),\quad (j)\ (\sqrt{2},-\sqrt{2})$$