

MA0001 Brukerkurs A i Matematikk

TRENINGSPROGRAM I ENKLE REGNEOPERASJONER

Opgavene 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.

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

Oppgave 4: Beregn uttrykket og forenkle svaret.

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

Oppgave 5: Beregn uttrykket og forenkle svaret.

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

LØSNING AV LIGNINGER:

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

$$(a) x + 3 = 5, \quad (b) x - 3 = 5, \quad (c) x + 5 = -1, \quad (d) x + 7 = 0,$$
$$(e) 2x + 3 = 5, \quad (f) 2x - 3 = 5, \quad (g) 2x + 5 = -1, \quad (h) 2x + 7 = 0,$$
$$(i) 1 - 3x = -5, \quad (j) 8 - 2x = 2, \quad (k) (a^2 + 1)x + 1 = a^2, \quad (\ell) \frac{\pi}{2}x - 1 = 0$$

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

$$(a) x^2 - x - 2 = 0, \quad (b) x^2 - 2x - 3 = 0, \quad (c) 2x^2 - 5x + 2 = 0,$$
$$(d) x^2 + ax - 2a^2 = 0, \quad (e) x^2 - 9 = 0, \quad (f) x^2 - (a+1)^2 = 0,$$
$$(g) x^2 - 2x = 3, \quad (h) 2x^2 - ax + 4a = 8x, \quad (i) 3(x+p)x = 2x + 2p,$$
$$(j) 5x(x+2b) = 2(x+2b), \quad (k) (a^2+1)x^2 - 2(a+1)x + 1 = 0 \text{ der } a > 0,$$
$$(\ell) (a^2+1)x^2 - 2ax = 1$$

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

$$(a) x + 1 = 0 \text{ og } x + y = 0, \quad (b) x + y = 1 \text{ og } x - y = 5,$$
$$(c) x + y = 1 \text{ og } y = x - 5, \quad (d) 2x - y = 3 \text{ og } x + y = 0,$$
$$(e) 6x + y = 0 \text{ og } x + \frac{y}{3} = 1, \quad (f) x + y = 0 \text{ og } x^2 + y^2 = 8,$$
$$(g) x - y = 6 \text{ og } x^2 - 4x = y, \quad (h) x^2 = y^2 \text{ og } x^2 - 4x + 3 - y^2 = 0,$$
$$(i) x^2 + y^2 = 5 \text{ og } x^2 - y^2 = 3, \quad (j) x^2 + y^2 = 4 \text{ og } x^2 + 2x + y^2 - 2y = 4(1 + \sqrt{2})$$

FASIT:**Oppgave 1:**

$$(a) 0.1000, \quad (b) 0.4000, \quad (c) 1.1250, \quad (d) 1.0000, \quad (e) 0.5000,$$

$$(f) 0.6000, \quad (g) 3.0000, \quad (h) 0.3333, \quad (i) 1.8571, \quad (j) 2.0000$$

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:

$$(a) (-1, 1), \quad (b) (3, -2), \quad (c) (3, -2), \quad (d) (1, -1), \quad (e) (-1, 6)$$

$$(f) (2, -2), (-2, 2), \quad (g) (2, -4), (3, -3), \quad (h) \left(\frac{3}{4}, -\frac{3}{4}\right), \left(\frac{3}{4}, \frac{3}{4}\right),$$

$$(i) (-2, -1), (-2, 1), (2, -1), (2, 1), \quad (j) (\sqrt{2}, -\sqrt{2})$$