Kertausta ja syventämistä

9 POLYNOMILASKENTAA

Tuntitehtävien ratkaisut

223. a) $5a + 6 + (8a + 1) =$
$5a + 6 + 8a + 1 =$
$13a + 7$

b) $3 \cdot 2a + (a - 15) =$
$6a + a - 15 =$
$7a - 15$

c) $11a + 3 - (7a - 4) =$
$11a + 3 - 7a + 4 =$
$4a + 7$

224. a) $x + 6 + (x + 8) =$
$x + 6 + x + 8 =$
$2x + 14$

b) $2x + 4 - (x - 1) =$
$2x + 4 - x + 1 =$
$x + 5$

225. a) $p = 4 \cdot 5k = 20k$
b) $A = 5k \cdot 5k = 25k^2$

226. a) $6(5x + 1) =$
$6 \cdot 5x + 6 \cdot 1 =$
$30x + 6$

b) $7(2x - 10) =$
$7 \cdot 2x + 7 \cdot (-10) =$
$14x - 70$

c) $3x(8x + 4) =$
$3x \cdot 8x + 3x \cdot 4 =$
$24x^2 + 12x$

227. a) $x - 10 + (x + 30) =$
$x - 10 + x + 30 =$
$2x + 20$

b) $-2x + 6 - (x - 3) =$
$-2x + 6 - x + 3 =$
$-3x + 9$

228. a) $-3y + 7 + (3y + 7) =$
$-3y + 7 + 3y + 7 =$
14

b) $(y - 15) + 4 \cdot 2y =$
$y - 15 + 8y =$
$9y - 15$

c) $y - (5y - 1) - 2 =$
$y - 5y + 1 - 2 =$
$-4y - 1$

229. a) $A = 6x \cdot 6x = 36x^2$

b) $A = a(a + 4) =$
$a \cdot a + a \cdot 4 =$
$a^2 + 4a$

230. a) $10(9x - 2) =$
$10 \cdot 9x + 10 \cdot (-2) =$
$90x - 20$

b) $-7x(2x + 3) =$
$-7x \cdot 2x - 7x \cdot 3 =$
$-14x^2 - 21x$

c) $20x + 6x(4x - 5) =$
$20x + 6x \cdot 4x + 6x \cdot (-5) =$
$20x + 24x^2 - 30x =$
$24x^2 - 10x$

231. Sievennetään lauseke.
$-x^2 + 11 + x(x + 2) =$
$-x^2 + 11 + x \cdot x + x \cdot 2 =$
$-x^2 + 11 + x^2 + 2x =$
$11 + 2x$

Sijoitetaan lausekkeeseen arvo $x = 9$.
$11 + 2 \cdot 9 = 11 + 18 = 29$

232. a) $p = 6(9r - 4) =$
$54r - 24$

b) $A = (7s + 11)(3s + 1) =$
$7s \cdot 3s + 7s \cdot 1 + 11 \cdot 3s + 11 \cdot 1 =$
$21s^2 + 7s + 33s + 11 =$
$21s^2 + 40s + 11$

233. a) $(6x - 2)(5x + 4) =$
$6x \cdot 5 + 6x \cdot 4 - 2 \cdot 5x - 2 \cdot 4 =$
$30x^2 + 24x - 10x - 8 =$
$30x^2 + 14x - 8$

b) $(-x + 1)(-10x + 17) =$
$-x \cdot (-10x) - x \cdot 17 + 1 \cdot (-10x) + 1 \cdot 17 =$
$10x^2 - 17x - 10x + 17 =$
$10x^2 - 27x + 17$

234. Sievennetään lauseke.
$-5x(-4x - 5) - x(10x - 15) - 10x^2 =$
$20x^2 + 25x - 10x^2 + 15x - 10x^2 =$
$40x$

Sijoitetaan lausekkeeseen arvo $x = 0{,}1$.
$40 \cdot 0{,}1 = 4$

235. a) $9x - 13 - (11x - 9) =$
$9x - 13 - 11x + 9 =$
$-2x - 4$

b) $2x(11x - 5) =$
$2x \cdot 11x + 2x \cdot (-5) =$
$22x^2 - 10x$

c) $-7x(-4x + 6) =$
$-7x \cdot (-4x) - 7x \cdot 6 =$
$28x^2 - 42x$

236. a) $-6x - 2 - (5x + 4) =$
$-6x - 2 - 5x - 4 =$
$-11x - 6$

b) $(16x + 10)(-x + 2) =$
$16x \cdot (-x) + 16x \cdot 2 + 10 \cdot (-x) + 10 \cdot 2 =$
$-16x^2 + 32x - 10x + 20 =$
$-16x^2 + 22x + 20$

237. a) $4x(x + 12) - x(x + 2) =$
$4x^2 + 48x - x^2 - 2x =$
$3x^2 + 46x$

b) $10x(5x + 7) - 20x(3x - 5) =$
$50x^2 + 70x - 60x^2 + 100x =$
$-10x^2 + 170x$

c) $(-7x + 3)(4x - 7) =$
$-7x \cdot 4x - 7x \cdot (-7) + 3 \cdot 4x + 3 \cdot (-7) =$
$-28x^2 + 49x + 12x - 21 =$
$-28x^2 + 61x - 21$

238. a) $A = (8x + 4)(8x + 4) =$
$8x \cdot 8x + 8x \cdot 4 + 4 \cdot 8x + 4 \cdot 4 =$
$64x^2 + 32x + 32x + 16 =$
$64x^2 + 64x + 16$

b) $A = (20a - 6)(10a + 5) =$
$20a \cdot 10a + 20a \cdot 5 - 6 \cdot 10a - 6 \cdot 5 =$
$200a^2 + 100a - 60a - 30 =$
$200a^2 + 40a - 30$

239. a) $p = 12(-2r + 7) =$
$-24r + 84$

b) $A = (12s + 20)(3s - 1) : 2 =$
$(12s \cdot 3s + 12s \cdot (-1) + 20 \cdot 3s + 20 \cdot (-1)) : 2 =$
$(36s^2 - 12s + 60s - 20) : 2 =$
$(36s^2 + 48s - 20) : 2 =$
$18s^2 + 24s - 10$

240. Sievennetään lauseke.
$(x - 2)(-3x - 2) + (2x - 1)^2 =$
$x \cdot (-3x) + x \cdot (-2) - 2 \cdot (-3x) - 2 \cdot (-2) + (2x - 1)(2x - 1) =$
$-3x^2 - 2x + 6x + 4 + 2x \cdot 2x + 2x \cdot (-1) - 1 \cdot 2x - 1 \cdot (-1) =$
$-3x^2 - 2x + 6x + 4 + 4x^2 - 2x - 2x + 1 =$
$x^2 + 5$

Sijoitetaan lausekkeeseen arvo $x = 10$.
$10^2 + 5 = 100 + 5 = 105$

241. Sievennetään lauseke.

$23y^2 + (4y - 5)(-8y - 3) + 3y(3y - 6) =$

$23y^2 + 4y \cdot (-8) + 4y \cdot (-3) - 5 \cdot (-8y) - 5 \cdot (-3) + 3y \cdot 3y + 3y \cdot (-6) =$

$23y^2 - 32y^2 - 12y + 40y + 15 + 9y^2 - 18y =$

$10y + 15$

Sijoitetaan lausekkeeseen arvo $x = -\frac{7}{10}$.

$10 \cdot \left(-\frac{7}{10}\right) + 15 = -7 + 15 = 8$

242. a) $x^2 = x \cdot x$

$6x = 2 \cdot x \cdot 3$

$9 = 3 \cdot 3$ tai $9 = (-3) \cdot (-3)$

$x^2 + 6x + 9 = (x + 3)(x + 3)$

Sivun pituus on $x + 3$.

b) $4x^2 = 2x \cdot 2x$

$1 = 1 \cdot 1$ tai $1 = (-1) \cdot (-1)$

$-4x = 2 \cdot 2x \cdot (-1)$

$4x^2 - 4x + 1 = (2x - 1)(2x - 1)$

Sivun pituus on $2x - 1$.