

39
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TOIMETUSEL

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PEET 2656
V.51

MATEMAATIKA KESKKOOLIS

III K L A S S I
H A R J U T U S
V I H I K № 1



K/Ü. KOOPERATIIV TALLINNAS 1935

89-92-14

Aste. Astmete korrumamine.

1. Kui ruudu külg on 4 cm, siis tema pindala on $4 \cdot 4 = 4^2 = 16 \text{ cm}^2$;
 Kui kuubi serv on 3 cm, siis tema ruumala on $3 \cdot 3 \cdot 3 = 3^3 = 27 \text{ cm}^3$.
 Kui kuubi serv on a , siis tema ruumala $V = a \cdot a \cdot a$ ehk lühendatud
 kirjavärsil $V = a^3$

2. Kirjuta lühemalt järgmised korrutised!

$$3 \cdot 3 \cdot 3 \cdot 3 = 3^4$$

$$8 \cdot 8 = 8^2$$

$$3 \cdot 3 \cdot 3 \cdot 3 \cdot 3 = 3^5$$

$$4 \cdot 4 \cdot 4 = 4^3$$

$$6 \cdot 6 \cdot 6 = 6^3$$

$$7 \cdot 7 \cdot 7 = 7^3$$

$$b \cdot b \cdot b \cdot b = b^4$$

$$c \cdot c \cdot c \cdot c \cdot c = c^5$$

$$d \cdot d = d^2$$

- 3.

Avaldis a^5 tähendab sama, mis korutis $a \cdot a \cdot a \cdot a \cdot a$
 ja nimetatakse astendamiseks. Arvu a , s. o. korduvalt tegurit
 nimetatakse astendatavaks ehk astme aluseks; arvu 5 nimeta-
 takse astendajaks ehk astmenäitajaks.
 a^5 tähendab sama, mis a . Astendajat lühte ei kirjutata.

4. Teisenda astmed korrutisteks!

$$2^2 = 2 \cdot 2$$

$$0,5^4 = 0,5 \cdot 0,5 \cdot 0,5 \cdot 0,5$$

$$\left(\frac{2}{3}\right)^5 = \frac{2}{3} \cdot \frac{2}{3} \cdot \frac{2}{3} \cdot \frac{2}{3} \cdot \frac{2}{3}$$

$$\left(7\frac{1}{2}\right)^2 = 7\frac{1}{2} \cdot 7\frac{1}{2}$$

$$1,2^2 = 1,2 \cdot 1,2$$

$$a^4 = a \cdot a \cdot a \cdot a$$

$$2^3 \cdot 2^2 = 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2$$

$$b^3 \cdot b^2 = b \cdot b \cdot b \cdot b \cdot b$$

$$4^2 \cdot 4^2 = 4 \cdot 4 \cdot 4 \cdot 4$$

$$c^3 \cdot c = c \cdot c \cdot c \cdot c$$

$$3^2 \cdot 3^4 = 3 \cdot 3 \cdot 3 \cdot 3 \cdot 3 \cdot 3$$

$$n^3 \cdot n = n \cdot n \cdot n \cdot n$$

5. Korruta!

$$5^2 \cdot 5^3 = 5^{2+3} = 5^5$$

$$a^2 \cdot a^3 = a^{2+3} = a^5$$

$$3^2 \cdot 3^4 = 3^{2+4} = 3^6$$

$$m^2 \cdot m^4 = m^{2+4} = m^6$$

$$2^5 \cdot 2^1 = 2^{5+1} = 2^6$$

$$b^3 \cdot b = b^{3+1} = b^4$$

$$a^2 \cdot a^3 = a^{2+3} = a^5$$

Üksliikmete korrumamine.

1. $x^3 \cdot x^4 = x^{3+4} = x^7$;

$c \cdot c^3 = c^{1+3} = c^4$;

$a^2 \cdot a^2 = a^{2+2} = a^4$;

$m^4 \cdot m = m^{4+1} = m^5$;

$d^3 \cdot d^2 = d^{3+2} = d^5$;

2. $y^3 \cdot y \cdot y^4 = y^{3+1+4} = y^8$;

$a \cdot a^2 \cdot a^3 = a^{1+2+3} = a^6$;

$b^3 \cdot b^2 \cdot b^2 = b^{3+2+2} = b^7$;

$z^3 \cdot z \cdot z = z^{3+1+1} = z^5$;

$k^3 \cdot k^3 \cdot k^3 = k^{3+3+3} = k^9$;

3. $2a^3 \cdot a = (2^1 \cdot a^3) \cdot a^1 = 2^{1+1} a^{3+1} = 2a^4$;

$x^4 \cdot 3x = 3x^{4+1} = 3x^5$;

$5m^2 \cdot m^3 = 5m^{2+3} = 5m^5$;

$n^2 \cdot 4n^3 = 4n^{2+3} = 4n^5$;

$5b^3 \cdot b^4 = 5b^{3+4} = 5b^7$;

4. $4x^2 \cdot 5x = 4 \cdot 5x^{2+1} = 20x^3$;

$3a \cdot 2a^3 = 3 \cdot 2a^{1+3} = 6a^4$;

$2b^3 \cdot 5b^2 = 2 \cdot 5b^{3+2} = 10b^5$;

$7y \cdot y^3 = 7y^{1+3} = 7y^4$;

$c \cdot 8c^3 = 8c^{1+3} = 8c^4$;

5. $0,2m \cdot 5m^3 = 5 \cdot 0,2m^{1+3} = m^4$;

$7n^3 \cdot 0,3n^3 = 2,1n^{3+3} = 2,1n^6$;

$0,1d \cdot 9d^5 = 0,9d^{1+5} = 0,9d^6$;

$0,3t^4 \cdot 0,3t^3 = 0,09t^{4+3} = 0,09t^7$;

$5x^2 \cdot 0,8x^4 = 4x^{2+4} = 4x^6$;

6. $3a^3 \cdot 4a \cdot 2a^3 = 24a^{3+1+3} = 24a^7$;

$4z \cdot 5z^3 \cdot 0,5z^2 = 10z^{1+3+2} = 10z^6$;

$0,6c^3 \cdot 5c \cdot 2c^3 = 6c^{3+1+3} = 6c^7$;

$5v \cdot 0,4v^4 \cdot 0,2v = 5 \cdot 0,4 \cdot 0,2v^{1+4+1} = 0,4v^6$;

$0,1x^3 \cdot 0,1x \cdot x^5 = 0,01x^{3+1+5} = 0,01x^9$;

- $3k^2 \cdot 2k^4 = -6k^{2+4} = -6k^6$;

$4ab^2 \cdot (-3a) = -12a^{1+2}b^2$;

$-5x^3y \cdot 3xy = -15x^{3+1}y^{2+1}$;

$2s^2t \cdot 5st^2 = 10s^{2+1}t^{1+2}$;

$-6c^3d^2 \cdot (-7cd^2) = 42c^{3+1}d^{2+2}$;

Siit on, kas peaks olema tavaline - ;

8. $4x^2 \cdot (-0,5x^4) = -2x^{2+4}$;

$-2c \cdot c^2 \cdot 0,8c^3 = -1,6c^{1+2+3}$;

$0,6a^3 \cdot a \cdot (-5a) = -3a^{3+1+1}$;

$0,3d \cdot (-8d^2) \cdot 2d = -4,8d^{1+2+1}$;

$-0,5s \cdot (-6s^2) \cdot 3s^2 = +9s^{1+2+2}$;

Astmete jagamine. Üksliikmete jagamine.

1. $a^5 : a^2 = \frac{a^5}{a^2} = \frac{\cancel{a} \cdot \cancel{a} \cdot a \cdot a \cdot a}{\cancel{a} \cdot \cancel{a}} = a^3$;

$a^5 : a^2 = a^{5-2} = a^3$

2. $a^4 : a^3 = \frac{a^{4-3}}{1} = a$;

$c^5 : c^2 = \frac{c^{5-2}}{1} = c^3$;

$x^7 : x^5 = \frac{x^{7-5}}{1} = x^2$;

$y^6 : y^3 = \frac{y^{6-3}}{1} = y^3$;

$d^2 : d^0 = \frac{d^{2-0}}{1} = d^2$;

3. $x^5 : x^2 = \frac{x^{5-2}}{1} = x^3$;

$d^7 : d^6 = \frac{d^{7-6}}{1} = d^1 = d$;

$a^3 : a^2 = \frac{a^{3-2}}{1} = a^1 = a$;

$y^4 : y^2 = \frac{y^{4-2}}{1} = y^2$;

$c^6 : c^3 = \frac{c^{6-3}}{1} = c^3$;

4. $x^3y^5 : xy^2 = \frac{x^{3-1}y^{5-2}}{1} = x^2y^3$;

$m^4n^3 : m^2n = \frac{m^{4-2}n^{3-1}}{1} = m^2n^2$;

$r^3s^4 : r^2s^1 = \frac{r^{3-2}s^{4-1}}{1} = rs^3$;

$a^8b : a^7b = \frac{a^{8-7}b^{1-1}}{1} = a^1b^0 = a$;

$p^{11}q^4 : p^3q^2 = \frac{p^{11-3}q^{4-2}}{1} = p^8q^2$;

6. $\frac{36a^3}{4a^2} = 9a$;

7. $\frac{54x^7}{-9x^5} = -6x^2$;

$\frac{-21m^3n}{7m^2n} = -3m$;

$\frac{38xy^5}{-19xy^5} = -2$;

5. $8a^5 : 2a^3 = \frac{8a^{5-3}}{2} = 4a^2$;

$9c^4 : 3c^3 = \frac{9c^{4-3}}{3} = 3c$;

$18x^6 : 9x^4 = \frac{18x^{6-4}}{9} = 2x^2$;

$25d^7 : 5d^4 = \frac{25d^{7-4}}{5} = 5d^3$;

$32y^9 : 8y^3 = \frac{32y^{9-3}}{8} = 4y^6$;

$\frac{-27c^3d^5}{-3c^2d^2} = +9cd^3$;

$\frac{35y^2z^5}{7y^2z^4} = 5yz$;

$\frac{-72a^2b^7}{-8a^2b^5} = +9b^2$;

$\frac{84x^2y}{-12y} = -7x^2$;

8. $(-24m^3) : 6m^4 = -4m^{-1}$;

$(-42a^3) : (-7a^4) = 6a^{-1}$;

$12c^7 : 3c^3 = 4c^4$;

$28s^3 : (-4s^4) = -7s^{-1}$;

$(-56r^3) : (-7) = 8r^3$;

$\frac{0,36m^3n}{6m} = 0,06mn$;

$\frac{-2c^3d}{0,5cd} = -4c^2$;

Korrutise ja astme astendamise.

$$1. (abc)^3 = (abc) (abc) (abc) = abcabcabc = a^3 b^3 c^3$$

$$(abc)^3 = a^3 b^3 c^3$$

$$2. (2a)^3 = 2^3 a^3;$$

$$(3b)^3 = 3^3 b^3;$$

$$(0,2r)^4 = 0,2^4 r^4;$$

$$(1,5c)^2 = 1,5^2 c^2;$$

$$(7b)^3 = 7^3 b^3;$$

$$3. (xyz)^3 = x^3 y^3 z^3;$$

$$(cde)^4 = c^4 d^4 e^4;$$

$$(pq)^5 = p^5 q^5;$$

$$(mn)^6 = m^6 n^6;$$

$$(ac)^5 = a^5 c^5;$$

$$5. (\frac{1}{3}bk)^4 = (\frac{1}{3})^4 b^4 k^4;$$

$$(0,5cd)^3 = 0,5^3 c^3 d^3;$$

$$(0,2ax)^5 = 0,2^5 a^5 x^5;$$

$$(\frac{1}{3}mny)^4 = (\frac{1}{3})^4 m^4 n^4 y^4;$$

$$(0,4dkz)^2 = 0,4^2 d^2 k^2 z^2;$$

$$7. (a^3)^2 = a^3 \cdot a^3 = a^{3+3} = a^{2 \cdot 3} = a^6;$$

$$(a^3)^2 = a^{2 \cdot 3} = a^6$$

$$8. (a^2)^3 = a^{2 \cdot 3} = a^6; \quad 9. (3)^3 = 3^3; \quad 10. (m^2)^7 = m^{2 \cdot 7} = m^{14}; \quad 11. (a^2)^5 = a^{2 \cdot 5} = a^{10};$$

$$(x^3)^2 = x^{3 \cdot 2} = x^6;$$

$$(2^2)^3 = 2^{2 \cdot 3} = 2^6;$$

$$(-5)^3 = -5^3 = -125;$$

$$(-s^2)^4 = -s^{2 \cdot 4} = -s^8;$$

$$(y^4)^3 = y^{4 \cdot 3} = y^{12};$$

$$(3^2)^3 = 3^{2 \cdot 3} = 3^6;$$

$$(-a^3)^3 = -a^{3 \cdot 3} = -a^9;$$

$$(-2^5)^2 = -2^{5 \cdot 2} = -2^{10};$$

$$(b^2)^4 = b^{2 \cdot 4} = b^8;$$

$$(-2)^5 = -2^5 = -32;$$

$$(-x^2)^3 = -x^{2 \cdot 3} = -x^6;$$

$$(x^3)^3 = x^{3 \cdot 3} = x^9;$$

$$(c^3)^3 = c^{3 \cdot 3} = c^9;$$

$$(-3)^4 = +3^4;$$

$$(-3)^4 = +3^4 = 81;$$

$$(y^2)^3 = y^{2 \cdot 3} = y^6;$$

$$(-2)^5 = (-2) \cdot (-2) \cdot (-2) \cdot (-2) \cdot (-2) = 4 \cdot 2 \cdot (-2) \cdot (-2) \cdot (-2) = 4 \cdot 4 \cdot (-2) = 16 \cdot (-2) = -32;$$

$$= (-2) \cdot (-2) \cdot (-8) = (-2) \cdot 16 = -32;$$

Korrutise astendamise.

$$1. (5x^3)^2 = 5^2 x^{3 \cdot 2} = 25 x^6;$$

$$(3m^2)^4 = 3^4 m^{2 \cdot 4} = 81 m^8;$$

$$(2a^3)^5 = 2^5 a^{3 \cdot 5} = 32 a^{15};$$

$$(4y^3)^3 = 4^3 y^{3 \cdot 3} = 64 y^9;$$

$$(7c^2)^2 = 7^2 c^{2 \cdot 2} = 49 c^4;$$

$$2. (-6x)^2 = (-6)^2 x^2 = 36 x^2;$$

$$(-x^3)^4 = +x^{3 \cdot 4} = x^{12};$$

$$(-3a^2)^3 = -3^3 a^{2 \cdot 3} = -27 a^6;$$

$$(-4y^3)^3 = -4^3 y^{3 \cdot 3} = -64 y^9;$$

$$(-7b^2)^2 = +7^2 b^{2 \cdot 2} = 49 b^4;$$

$$3. (2a^2b)^3 = 2^3 a^{2 \cdot 3} b^3 = 8 a^6 b^3;$$

$$(5mn^2)^3 = 5^3 m^3 n^{2 \cdot 3} = 125 m^3 n^6;$$

$$(3c^2d)^4 = 3^4 c^{2 \cdot 4} d^4 = 81 c^8 d^4;$$

$$(abc^2)^5 = a^5 b^5 c^{2 \cdot 5} = a^5 b^5 c^{10};$$

$$(7x^2y)^2 = 7^2 x^{2 \cdot 2} y^2 = 49 x^4 y^2;$$

$$4. (3x^4y)^3 = 3^3 x^{4 \cdot 3} y^3 = 27 x^{12} y^3;$$

$$(-4a^3b)^2 = (-4)^2 a^{3 \cdot 2} b^2 = 16 a^6 b^2;$$

$$(2s^4t^2)^3 = 2^3 s^{4 \cdot 3} t^{2 \cdot 3} = 8 s^{12} t^6;$$

$$(-0,5c^2d)^2 = (-0,5)^2 c^{2 \cdot 2} d^2 = 0,25 c^4 d^2;$$

$$(-0,4mn^2)^3 = -0,4^3 m^3 n^{2 \cdot 3} = -0,064 m^3 n^6;$$

$$5. (0,9x^2y^3)^2 = 0,9^2 x^{2 \cdot 2} y^{3 \cdot 2} = 0,81 x^4 y^6;$$

$$(0,2a^2c)^3 = 0,2^3 a^{2 \cdot 3} c^3 = 0,008 a^6 c^3;$$

$$(0,5mn^2)^3 = 0,5^3 m^3 n^{2 \cdot 3} = 0,125 m^3 n^6;$$

$$(0,3s^2t^4)^3 = 0,3^3 s^{2 \cdot 3} t^{4 \cdot 3} = 0,027 s^6 t^{12};$$

$$(1,1kp^2)^2 = 1,1^2 k^2 p^{2 \cdot 2} = 1,21 k^2 p^4;$$

$$6. (-\frac{1}{2}kp^4)^3 = -(\frac{1}{2})^3 k^3 p^{4 \cdot 3} = -\frac{1}{8} k^3 p^{12};$$

$$(\frac{1}{3}abc^2)^3 = (\frac{1}{3})^3 a^3 b^3 c^{2 \cdot 3} = \frac{1}{27} a^3 b^3 c^6;$$

$$(-\frac{2}{3}m^2np^3)^3 = -(\frac{2}{3})^3 m^{2 \cdot 3} n^3 p^{3 \cdot 3} = -\frac{8}{27} m^6 n^3 p^9;$$

$$(-\frac{1}{3}x^2y^2z^2)^3 = -(\frac{1}{3})^3 x^{2 \cdot 3} y^{2 \cdot 3} z^{2 \cdot 3} = -\frac{1}{27} x^6 y^6 z^6;$$

$$(\frac{1}{4}deh^2k^2)^3 = (\frac{1}{4})^3 d^3 e^3 h^{2 \cdot 3} k^{2 \cdot 3} = \frac{1}{64} d^3 e^3 h^6 k^6;$$

$$7. (\frac{1}{2}a^3de^2)^3 = (\frac{1}{2})^3 a^{3 \cdot 3} d^3 e^{2 \cdot 3} = \frac{1}{8} a^9 d^3 e^6;$$

$$(x_2y^2z^4)^3 = (\frac{1}{2})^3 x^3 y^{2 \cdot 3} z^{4 \cdot 3} = \frac{1}{8} x^3 y^6 z^{12};$$

$$(m^2np^4)^3 = (\frac{1}{3})^3 m^{2 \cdot 3} n^3 p^{4 \cdot 3} = \frac{1}{27} m^6 n^3 p^{12};$$

$$(s^2r^2t^2)^3 = (\frac{1}{2})^3 s^{2 \cdot 3} r^{2 \cdot 3} t^{2 \cdot 3} = \frac{1}{8} s^6 r^6 t^6;$$

$$(h^2k^2)^3 = (\frac{1}{2})^3 h^{2 \cdot 3} k^{2 \cdot 3} = \frac{1}{8} h^6 k^6;$$

$$8. (-0,2ab^2c)^3 = -0,2^3 a^3 b^{2 \cdot 3} c^3 = -0,008 a^3 b^6 c^3;$$

$$(\frac{1}{3}mnk^2)^3 = (\frac{1}{3})^3 m^3 n^3 k^{2 \cdot 3} = \frac{1}{27} m^3 n^3 k^6;$$

$$(-0,1x^3y^2)^3 = -0,1^3 x^{3 \cdot 3} y^{2 \cdot 3} = -0,001 x^9 y^6;$$

$$(0,3c^2d^2)^3 = 0,3^3 c^{2 \cdot 3} d^{2 \cdot 3} = 0,027 c^6 d^6;$$

$$(-\frac{1}{3}abcd^2)^3 = -(\frac{1}{3})^3 a^3 b^3 c^3 d^{2 \cdot 3} = -\frac{1}{27} a^3 b^3 c^3 d^6;$$

$$\text{Märge: } (\frac{3}{4})^3 = \frac{3^3}{4^3} = \frac{27}{64};$$

Tehteid üksliikmetega.

$$\begin{aligned}
 1. \quad 5x^2y(3xy^3)^3 &= 5x^2y \cdot (3xy^3)^3 = 5x^2y \cdot 3^3 x^3 y^9 = 45x^5y^{10}; \\
 (-2ab^3)^2(-3a^2b) &= (-2ab^3)^2(-3a^2b) = 4a^2b^6(-3a^2b) = -12a^4b^7; \\
 6s^3t^2(-8st^3)^2 &= 6s^3t^2(-8st^3)^2 = 6s^3t^2 \cdot 64s^2t^6 = 384s^5t^8; \\
 4m^3n^3(-3m)^2 &= 4m^3n^3(-3m)^2 = 4m^3n^3 \cdot 9m^2 = 36m^5n^3; \\
 (-4a^3n)(-7an)^2 &= (-4a^3n)(-7an)^2 = (-4a^3n)(49a^2n^2) = -196a^5n^3;
 \end{aligned}$$

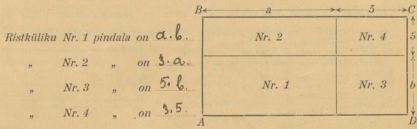
$$\begin{aligned}
 2. \quad \frac{-16x^5y}{2x^3} &= -8x^2y; & \frac{-45a^2b^3}{-9b^2} &= 5a^2b; & \frac{63m^3n^3}{-9} &= -7m^3n^3; \\
 \frac{14c^4d^3}{2c^3d^2} &= 7cd; & \frac{51r^3t^4}{-3r^2t^2} &= -17rt^2; & \frac{-36x^5z^2}{-12xz} &= 3x^4z; \\
 & & & & &= 3x^4z \cdot n;
 \end{aligned}$$

$$\begin{aligned}
 3. \quad (0,4m^2n^3)^3(5m^2n^2)^2 &= 0,4^3 m^6 n^9 \cdot 5^2 m^4 n^4 = 0,64 m^{10} n^{13}; \\
 (-0,2a^2b^3)^5(-25a^3) &= (-0,2)^5 a^{10} b^{15} \cdot (-25a^3) = 0,00032 a^{13} b^{15}; \\
 (\frac{1}{2}yz^2)^3(-\frac{3}{4}y^2z)^2 &= (\frac{1}{2})^3 y^3 z^4 \cdot (-\frac{3}{4})^2 y^4 z^4 = -\frac{9}{64} y^7 z^8; \\
 (-0,3s^4t^2)(2st^3)^2 &= (-0,3)^2 s^8 t^4 \cdot 4s^2 t^6 = 0,36 s^{10} t^{10}; \\
 (-\frac{1}{2}a^2z^3)(\frac{3}{4}a^4z) &= (-\frac{1}{2})^2 a^6 z^4 \cdot \frac{3}{4} a^4 z = -\frac{3}{16} a^{10} z^5;
 \end{aligned}$$

$$\begin{aligned}
 4. \quad (-\frac{1}{2}xy^2)^4(-2xy) &= (-\frac{1}{2})^4 x^4 y^8 \cdot (-2xy) = -\frac{1}{8} x^5 y^9; \\
 (-0,1ab^2)^3(-5a^2b) &= (-0,1)^3 a^3 b^4 \cdot (-5a^2b) = 0,005 a^5 b^5; \\
 (\frac{2}{3}mn)(\frac{1}{2}mn^2)^2 &= \frac{2}{3} m n \cdot \frac{1}{4} m^2 n^4 = \frac{1}{6} m^3 n^5; \\
 (-\frac{1}{3}s^2t)^3(\frac{2}{5}st^2)^2 &= (-\frac{1}{3})^3 s^6 t^3 \cdot (\frac{2}{5})^2 s^2 t^4 = -\frac{8}{225} s^8 t^7; \\
 (-0,2yz^3)^3(-8y^2z) &= (-0,2)^3 y^3 z^9 \cdot (-8y^2z) = 0,32 y^5 z^{10};
 \end{aligned}$$

Kaksliikmete korrumamine.

1. Ristküliku pikkus on a m ja laius b m. Kui suur on ristküliku pindala, mille pikkus on 5 -e m ja laius 3 -e m võrra suurem?



Ristküliku ABCD pindala on $ab+3a+5b+15$;

Ristküliku ABCD alus on $a+5$.

" " kõrgus on $b+3$.

" " pindala on $(a+5)(b+3)$.

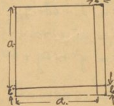
Mõlemad pindala avaldised on võrdsed, sest nad kujutavad sama (A) pindala ristküliku pindala. Järelikult $(a+5)(b+3) = ab+3a+5b+15$;

$$\begin{aligned}
 2. \quad (a+2)(b+7) &= ab+7a+2b+14; \\
 (m+1)(n+5) &= mn+5m+n+5; \\
 (c+6)(d+2) &= cd+2c+6d+12; \\
 (r+9)(s+1) &= rs+r+9s+9; \\
 (k+4)(l+3) &= kl+3k+4l+12; \\
 (x+0,6)(y+0,5) &= xy+0,5x+0,6y+0,3; \\
 (c+4)(d+0,3) &= cd+0,3c+4d+1,2; \\
 (y+1)(z+1) &= yz+y+z+1; \\
 3. \quad (a+5)(a+2) &= a^2+7a+10 = a^2+7a+10; \\
 (x-0,2)(x+0,7) &= x^2+0,5x-0,14 = x^2+0,5x-0,14; \\
 (3+m)(5+n) &= 15+3n+5m+mn = 15+3n+5m+mn; \\
 (6+c)(d+0,1) &= 0,1cd+0,6d+6c+0,6; \\
 (x+0,8)(5+y) &= 5x+4y+4+0,8y; \\
 (0,3+d)(0,7+d) &= 0,21+0,3d+0,7d+d^2 = 0,21+d+d^2; \\
 (a+b)(c+d) &= ac+ad+bc+bd; \\
 (l+l)(l+l) &= \frac{1}{10}l^2 + \frac{1}{10}l^2 + \frac{1}{10}l^2 + \frac{1}{10}l^2 = \frac{4}{10}l^2 = \frac{2}{5}l^2;
 \end{aligned}$$

1. $(3x+1)(x+5) = 3x^2 + 15x + x + 5 = 3x^2 + 16x + 5$; 2. $(2a+3b)(3c-4d) = 6ac - 8ad + 9bc - 12bd$
 $(3a+4)(a-3) = 3a^2 - 9a + 4a - 12 = 3a^2 - 5a - 12$; $(5x-3y)(2z+3v) = 10xz + 15zv - 6yz - 9yv$
 $(5m-2)(m-1) = 5m^2 - 5m - 2m + 2 = 5m^2 - 7m + 2$; $(6m-4n)(5p-2q) = 30mp - 12mq - 20np + 8nq$
 $(4y-3)(2y-5) = 8y^2 - 20y - 6y + 15 = 8y^2 - 26y + 15$; $(3c-5d)(h+5k) = 3ch + 15ck - 5dh - 25dk$
 $(5c+8)(3c-2) = 15c^2 - 10c + 24c - 16 = 15c^2 + 14c - 16$; $(\frac{1}{2}a-b)(\frac{1}{3}c-\frac{1}{4}d) = \frac{1}{6}ac - \frac{1}{4}ad - \frac{1}{3}cb + \frac{1}{4}bd$
3. $(x+y)(x+3y) = x^2 + 3xy + xy + 3y^2 = x^2 + 4xy + 3y^2$; 4. $(3+a)(7-a) = 21 - 3a + 7a - a^2 = 21 + 4a - a^2$
 $(a-3b)(a-2b) = a^2 - 2ab + 6b^2 - 2ab = a^2 - 4ab + 6b^2$; $(8-x)(x-2) = 8x - 16 - x^2 + 2x = 10x - 16 - x^2$
 $(m+2n)(m-5n) = m^2 - 5mn + 2mn - 10n^2 = m^2 - 3mn - 10n^2$; $(\frac{1}{2}m-\frac{3}{4}n)(\frac{1}{3}m-\frac{2}{5}n) = \frac{1}{6}m^2 - \frac{2}{5}mn - \frac{3}{4}mn + \frac{3}{10}n^2 = \frac{1}{6}m^2 - \frac{17}{20}mn + \frac{3}{10}n^2$
 $(4r+s)(r+4s) = 4r^2 + 16rs + rs + 4s^2 = 4r^2 + 17rs + 4s^2$; $(1-y)(y+0,7) = y^2 + 0,7y - y^2 - 0,7 = 0,7y - 0,7$
 $(5x-3y)(2x-y) = 10x^2 - 5xy - 6xy + 3y^2 = 10x^2 - 11xy + 3y^2$; $(\frac{1}{2}-s)(\frac{1}{3}+s) = \frac{1}{6} + \frac{1}{3}s - \frac{1}{2}s - s^2 = \frac{1}{6} - \frac{1}{6}s - s^2$
5. $(2c-3d)(5c+4d) = 10c^2 + 2cd - 15cd - 12d^2 = 10c^2 - 13cd - 12d^2$; $(2c-\frac{1}{2})(c-4) = 2c^2 - 8c - \frac{1}{2}c + 2 = 2c^2 - 8\frac{1}{2}c + 2$
 $(7a-4x)(2a-5x) = 14a^2 - 35ax - 8ax + 20x^2 = 14a^2 - 43ax + 20x^2$; $(5m-\frac{3}{2})(m+\frac{1}{2}) = 5m^2 + \frac{3}{2}m - \frac{3}{2}m - \frac{3}{4} = 5m^2 - \frac{3}{4}$
 $(5r-6s)(3r-2s) = 15r^2 - 10rs - 18rs + 12s^2 = 15r^2 - 28rs + 12s^2$; $(\frac{1}{2}x-4)(x-6) = \frac{1}{2}x^2 - 4x - 4x + 24 = \frac{1}{2}x^2 - 8x + 24$
 $(0,4x+1)(x-3) = 0,4x^2 + 1,2x - 3c - 0,4x^2 - 2,3 = 1,2x - 3,7$; $(\frac{1}{3}x-2)(x+\frac{1}{2}) = \frac{1}{3}x^2 + \frac{1}{6}x - 2x - 1 = \frac{1}{3}x^2 - \frac{11}{6}x - 1$
 $(0,5-6)(y+0,2) = 0,5y + 0,1 - 6y - 1,2 = -5,5y - 1,1$; $(\frac{1}{2}a-5)(2a-\frac{1}{2}) = \frac{1}{2}a^2 - \frac{5}{2}a - a + \frac{1}{4} = \frac{1}{2}a^2 - \frac{7}{2}a + \frac{1}{4}$
7. $(0,7a-1)(0,8a-0,5) = 0,56a^2 - 0,35a + 0,8a - 0,5 = 0,56a^2 + 0,45a - 0,5$; $(3n-\frac{1}{2})(\frac{1}{2}+4n) = \frac{3}{4}n + 12n^2 - \frac{1}{4}n - 2n = 12n^2 - \frac{1}{4}n$
 $(0,1a-0,2b)(0,2a+0,1b) = 0,02a^2 + 0,01ab - 0,04ab + 0,02b^2 = 0,02a^2 - 0,03ab + 0,02b^2$; $(5-4k)(k+7) = 5k + 35 - 4k^2 - 28k = -4k^2 - 23k + 35$
 $(0,5m-4n)(2m-0,3n) = 0,01m^2 - 0,15mn - 8mn + 1,2n^2 = 0,01m^2 - 8,15mn + 1,2n^2$; $(5y-2)(\frac{1}{2}-3y) = \frac{5}{4}y - 15y^2 - y + 6y^2 = \frac{1}{4}y - 9y^2$
 $(2x-0,7y)(0,5x+4y) = x^2 + 7,5xy - 0,35xy - 2,8y^2 = x^2 + 7,15xy - 2,8y^2$; $(\frac{1}{2}r+3)(\frac{1}{2}r+5) = \frac{1}{4}r^2 + \frac{3}{2}r + \frac{1}{2}r + 15 = \frac{1}{4}r^2 + 2r + 15$
 $(7c-0,2d)(2c-0,5d) = 14c^2 - 3,5cd - 0,4cd + 0,1d^2 = 14c^2 - 3,9cd + 0,1d^2$; $(6z+\frac{1}{2})(\frac{1}{2}-z) = \frac{3}{4}z - 6z^2 + \frac{1}{4} - \frac{1}{2}z = \frac{1}{4} - 6z^2 + \frac{1}{4}z$

1. Kui ruudu külje pikkus on a cm, siis ruudu pindala on a^2 cm².
 Kui suurendada selle ruudu külje pikkust b cm võrra, siis uue ruudu külje pikkus on $a+b$ cm ja ruudu pindala on $(a+b)^2$ cm².

Tee joonis ja määra ruudu pindala kasv, kui selle serv kasvas b cm võrra.



Pindala kasv on

$$ab + ab + b^2 = 2ab + b^2 \text{ cm}^2.$$

2. Väljenda suurema ruudu pindala väiksema ruudu pindala ja saadud pindala kasvu abil

$$(a+b)^2 = a^2 + (2ab + b^2).$$

Esimeses ülesandes Sa väljendasid suurema ruudu pindala teisiti. Mõlemad avaldised peavad olema võrdsed, sest nad kujutavad sama ruudu pindala. Järelikult $(a+b)^2 = a^2 + 2ab + b^2$.

3. Kontrolli saadust kaksliikmete korrutamise teel!

$$(a+b)^2 = (a+b)(a+b) = a^2 + ab + ba + b^2 = a^2 + 2ab + b^2;$$

4. Ruudu külje.

Ruudu pindala.

$$(a+2)^2 = a^2 + 2 \cdot 2a + 4 = a^2 + 4a + 4;$$

$$(a+2) \text{ cm}$$

$$(a+5) \text{ cm}$$

$$(a+4) \text{ cm}$$

$$(n+1) \text{ cm}$$

$$(n+3) \text{ cm}$$

$$(m+7) \text{ cm}$$

$$(a+n) \text{ cm}$$

$$(a+5)^2 = a^2 + 10a + 25;$$

$$(a+4)^2 = a^2 + 8a + 16;$$

$$(n+1)^2 = n^2 + 2n + 1;$$

$$(n+3)^2 = n^2 + 6n + 9;$$

$$(m+7)^2 = m^2 + 14m + 49;$$

$$(a+n)^2 = a^2 + 2an + n^2;$$

- 5.

Kahe arvu summa ruut võrdub esimese liivme ruut, pluss kahe arvu liivme korrutis plus teise liivme ruut.

Summa ruudu valemi rakendamine.

Kontrolli korratamise teel!

1. $(c + 6)^2 = c^2 + 12c + 36;$

$(x + 2)^2 = x^2 + 4x + 4;$

$(d + 3)^2 = d^2 + 6d + 9;$

$(a + 7)^2 = a^2 + 14a + 49;$

$(y + 8)^2 = y^2 + 16y + 64;$

$(c+6)^2 = (c+6)(c+6) = c^2 + 6c + 6c + 36 = c^2 + 12c + 36;$

$(x+2)^2 = (x+2)(x+2) = x^2 + 2x + 2x + 4 = x^2 + 4x + 4;$

$(d+3)^2 = (d+3)(d+3) = d^2 + 3d + 3d + 9 = d^2 + 6d + 9;$

$(a+7)^2 = (a+7)(a+7) = a^2 + 7a + 7a + 49 = a^2 + 14a + 49;$

$(y+8)^2 = (y+8)(y+8) = y^2 + 8y + 8y + 64 = y^2 + 16y + 64;$

2. $(4 + n)^2 = 16 + 8n + n^2;$ 3. $(a + 10)^2 = a^2 + 20a + 100;$

$(1 + b)^2 = 1 + 2b + b^2;$

$(8 + k)^2 = 64 + 16k + k^2;$

$(3 + c)^2 = 9 + 6c + c^2;$

$(m + n)^2 = m^2 + 2mn + n^2;$

$(5 + s)^2 = 25 + 10s + s^2;$

$(7 + d)^2 = 49 + 14d + d^2;$

$(2 + v)^2 = 4 + 4v + v^2;$

$(h + 3)^2 = h^2 + 6h + 9;$

Kontroll.

4. $62^2 = (60 + 2)^2 = 3600 + 240 + 4 = 3844;$

$62 \cdot 62 = \begin{array}{r} 124 \\ 3844 \\ \hline \end{array}$

$53^2 = (50 + 3)^2 = 2500 + 300 + 9 = 2809; 53 \cdot 53 = \begin{array}{r} 159 \\ 3844 \\ \hline 2809 \end{array};$

$21^2 = (20 + 1)^2 = 400 + 40 + 1 = 441; 21 \cdot 21 = \begin{array}{r} 21 \\ 420 \\ \hline 441 \end{array};$

$35^2 = (30 + 5)^2 = 900 + 300 + 25 = 1225; 35 \cdot 35 = \begin{array}{r} 175 \\ 1050 \\ \hline 1225 \end{array};$

$44^2 = (40 + 4)^2 = 1600 + 320 + 16 = 1936; 44 \cdot 44 = \begin{array}{r} 176 \\ 1760 \\ \hline 1936 \end{array};$

5. $(a + \frac{1}{2})^2 = a^2 + a + \frac{1}{4};$

$(b + \frac{1}{3})^2 = b^2 + \frac{2}{3}b + \frac{1}{9};$

$(\frac{1}{5} + x)^2 = \frac{1}{25} + \frac{2}{5}x + x^2;$

$(\frac{1}{6} + c)^2 = \frac{1}{36} + \frac{1}{3}c + c^2;$

$(m + \frac{4}{3})^2 = m^2 + \frac{8}{3}m + \frac{16}{9};$

6. $(y + 0,2)^2 = y^2 + 0,4y + 0,04;$

$(0,4 + z)^2 = 0,16 + 0,8z + z^2;$

$(n + 0,3)^2 = n^2 + 0,6n + 0,09;$

$(0,5 + d)^2 = 0,25 + d + d^2;$

$(0,8 + s)^2 = 0,64 + 1,6s + s^2;$

Arvutamise abivalemid: vahe ruut.

1. $(a - b)^2 = (a - b)(a - b) = a^2 - ab - ab + b^2 = a^2 - 2ab + b^2;$

$(m - n)^2 = (m - n)(m - n) = m^2 - mn - mn + n^2 = m^2 - 2mn + n^2;$

$(x - y)^2 = (x - y)(x - y) = x^2 - xy - xy + y^2 = x^2 - 2xy + y^2;$

$(a - 2)^2 = (a - 2)(a - 2) = a^2 - 2a - 2a + 4 = a^2 - 4a + 4;$

$(c - 1)^2 = (c - 1)(c - 1) = c^2 - c - c + 1 = c^2 - 2c + 1;$

2. $(3 - m)^2 = (3 - m)(3 - m) = 9 - 3m - 3m + m^2 = 9 - 6m + m^2;$

$(7 - x)^2 = (7 - x)(7 - x) = 49 - 7x - 7x + x^2 = 49 - 14x + x^2;$

$(6 - d)^2 = (6 - d)(6 - d) = 36 - 6d - 6d + d^2 = 36 - 12d + d^2;$

$(a - 11)^2 = (a - 11)(a - 11) = a^2 - 11a - 11a + 121 = a^2 - 22a + 121;$

$(z - 8)^2 = (z - 8)(z - 8) = z^2 - 8z - 8z + 64 = z^2 - 16z + 64;$

3.

Kahe arvu vahe ruut võrdub esimese liitme ruuduga, minuse kaheksa korda esimese ja teise liitme korrutis, plus teise liitme ruut:

Kontrolli korratamise abil.

4. $(d - 2)^2 = d^2 - 4d + 4;$

$(d-2)(d-2) = d^2 - 2d - 2d + 4 = d^2 - 4d + 4;$

$(x - 5)^2 = x^2 - 10x + 25;$

$(x-5)(x-5) = x^2 - 5x - 5x + 25 = x^2 - 10x + 25;$

$(a - 4)^2 = a^2 - 8a + 16;$

$(a-4)(a-4) = a^2 - 4a - 4a + 16 = a^2 - 8a + 16;$

$(3 - y)^2 = 9 - 6y + y^2;$

$(3-y)(3-y) = 9 - 3y - 3y + y^2 = 9 - 6y + y^2;$

$(7 - c)^2 = 49 - 14c + c^2;$

$(7-c)(7-c) = 49 - 7c - 7c + c^2 = 49 - 14c + c^2;$

5.

$(c - d)^2 = c^2 - 2cd + d^2;$

$(c-d)(c-d) = c^2 - cd - cd + d^2 = c^2 - 2cd + d^2;$

$(s - t)^2 = s^2 - 2st + t^2;$

$(s-t)(s-t) = s^2 - st - st + t^2 = s^2 - 2st + t^2;$

$(2y - z)^2 = 4y^2 - 4yz + z^2;$

$(2y-z)(2y-z) = 4y^2 - 2yz - 2yz + z^2 = 4y^2 - 4yz + z^2;$

Vahe ruudu valemite rakendamine.

1. $(m-6)^2 = m^2 - 12m + 36$; 2. $(z-11)^2 = z^2 - 22z + 121$;

$(10-t)^2 = 100 - 20t + t^2$; $(9-b)^2 = 81 - 18b + b^2$;

$(8-n)^2 = 64 - 16n + n^2$; $(d-7)^2 = d^2 - 14d + 49$;

$(s-1)^2 = s^2 - 2s + 1$; $(1-a)^2 = 1 - 2a + a^2$;

$(r-3)^2 = r^2 - 6r + 9$; $(x-z)^2 = x^2 - 2xz + z^2$;

Kontroll

3. $79^2 = (80-1)^2 = 6400 - 160 + 1 = 6241$; $79 \cdot 79 = 711 + 5530 = 6241$;

$18^2 = (20-2)^2 = 400 - 80 + 4 = 324$; $18 \cdot 18 = 144 + 180 = 324$;

$36^2 = (40-4)^2 = 1600 - 320 + 16 = 1296$; $36 \cdot 36 = 216 + 1080 = 1296$;

$47^2 = (50-3)^2 = 2500 - 300 + 9 = 2209$; $47 \cdot 47 = 329 + 1880 = 2209$;

$55^2 = (60-5)^2 = 3600 - 600 + 25 = 3025$; $55 \cdot 55 = 275 + 2750 = 3025$;

4. $(x-\frac{1}{2})^2 = x^2 - x + \frac{1}{4}$; 5. $(z-0,9)^2 = z^2 - 1,8z + 0,81$;

$(\frac{1}{3}-a)^2 = \frac{1}{9} - \frac{2}{3}a + a^2$; $(0,7-m)^2 = 0,49 - 1,4m + m^2$;

$(y-\frac{3}{4})^2 = y^2 - \frac{3}{2}y + \frac{9}{16}$; $(d-0,4)^2 = d^2 - 0,8d + 0,16$;

$(\frac{2}{5}-c)^2 = \frac{4}{25} - \frac{4}{5}c + c^2$; $(1,1-r)^2 = 1,21 - 2,2r + r^2$;

$(n-\frac{3}{7})^2 = n^2 - \frac{6}{7}n + \frac{9}{49}$; $(0,3-t)^2 = 0,09 - 0,6t + t^2$;

6. $(3x-y)^2 = 9x^2 - 6xy + y^2$; 7. $(3k-5l)^2 = 9k^2 - 30kl + 25l^2$;

$(2m-3n)^2 = 4m^2 - 12mn + 9n^2$; $(5a-xy)^2 = 25a^2 - 10axy + x^2y^2$;

$(ab-2c)^2 = a^2b^2 - 4abc + 4c^2$; $(7s-2t)^2 = 49s^2 - 28st + 4t^2$;

$(\frac{1}{2}c - \frac{1}{2}d)^2 = \frac{1}{4}c^2 - \frac{1}{2}cd + \frac{1}{4}d^2$; $(mn-8k)^2 = m^2n^2 - 16mk + 64k^2$;

$(1-xyz)^2 = 1 - 2xyz + x^2y^2z^2$; $(ab-xy)^2 = a^2b^2 - 2abxy + x^2y^2$;

Summa ja vahe ruudu valemite rakendamine.

$(a+b)^2 = a^2 + 2ab + b^2$

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

1. $(x+yz)^2 = x^2 + 2xyz + y^2z^2$; 2. $(5a+b)^2 = 25a^2 + 10ab + b^2$;

$(a-bc)^2 = a^2 - 2abc + b^2c^2$; $(2x-y)^2 = 4x^2 - 4xy + y^2$;

$(mn+p)^2 = m^2n^2 + 2mnp + p^2$; $(m+3n)^2 = m^2 + 6mn + 9n^2$;

$(rs-t)^2 = r^2s^2 - 2rst + t^2$; $(c-4d)^2 = c^2 - 8cd + 16d^2$;

$(b-cd)^2 = b^2 - 2bcd + c^2d^2$; $(9s+t)^2 = 81s^2 + 18st + t^2$;

3. $(3m+5n)^2 = 9m^2 + 30mn + 25n^2$; 4. $(1,3x+2)^2 = 1,69x^2 + 5,2x + 4$;

$(4c-3d)^2 = 16c^2 - 24cd + 9d^2$; $(2,5-a)^2 = 6,25 - 5a + a^2$;

$(8x+5y)^2 = 64x^2 + 80xy + 25y^2$; $(1,1y+1)^2 = 1,21y^2 + 2,2y + 1$;

$(4m-9n)^2 = 16m^2 - 72mn + 81n^2$; $(2-1,5c)^2 = 4 - 6c + 2,25c^2$;

$(5a-4b)^2 = 25a^2 - 40ab + 16b^2$; $(1,4z-3)^2 = 1,96z^2 - 8,4z + 9$;

Teisenda, kui võimalik, järgnevad bulklikmed kahe arvu summa või vahe ruuduks!

5. $a^2 + 2a + 1 = (a+1)^2$; 6. $y^2 - 6y + 9 = (y-3)^2$;

$x^2 + 6x + 9 = (x+3)^2$; $b^2 + 10b + 25 = (b+5)^2$;

$m^2 + 4m + 4 = (m+2)^2$; $z^2 - 4z + 4 = (z-2)^2$;

$s^2 - 2s + 1 = (s-1)^2$; $n^2 + 12n + 36 = (n+6)^2$;

$c^2 + 8c + 16 = (c+4)^2$; $v^2 - 8v + 16 = (v-4)^2$;

7. $x^2 + 12x + 36 = (x+6)^2$; 8. $d^2 - 14d - 49$ peaks olema: $d^2 - 14d + 49$, mis oleks $(d-7)^2$;

$a^2 - 2a - 1$ kui oleks: $a^2 - 2a + 1$, mis oleks $(a+1)^2$;

$n^2 - 10n + 25 = (n-5)^2$;

$c^2 + 6c - 9$ kui oleks: $c^2 - 6c + 9$, mis oleks $(c-3)^2$;

$y^2 - 4y + 16$ kui oleks: $y^2 - 8y + 16$, mis oleks $(y-4)^2$;

$k^2 + 20k + 100 = (k+10)^2$;

$a^2 - 3z + 9$ peaks olema: $a^2 - 6a + 9$, mis oleks $(a-3)^2$;

Summa ja vahe ruudu valemite rakendamine.

$$\begin{aligned}
 1. (2a-bc)^2 &= 4a^2 - 4abc + b^2c^2; \\
 (xy-3z)^2 &= x^2y^2 - 6xyz + 9z^2; \\
 (5r+st)^2 &= 25r^2 + 10rst + s^2t^2; \\
 (mn-10p)^2 &= m^2n^2 - 20mnp + 100p^2; \\
 (11c-dk)^2 &= 121c^2 - 22cdk + d^2k^2;
 \end{aligned}$$

$$\begin{aligned}
 3. (2xyz-5a)^2 &= 4x^2y^2z^2 - 20xyz a + 25a^2; \\
 (4m+7abc)^2 &= 16m^2 + 56abc m + 49a^2b^2c^2; \\
 (3rst-v)^2 &= \frac{25}{4}r^2s^2t^2 - \frac{15}{2}rstv + v^2; \\
 (\frac{1}{2}d + \frac{3}{4}kpt)^2 &= \frac{1}{4}d^2 + \frac{3}{2}dkpt + \frac{9}{16}k^2p^2t^2; \\
 (\frac{3}{4}az-bcd)^2 &= \frac{9}{16}a^2z^2 - \frac{3}{2}azbcd + b^2c^2d^2;
 \end{aligned}$$

Teisenda, kui võimalik, järgnevad hulklükked kahe arvu summa või vahe ruuduks!

$$\begin{aligned}
 5. 4x^2 + 12x + 9 &= (2x+3)^2; \\
 9a^2 - 30a + 25 &= (3a-5)^2; \\
 25y^2 - 10y + 1 &= (5y-1)^2; \\
 c^2 + 4c + 4 &\neq (c+2)^2; \\
 16s^2 - 7s + 1 &= (4s-1)^2;
 \end{aligned}$$

$$\begin{aligned}
 7. t^2 + 20t + 100 &\neq (t+10)^2; \\
 \frac{1}{4}m^2 - \frac{1}{4}m + \frac{1}{4} &= (\frac{1}{2}m - \frac{1}{2})^2; \\
 r^2 - \frac{4}{9}r + \frac{16}{81} &= (r - \frac{2}{3})^2; \\
 9d^2 + 42d + 49 &= (3d+7)^2; \\
 0,04a^2 - 0,04a + 0,01 &= (0,2a - 0,1)^2;
 \end{aligned}$$

Plüüsiga on mäeldatud viitas hulklükked teisenduse, kui parandada hulklükkemid vastavalt näpunäidele, mis on mäeldatud. Siin on võimalus mid muutmise eestlasta.

Arvutamise abivalemid: summa ja vahe korrutis.

$$\begin{aligned}
 1. (a+1)(a-1) &= a^2 - a + a - 1^2 = a^2 - 1^2 = a^2 - 1; \\
 (x+7)(x-7) &= x^2 - 7x + 7x - 49 = x^2 - 7^2 = x^2 - 49; \\
 (c+11)(c-11) &= c^2 - 11c + 11c - 11^2 = c^2 - 11^2 = c^2 - 121; \\
 (4+y)(4-y) &= 4^2 - 4y + 4y - y^2 = 4^2 - y^2 = 16 - y^2; \\
 (9+m)(9-m) &= 9^2 - 9m + 9m - m^2 = 9^2 - m^2 = 81 - m^2;
 \end{aligned}$$

$$\begin{aligned}
 2. (d-2)(d+2) &= d^2 - 2d + 2d - 2^2 = d^2 - 2^2; \\
 (n-8)(n+8) &= n^2 - 8n + 8n - 8^2 = n^2 - 8^2; \\
 (z-10)(z+10) &= z^2 - 10z + 10z - 10^2 = z^2 - 10^2; \\
 (b-12)(b+12) &= b^2 - 12b + 12b - 12^2 = b^2 - 12^2; \\
 (a-b)(a+b) &= a^2 - ab + ab - b^2 = a^2 - b^2;
 \end{aligned}$$

3.

Kahe arvu summa ja vahe korrutis võrdub samade arvude ruutude vahel.

$$(a+b) \cdot (a-b) = a^2 - b^2;$$

$$\begin{aligned}
 4. (x-9)(x+9) &= x^2 - 9^2; \\
 (m+4)(m-4) &= m^2 - 4^2; \\
 (k-15)(k+15) &= k^2 - 15^2; \\
 (5-z)(5+z) &= 5^2 - z^2; \\
 (15+r)(15-r) &= 15^2 - r^2; \\
 (u-b)(u+b) &= u^2 - b^2; \\
 (m-c)(m+c) &= m^2 - c^2; \\
 5. (ab-2)(ab+2) &= a^2b^2 - 2^2; \\
 (3-xy)(3+xy) &= 3^2 - x^2y^2; \\
 (mn+7)(mn-7) &= m^2n^2 - 7^2; \\
 (10+st)(10-st) &= 10^2 - s^2t^2; \\
 (2xy-1)(2xy+1) &= 2^2x^2y^2 - 1; \\
 (cd+x)(cd-x) &= c^2d^2 - x^2; \\
 (ak-3)(ak+3) &= a^2k^2 - 3^2;
 \end{aligned}$$

Summa ja vahe korrutise valemi rakendamine.

- $(7a - b)(7a + b) = 7^2 a^2 - b^2$;
 $(6x + 11y)(6x - 11y) = 36x^2 - 121y^2$;
 $(30c - 5d)(30c + 5d) = (30c)^2 - (5d)^2$;
 $(m + 10n)(m - 10n) = m^2 - 10^2 n^2$;
 $(2n - 7d)(2n + 7d) = 4n^2 - 49d^2$;
- $67 \cdot 73 = (70 - 3)(70 + 3) = 70^2 - 3^2$;
 $38 \cdot 42 = (40 - 2)(40 + 2) = 40^2 - 2^2$;
 $99 \cdot 101 = (100 - 1)(100 + 1) = 100^2 - 1^2$;
 $19 \cdot 21 = (20 - 1)(20 + 1) = 20^2 - 1^2$;
 $56 \cdot 64 = (60 - 4)(60 + 4) = 60^2 - 4^2$;
- $(x - 0,1)(x + 0,1) = x^2 - 0,1^2$;
 $(a - 0,5)(a + 0,5) = a^2 - 0,5^2$;
 $(0,3 + m)(0,3 - m) = 0,3^2 - m^2$;
 $(0,6 - k)(0,6 + k) = 0,6^2 - k^2$;
 $(s - 0,7)(s + 0,7) = s^2 - 0,7^2$;
- $(c + \frac{1}{2})(c - \frac{1}{2}) = c^2 - (\frac{1}{2})^2$;
 $(y - \frac{1}{3})(y + \frac{1}{3}) = y^2 - (\frac{1}{3})^2$;
 $(d - \frac{2}{5})(d + \frac{2}{5}) = d^2 - (\frac{2}{5})^2$;
 $(\frac{1}{2}a + b)(\frac{1}{2}a - b) = (\frac{1}{2}a)^2 - b^2$;
 $(\frac{1}{3}z - 5)(\frac{1}{3}z + 5) = (\frac{1}{3}z)^2 - 5^2$;

Teisenda, kui võimalik, järgnevad kaksliikmed korrutisteks!

- $s^2 - 9 = (s - 3)(s + 3)$;
 $x^2 - 4 = (x - 2)(x + 2)$;
 $a^2 - 1 = (a - 1)(a + 1)$;
 $1 - m^2 = (1 - m)(1 + m)$;
 $36 - c^2 = (6 - c)(6 + c)$;
- $d^2 - 64 = (d - 8)(d + 8)$;
 $49 - y^2 = (7 - y)(7 + y)$;
 $b^2 - 100 = (b - 10)(b + 10)$;
 $2 - z^2$ ei lahene;
 $n^2 - 1 = (n - 1)(n + 1)$;
- $25 - a^2 = (5 - a)(5 + a)$;
 $9 - k^2 = (3 - k)(3 + k)$;
 $x^2 - 0,16 = (x - 0,4)(x + 0,4)$;
 $c^2 - a^2 = (c - a)(c + a)$;
 $y^2 - 0,9 = (y - 0,3)(y + 0,3)$;
- $a^2 b^2 - 1 = (ab - 1)(ab + 1)$;
 $x^2 y^2 - z^2 = (xy - z)(xy + z)$;
 $m^2 n^2 - t^2 = (mn - t)(mn + t)$;
 $81u^2 - 25 = (9u - 5)(9u + 5)$;
 $0,49 - 16s^2 = (0,7 - 4s)(0,7 + 4s)$;

Arvutamise abivalemite rakendamine.

- $(t - s)(t + s) = t^2 - s^2$;
 $(c + d)(c + d) = c^2 + 2cd + d^2$;
 $(x - y)(x - y) = x^2 - 2xy + y^2$;
 $(8 - c)(8 + c) = 8^2 - c^2$;
 $(3 + z)(3 + z) = 3^2 + 6z + z^2$;
- $(7 - k)^2 = 49 - 14k + k^2$;
 $(1 - p)(1 + p) = 1 - p^2$;
 $(ab - c)(ab - c) = a^2 b^2 - 2abc + c^2$;
 $(5v + u)(5v + u) = 25v^2 + 10vu + u^2$;
 $(n - pk)^2 = n^2 - 2npk + p^2 k^2$;
- $(4c + d)(4c - d) = 16c^2 - d^2$;
 $(2x + 13y)^2 = 4x^2 + 52xy + 169y^2$;
 $(3a - b)^2 = 9a^2 - 6ab + b^2$;
 $(30x - 5y)(30x + 5y) = 900x^2 - 25y^2$;
 $(10c - 4d)^2 = 100c^2 - 80cd + 16d^2$;
- $79 \cdot 81 = (80 - 1)(80 + 1) = 80^2 - 1^2$;
 $(8m + 3k)(8m + 3k) = 64m^2 + 48k + 9k^2$;
 $(12x - 10y)(12x + 10y) = 144x^2 - 100y^2$;
 $(4 + 1,5x)^2 = 16 + 12x + 2,25x^2$;
 $(8a + 5b)(8a - 5b) = 64a^2 - 25b^2$;

Teisenda, kui võimalik, järgnevad hulklühend korrutisteks või astmeteks!

- $0,09 - u^2 = (0,3 - u)(0,3 + u)$;
 $64a^2 - 16ax + x^2 = (8a - x)^2$;
 $4m^2 - 25 = (2m - 5)(2m + 5)$;
 $1 - 4d + 4d^2 = (1 - 2d)^2$;
 $n^2 + 6n \pm 9 = (n + 3)^2$;
- $100a^2 + 20ab + b^2 = (10a + b)^2$;
 $x^2 - 121 = (x - 11)(x + 11)$;
 $y^2 - 2y + 1 = (y - 1)^2$;
 $0,01c^2 - 1 = (0,1c - 1)(0,1c + 1)$;
 $u^2 + 2uvk + v^2 k^2 = (u + vk)^2$;
- $1 - 0,16z^2 = (1 - 0,4z)(1 + 0,4z)$;
 $9x^2 - 66xy + 121y^2 = (3x - 11y)^2$;
 $4x^2 - 14ax + 49a^2 = (2x - 7a)^2$;
 $1 + x^2$ ei lahene;
 $9d^2 - 6dn + n^2 = (3d - n)^2$;
- $n^2 - 10n + 25 = (n - 5)^2$;
 $0,25c^2 - 2cd + 4d^2 = (0,5c - 2d)^2$;
 $0,04 - s^2 = (0,2 - s)(0,2 + s)$;
 $t^2 + 0,1t + 0,01s^2 = (t + 0,1s)^2$;
 $0,25b^2 - 81 = 0,5b^2 - 9^2 = (0,5b - 9)(0,5b + 9)$;

1. $(3u + 7v)^2 = 9u^2 + 42uv + 49v^2$; $(3 - 1,3d)^2 = 9 - 7,8d + 1,69d^2$;
 $(2 - 0,5n)^2 = 4 - 2n + 0,25n^2$; $(1 + 2,5z)^2 = 1 + 5z + 6,25z^2$;
 $(0,6x - 0,5y)(0,6x - 0,5y) = 0,36x^2 - 0,6xy + 0,25y^2$; $47^2 = (50 - 3)(50 - 3) = 2500 - 300 + 9 = 2209$;
 $(3d - 2,4)^2 = 9d^2 - 14,4d + 5,76$; $(0,3m + 0,2n)(0,3m + 0,2n) = 0,09m^2 + 0,12mn + 0,04n^2$;
 $(2,5 + 4a)^2 = 6,25 + 20a + 16a^2$; $(1,5 - 8s)(8s + 1,5) = 12s^2 - 6,45s^2$;
3. $(\frac{1}{3}a - \frac{1}{3}b)(\frac{1}{3}a + \frac{1}{3}b) = (\frac{1}{3}a)^2 - (\frac{1}{3}b)^2$; $(\frac{1}{3}c - 1)^2 = \frac{1}{9}c^2 - \frac{2}{3}c + 1$;
 $(0,3 - t)(t + 0,3) = 0,3^2 - t^2$;
 $(10 - \frac{4}{9}x)^2 = 100 - \frac{80}{9}x + \frac{16}{81}x^2$;
 $(\frac{1}{3}bcd + 5k)(\frac{1}{3}bcd + 5k) = \frac{1}{9}b^2c^2d^2 + \frac{10}{3}bcdk + (\frac{1}{3}xyz - 1)(1 + \frac{1}{3}xyz) = \frac{1}{9}x^2y^2z^2 - 1^2 + 2\frac{1}{3}xyz$;
4. $(6 + \frac{1}{16}b)^2 = 36 + 3b + \frac{1}{256}b^2$;
 $(\frac{1}{3}m + \frac{1}{3}n)(\frac{1}{3}m - \frac{1}{3}n) = (\frac{1}{3}m)^2 - (\frac{1}{3}n)^2$;
 $(a - 0,7)(0,7 + a) = a^2 - 0,7^2$;
 $(\frac{1}{16}k + 1)^2 = \frac{1}{256}k^2 + \frac{1}{8}k + 1$;

Teisenda, kui võimalik, järgnevad hulkkliikmed korratisteks või astmeteks!

5. $1 - \frac{1}{9}x^2 = (1 - \frac{1}{3}x)(1 + \frac{1}{3}x)$;
 $a^2b^2c^2 - z^2 = (abc - z)(abc + z)$;
 $\frac{1}{4}x^2 - \frac{1}{9}y^2 = (\frac{1}{2}x - \frac{1}{3}y)(\frac{1}{2}x + \frac{1}{3}y)$;
 $0,9s^2 - 16 = (0,3s - 4)(0,3s + 4)$;
 $4m^2 + n^2 = (2m + \frac{1}{2}n)(2m - \frac{1}{2}n)$;
 $4m^2 + n^2 = (2m + \frac{1}{2}n)(2m - \frac{1}{2}n)$;
 $4m^2 + n^2 = (2m + \frac{1}{2}n)(2m - \frac{1}{2}n)$;
6. $6x + 12x + \frac{1}{4}x^2 = (3 + \frac{1}{2}x)^2$;
 $4c^2d^2 - 4cdxy + 9x^2y^2 = (2cd - 3xy)^2$;
 $\frac{1}{4}a^2 - 5ab + 25b^2 = (\frac{1}{2}a - 5b)^2$;
 $\frac{1}{9}c^2 - \frac{4}{3}cd + d^2 = (\frac{1}{3}c - d)^2$;
 $r^2 - \frac{1}{4}rs + \frac{1}{16}s^2 = (\frac{1}{4}r - \frac{1}{8}s)^2$;
7. $0,04x^2 - 0,4x + 1 = (0,2x - 1)^2$;
 $\frac{1}{9}m^2n^2 - 1 = (\frac{1}{3}mn - 1)(\frac{1}{3}mn + 1)$;
 $\frac{1}{4}x^2y^2 + \frac{1}{9}x + \frac{1}{9}y = (\frac{1}{6}xy + \frac{1}{6})(\frac{1}{6}xy + \frac{1}{6})$;
 $0,36x^2 + 25 = (0,6x + 5)^2$;
 $\frac{1}{4}x^2 - \frac{1}{4}st + \frac{1}{4}s^2 = (\frac{1}{4}x - \frac{1}{4}st)^2$;
8. $0,01a^2b^2 - 0,64 = (0,1ab - 0,8)(0,1ab + 0,8)$;
 $\frac{1}{9}z^2 - 6z + 16 = (\frac{1}{3}z - 6)^2$;
 $\frac{1}{4}x^2 - \frac{1}{4}st + \frac{1}{4}s^2 = (\frac{1}{4}x - \frac{1}{4}st)^2$;
 $81y^2 + 1 = (9y + \frac{1}{9})^2$;
 $d^2 - abcd + \frac{1}{4}a^2b^2c^2 = (\frac{1}{2}d - \frac{1}{4}abc)^2$;

Hulkkliikmete liitmine.

1. $\frac{3a^2 - 5a + 2}{a^2 + 3a - 4} = \frac{4a^2 - 2a - 2v}{5a^2 - 2a - 2v}$;
2. $\frac{7x^2 - 4x + 5}{-2x^2 + 9x + 6} = \frac{5x^2 + 5x + 11}{5x^2 + 5x + 11}$;
3. $\frac{8c^2 - 7c - 3}{+ c^2 - 3c - 2} = \frac{9c^2 - 10c - 5}{9c^2 - 10c - 5}$;
4. $\frac{7y^2 - 6a - 1}{y^2 + 8a + 5} = \frac{8y^2 + 2a + 4}{8y^2 + 2a + 4}$;
5. $\frac{2m^2 - 3m - 4}{- m^2 + m + 4} = \frac{m^2 - 2m - 4}{m^2 - 2m - 4}$;
6. $\frac{4s^2 + 9s - 6}{- s^2 - 7s + 4} = \frac{5s^2 - 2s - 2}{5s^2 - 2s - 2}$;
7. $\frac{-4b^2 + 5b - 7}{10b^2 + 3} = \frac{6b^2 + 5b - 4}{6b^2 + 5b - 4}$;
8. $\frac{-5n^2 + 8n - 6}{- n^2 - 8n - 7} = \frac{-6n^2 - 13}{-6n^2 - 13}$;
9. $\frac{6z^2 - 2z - 3}{- 2z^2 + 3z} = \frac{4z^2 + z - 3}{4z^2 + z - 3}$;
10. $\frac{-d^2 + 4d + 8}{d^2 - d - 8} = \frac{-d^2 + 4d + 8}{-d^2 + 4d + 8}$;
11. $\frac{9x^2 + 5x}{-5x^2 + 3x - 6} = \frac{4x^2 + 8x - 6}{4x^2 + 8x - 6}$;
12. $\frac{10f^2 - 8}{2f^2 + 3f + 7} = \frac{12f^2 + 3f - 4}{12f^2 + 3f - 4}$;
13. $\frac{-3c^2 - 4cd + d^2}{4c^2 + 4cd - d^2} = \frac{c^2 - d^2}{c^2 - d^2}$;
14. $\frac{0,7 - 0,3y + 0,8y^2}{-0,4 + 0,8y - 0,3y^2} = \frac{0,3 + 0,5y + 0,5y^2}{0,3 + 0,5y + 0,5y^2}$;
15. $\frac{m^3 - 0,9mn - 0,6n^2}{-0,3m^2 + 0,5mn + n^2} = \frac{0,7m^2 - 0,4mn + 0,4n^2}{0,7m^2 - 0,4mn + 0,4n^2}$;
16. $\frac{3x^2 - 4xy - y^2}{x^2 + 2xy + y^2} = \frac{x^2 - xy - y^2}{x^2 - xy - y^2}$;
17. $\frac{5a^2 - 2}{+ 3a + 4} = \frac{-3a^2 - a - 2}{+ 2a^2 + 2a}$;
18. $\frac{2n^2 - 7n}{-6n^2 + 2n - 5} = \frac{7n^2 + 5n + 1}{3n^2 - 4}$;
19. $\frac{0,1c^2 + 0,4cd - d^2}{-0,5c^2 + 4d^2} = \frac{0,1c^2 + 0,1cd - 4d^2}{-0,3c^2 + 0,5cd - d^2}$;
20. $\frac{-2y + 3}{5y^2 - y - 10} = \frac{-3y^2 + 3y - 3}{2y^2 - 10}$;
21. $\frac{0,4m^2 - 0,6m - 0,7}{+ 0,3m + 0,4} = \frac{-0,1m^2 + 0,1}{0,3m^2 - 0,3m - 0,2}$;
22. $\frac{\frac{1}{4}a^2 + \frac{1}{4}a + \frac{1}{4}}{a^2 - \frac{1}{4}a - 1} = \frac{\frac{1}{4}a^2 + \frac{1}{4}a + \frac{1}{4}}{\frac{1}{4}a^2 + \frac{1}{4}a + \frac{1}{4}}$;
23. $\frac{\frac{1}{4}d^2 - \frac{1}{4}d + \frac{1}{4}}{\frac{1}{4}d^2 + d - \frac{1}{4}} = \frac{\frac{1}{4}d^2 + \frac{1}{4}d - \frac{1}{4}}{\frac{1}{4}d^2 + \frac{1}{4}d - \frac{1}{4}}$;
24. $\frac{\frac{1}{4}x^2 - \frac{1}{4}x + \frac{1}{4}}{\frac{1}{4}x^2 - \frac{1}{4}x - \frac{1}{4}} = \frac{\frac{1}{4}x^2 - \frac{1}{4}x - \frac{1}{4}}{\frac{1}{4}x^2 - \frac{1}{4}x - \frac{1}{4}}$;

Lüüda hulkliikmed, korraldades arvutamist eelmise lehekülje eeskujul!

1. $(5a^2 - a - 6) + (a^2 + 2a)$	8. $(d^2 - 0,1d + 1,1) + (-0,3d^2 + 0,7d - 0,9)$	
2. $(-x^2 - 4a + 3) + (3x^2 - 4)$	9. $(8s^2 - 5st) + (-7s^2 + 4st + t^2)$	
3. $(4c^2 - 6c - 7) + (-3c^2 + 5c + 8)$	10. $(3a^2 - 4a) + (-2a^2 + 3a - 2) + (5a^2 + a + 1)$	
4. $(2y^2 - 9) + (5y^2 + 4y + 7)$	11. $(7c^2 - 3) + (4c + 5) + (-4c^2 - 3c - 2)$	
5. $(7s^2 - 5s) + (4s^2 + 3s - 2)$	12. $(0,3x^2 + 0,4xy - 3y^2) + (0,2x^2 + 3y^2) + (0,5x^2 - 0,3xy)$	
6. $(N^3 - 6N - 4) + (5N^2 + 3N + 4)$		
7. $(0,8 - 0,7z - 0,3z^2) + (0,5 + 0,8z - 6,2z^2)$		
1. $\frac{5a^2 - a - 6}{a^2 + 2a}$	2. $\frac{-x^2 - 4a + 3}{3x^2 - 4}$	3. $\frac{4c^2 - 6c - 7}{-3c^2 + 5c + 8}$
$\frac{6a^2 + a - 6}{a^2 + 2a}$	$\frac{2x^2 - 4a - 1}{3x^2 - 4}$	$\frac{-3c^2 + 5c + 8}{c^2 - c + 1}$
4. $\frac{5y^2 + 4y + 7}{2y^2 - 9}$	5. $\frac{4s^2 + 3s - 2}{7s^2 - 5s}$	6. $\frac{5N^2 + 3N + 4}{N^3 - 6N - 4}$
$\frac{7y^2 + 4y - 2}{2y^2 - 9}$	$\frac{11s^2 - 2s - 2}{7s^2 - 5s}$	$\frac{N^3 - 6N - 4}{N^3 + 5N^2 - 3N}$
7. $\frac{0,8 - 0,7z - 0,3z^2}{0,5 + 0,8z - 0,2z^2}$	8. $\frac{d^2 - 0,1d + 1,1}{-0,3d^2 + 0,7d - 0,9}$	9. $\frac{-7s^2 + 4st + t^2}{8s^2 - 5st}$
$\frac{1,3 + 0,1z - 0,5z^2}{0,5 + 0,8z - 0,2z^2}$	$\frac{+0,7d^2 + 0,6d + 0,2}{-0,3d^2 + 0,7d - 0,9}$	$\frac{5s^2 - 5st + t^2}{8s^2 - 5st}$
10. $\frac{3a^2 - 4a}{-2a^2 + 3a - 2}$	11. $\frac{-4c^2 - 3c - 2}{+7c^2 + 4c + 5}$	12. $\frac{0,3x^2 + 0,4xy - 3y^2}{0,2x^2 + 3y^2}$
$\frac{5a^2 + a + 1}{-2a^2 + 3a - 2}$	$\frac{+7c^2 + 4c + 5}{-3}$	$\frac{0,5x^2 - 0,3xy}{1,0x^2 + 0,1xy}$
$\frac{6a^2 - 1}{-2a^2 + 3a - 2}$	$\frac{3c^2 + c}{-3}$	
13. $\frac{3,4c^2 - 1,5d^2}{0,3c^2 + 0,4d^2}$	14. $\frac{\frac{2}{3}v^2 - \frac{1}{3}v - \frac{1}{3}}{\frac{2}{3}v^2 + \frac{1}{3}v + \frac{1}{3}}$	15. $\frac{\frac{1}{3}a^2 - \frac{1}{3}a - 3}{\frac{2}{3}a^2 - \frac{1}{3}a + 1\frac{1}{3}}$
$\frac{3,7e^2 - 1,2d^2}{0,3c^2 + 0,4d^2}$	$\frac{\frac{2}{3}v^2 - \frac{1}{3}v - \frac{1}{3}}{\frac{2}{3}v^2 + \frac{1}{3}v + \frac{1}{3}}$	$\frac{a^2 - \frac{1}{3}a - 3}{\frac{2}{3}a^2 - \frac{1}{3}a + 1\frac{1}{3}}$
16. $\frac{\frac{2}{3}m^2 - \frac{1}{3}m - 1}{-2m^2 + m + \frac{1}{3}}$	17. $\frac{b^2 - \frac{1}{3}b + \frac{2}{3}}{\frac{1}{3}b^2 - \frac{2}{3}b - \frac{1}{3}}$	18. $\frac{n^2 - \frac{1}{3}n - 5}{-\frac{1}{3}n^2 - \frac{1}{3}n}$
$\frac{1m^2 + \frac{1}{3}m - \frac{2}{3}}{-2m^2 + m + \frac{1}{3}}$	$\frac{\frac{1}{3}b^2 - \frac{2}{3}b - \frac{1}{3}}{\frac{1}{3}b^2 - \frac{2}{3}b - \frac{1}{3}}$	$\frac{\frac{2}{3}n^2 - \frac{1}{3}n - 5}{-\frac{1}{3}n^2 - \frac{1}{3}n}$

Hulkliikmete lahutamine.

1. $\frac{4a^2 - 5a + 3}{+2a^2 + 7a + 6}$	2. $\frac{3n^2 - 7n - 8}{+2n^2 + 3n + 5}$	3. $\frac{5b^2 - 4b + 2}{+2b^2 + 3b + 5}$
$\frac{2a^2 - 12a + 9}{+2a^2 + 7a + 6}$	$\frac{4n^2 - 10n - 3}{+2n^2 + 3n + 5}$	$\frac{7b^2 - 6b + 7}{+2b^2 + 3b + 5}$
4. $\frac{6n^2 - 8n + 5}{+n^2 + 2n + 2}$	5. $\frac{-2c^2 - 3c + 1}{+c^2 + 5c + 4}$	6. $\frac{-9y^2 - 2y - 3}{+5y^2 + 3y + 7}$
$\frac{5n^2 - 10n + 7}{+n^2 + 2n + 2}$	$\frac{3c^2 + 2c + 5}{+c^2 + 5c + 4}$	$\frac{4y^2 - 5y + 4}{+5y^2 + 3y + 7}$
7. $\frac{3d^2 + 9d - 6}{+d^2 + 6d + 4}$	8. $\frac{5m^2 - 6m - 7}{+m^2 + 3m}$	9. $\frac{7s^2 + 4s - 8}{+7s^2 + 4s - 8}$
$\frac{2d^2 + 15d - 2}{+d^2 + 6d + 4}$	$\frac{6m^2 - 9m - 7}{+m^2 + 3m}$	$\frac{14s^2 + 4s - 10}{+7s^2 + 4s - 8}$
10. $\frac{5z^2}{+3z^2 + 0z + 5}$	11. $\frac{9t^2 - 5st}{+5t^2 + 4st + s^2}$	12. $\frac{x^2 + 3xy - y^2}{+x^2 + 3xy - y^2}$
$\frac{2t^2 + 6t - 12}{+3z^2 + 0z + 5}$	$\frac{14t^2 - 9st - 6s^2}{+5t^2 + 4st + s^2}$	$\frac{4xy + 2y^2}{+x^2 + 3xy - y^2}$
13. $\frac{4M^2 + MN - N^2}{+MN + 5N^2 - N^2}$	14. $\frac{-6a^2 - 7ab}{+6a^2 + 8ab + b^2}$	15. $\frac{5c^2 + 2cd - 2d^2}{+5c^2 + 2cd - 2d^2}$
$\frac{4M^2 + MN - N^2}{+MN + 5N^2 - N^2}$	$\frac{-6a^2 - 7ab}{+6a^2 + 8ab + b^2}$	$\frac{5c^2 + 2cd - 2d^2}{+5c^2 + 2cd - 2d^2}$
16. $\frac{0,7y^2 - 0,8y - 0,5}{+0,2y^2 + 0,2y + 0,8}$	17. $\frac{0,2m^2 - 0,3m + 1}{+0,2m^2 + 0,5m + 0,7}$	18. $\frac{s^2 - st + 0,2t^2}{+0,3s^2 + 0,2st + t^2}$
$\frac{0,5y^2 - 1,0y + 0,3}{+0,2y^2 + 0,2y + 0,8}$	$\frac{0,2m^2 - 0,3m + 1}{+0,2m^2 + 0,5m + 0,7}$	$\frac{0,3s^2 - 1,2st - 0,8t^2}{+0,3s^2 + 0,2st + t^2}$
19. $\frac{a^2 - 0,8ab + b^2}{+ab + b^2}$	20. $\frac{-c^2}{+c^2 + 2cd + d^2}$	21. $\frac{4z^2 - 1,5z + 6,2}{+1,8z^2 + 3,7}$
$\frac{a^2 - 1,8ab}{+ab + b^2}$	$\frac{-c^2}{+c^2 + 2cd + d^2}$	$\frac{2,2z^2 - 1,5z + 6,2}{+1,8z^2 + 3,7}$
22. $\frac{\frac{1}{3}x^2 - 3xy - \frac{1}{3}y^2}{+x^2 + 2xy + y^2}$	23. $\frac{\frac{1}{3}d^2 - \frac{1}{3}d + 3}{+x^2 + 2xy + y^2}$	24. $\frac{a^2 - \frac{1}{3}a - \frac{1}{3}}{+a^2 + \frac{1}{3}a + \frac{1}{3}}$
$\frac{\frac{1}{3}x^2 - 3xy - \frac{1}{3}y^2}{+x^2 + 2xy + y^2}$	$\frac{\frac{1}{3}d^2 - \frac{1}{3}d + 3}{+x^2 + 2xy + y^2}$	$\frac{a^2 - \frac{1}{3}a - \frac{1}{3}}{+a^2 + \frac{1}{3}a + \frac{1}{3}}$

Hulkliikmete lahutamine.

- $(2a^2 + 7a - 6) - (a^2 - 5a - 3) = 2a^2 + 7a - 6 - a^2 + 5a + 3 = a^2 + 12a - 3.$
- $(6x^2 - 7) - (5x^2 - 3x + 3) = 6x^2 - 7 - 5x^2 + 3x - 3 = x^2 + 3x - 10.$
- $(3m^2 - 4m - 6) - (-m^2 + 2m) = 3m^2 - 4m - 6 + m^2 - 2m = 4m^2 - 6m - 6.$
- $(5c^2 + cd - d^2) - (5c^2 - 4d^2) = 5c^2 + cd - d^2 - 5c^2 + 4d^2 = 3d^2 + cd.$
- $(-4x^2 - 5xy) - (-4x^2 + 7xy - y^2) = -4x^2 - 5xy + 4x^2 - 7xy + y^2 = -12xy + y^2.$

Lahuta hulkliikmed, korraldades arvutamist tulpades!

- $(4a^3 - 7a^2 + 3a - 2) - (3a^2 + 11 - 6a + 3a^3)$
- $(15b^3 - 2b^2 - 7b + 4) - (5b^2 - 9b + 1 - 8b^3)$
- $(h^2 - 3) - (3h - 5 + h^2 - 7h^3)$
- $(k^2 - 4 + 5k) - (k^2 + 1 - 3k - 8k^3)$
- $(0,7y^2 - yz) - (1,2y^3 - 5yz + 0,8y^2 - y)$
- $(3n^2 - 8 + 4n) - (5n^2 - 7 + 2n - 10n^3)$
- $(0,7m + 2,4m^2 + m^3 - 3) - (-2,7m^2 + 0,2m - 6)$
- $(0,9x^2 + 2) - (-4,3x^3 - 3x^2 + 1,7x - 8)$
- $(2c^3 - 3cd + d^2) - (d^2 + 5cd - 10c + 2c^3)$

$$\begin{array}{r} 6. \quad 4a^3 - 7a^2 + 3a - 2 \\ \quad - 3a^3 + 3a^2 + 6a - 11 \\ \hline a^3 - 10a^2 + 9a - 13. \end{array}$$

$$\begin{array}{r} 7. \quad 15b^3 - 2b^2 - 7b + 4 \\ \quad - 5b^2 - 9b + 1 - 8b^3 \\ \hline 23b^3 - 7b^2 - 2b + 3. \end{array}$$

$$\begin{array}{r} 8. \quad h^2 - 3 \\ \quad - 3h + 5 - h^2 + 7h^3 \\ \hline 7h^3 - 3h + 2. \end{array}$$

$$\begin{array}{r} 9. \quad k^2 - 4 + 5k - 13 \\ \quad - 8k^3 + 3k^2 + 3k + 1 \\ \hline -8k^3 + 8k^2 + 8k - 5. \end{array}$$

$$\begin{array}{r} 10. \quad 0,7y^2 - yz \\ \quad - 1,2y^3 + 0,8y^2 + 5yz - y \\ \quad - 0,8y^2 - 1,2y^3 + y + 4yz \\ \hline -1,2y^3 - 0,5y^2 + 4yz - y. \end{array}$$

$$\begin{array}{r} 11. \quad 3n^2 + 4n - 8 \\ \quad - 10n^3 + 5n^2 + 2n - 7 \\ \hline -10n^3 - 7n^2 + 6n - 15. \end{array}$$

$$\begin{array}{r} 12. \quad m^3 + 2,4m^2 + 0,7m - 3 \\ \quad - 2,7m^2 + 0,2m - 6 \\ \hline m^3 + 5,1m^2 + 0,9m - 9. \end{array}$$

$$\begin{array}{r} 13. \quad 0,9x^2 + 2 \\ \quad - 4,3x^3 - 3x^2 + 1,7x - 8 \\ \hline -4,3x^3 - 3,4x^2 + 1,7x - 6. \end{array}$$

$$\begin{array}{r} 14. \quad 2c^3 - 3cd + d^2 \\ \quad - 5c^3 + 10c^2 + 5cd - 7d^2 \\ \hline -3c^3 + 10c^2 + 8cd - 6d^2. \end{array}$$

$$\begin{array}{r} 15. \quad c^3 - c^2 - 2c + 2 \\ \quad - c^3 + c^2 + c - 3 \\ \hline -c^3 + c^2 - 2c + 2. \end{array}$$

$$\begin{array}{r} 16. \quad m^3 + 3m^2 - 2m \\ \quad - 2m^3 + 2m^2 + 1 \\ \hline -m^3 + 5m^2 - 2m + 1. \end{array}$$

$$\begin{array}{r} 17. \quad 5a^2 + ab + b^2 \\ \quad - 5a^2 + ab + b^2 \\ \hline 0. \end{array}$$

$$\begin{array}{r} 18. \quad 3n^2 + n + 8 \\ \quad - 3n^2 + n + 8 \\ \hline 0. \end{array}$$

$$\begin{array}{r} 19. \quad 3y^2 + 2t - 6 \\ \quad - 3y^2 + 2t - 6 \\ \hline 0. \end{array}$$

$$\begin{array}{r} 20. \quad 2b^2 + bc + c^2 \\ \quad - 2b^2 + bc + c^2 \\ \hline 0. \end{array}$$

Hulkliikmete korrutamine üksliikmega.

1.

Et korrutada hulkliikmet üksliikmega, selleks korrutatakse hulkliikme liiget üksliikmega.

$$k(a + b + c) = ka + kb + kc$$

$$2. \quad a(a^2 + 3a + 4) = a^3 + 3a^2 + 4a.$$

$$2c(c^2 - 5c + 1) = 2c^3 - 10c^2 + 2c.$$

$$5n(n^2 - 2n - 7) = 5n^3 - 10n^2 - 35n.$$

$$4n(m^2 - 3nm - 2n^2) = 4nm^2 - 12n^2m - 8n^3.$$

$$3t(3s^2 - st - t^2) = 9st^2 - 3st^2 - 3t^3.$$

$$3. \quad 7(2a - 3b + c - d) = 14a - 21b + 7c - 7d.$$

$$0,2(3x - 5y - z + 1) = 0,6x - 1y - 0,2z + 0,2.$$

$$3(0,4m + 0,8n - 3 + k^2) = 1,2m + 2,4n - 9 + 3k^2.$$

$$0,5(6r - 5s + 8t - 2) = 3r - 2,5s + 4t - 1.$$

$$2m(5m^2 - 4mn + 3n^2) = 10m^3 - 8m^2n + 6mn^2.$$

$$4. \quad 0,4r(r^2 - 3r + 7) = 0,4r^3 - 1,2r^2 + 2,8r.$$

$$0,7t(t^2 - 8t - 5) = 0,7t^3 - 5,6t^2 - 3,5t.$$

$$-0,2ab(6c^2 + 7c - 1) = -1,2ac^3 - 1,4ac^2 + 0,2ac.$$

$$-0,8bn(5n^2 - 3n + 4) = -4bn^3 + 2,4bn^2 + 3,2bn.$$

$$0,3rs(7r^2 + 4rs - 5s^2) = 2,1r^3s + 1,2r^2s^2 - 1,5rs^3.$$

$$5. \quad 8a^2b(5a^2 - 2ab + 3b^2 - 1) = 40a^4b - 16a^3b^2 + 24a^2b^3 - 8a^2b.$$

$$-5mn^2(-m + 2n + 3mn - 2) = 5m^2n^2 - 10mn^3 - 15m^2n^2 + 10mn^3.$$

$$18(\frac{1}{2}z + \frac{1}{2}z - \frac{1}{2}z + \frac{1}{2}z) = 9z + 9z - 9z + 9z = 18z.$$

$$8(y - \frac{1}{2}y + \frac{1}{2}y) = 8y - 4y + 4y = 8y.$$

$$15(\frac{n}{3} - \frac{n}{5} + \frac{4n}{15}) = 5n - 3n + 4n = 6n.$$

1.

Et jagada hulkliiget üksliikmega, selleks
hulkliikme liiget eraldi üksliikmega.

$$(a + b + c) : x = \frac{a}{x} + \frac{b}{x} + \frac{c}{x}$$

$$2. (4n^2 8n + 12) : 4 = n^2 8n + 3 = 8n^3 + 3.$$

$$(a^3 - a^2 + a) : a = a^2 - a + 1.$$

$$(-2c^2 + 4c - 12) : (-2) = c^2 - 2c + 6.$$

$$(-d + d^2 - d^3) : (-1) = +d - d^2 + d^3.$$

$$(5 - 20m + 15m^3) : 5 = 1 - 4m + 3m^3.$$

$$3. (cm^2 - cm - a) : c = m^2 - m - \frac{a}{c}.$$

$$(6y^3 - y^2 + 2y) : y = 6y^2 - y + 2.$$

$$(9dz^2 - 3d) : 3d = 3z^2 - 1.$$

$$(6mn^2 - 4mn - 8n) : (-2n) = -3mn + 2m + 4.$$

$$(-20bd^2 + 35bd - 5b) : (-5b) = +4d^2 - 7d + 1.$$

$$4. (8a^3 + 3a^2 - 16a) : (-2a) = -4a^2 - \frac{3}{2}a + 8.$$

$$(1,4x^3 - 4,9x^2 - 7x) : 7d = 0,2\frac{x^3}{d} - 0,7\frac{x^2}{d} - \frac{x}{d}.$$

$$(5,4m^2 - 0,12m +) : 0,6 = 9m^2 - 0,2m.$$

$$(8 - 0,32c - 4,8c^2) : (-0,8) = -10 + 0,4c + 6c^2.$$

$$(-3y + 2,7y^2 - 0,9y^3) : (-0,3y) = +10 - 9y + 3y^2.$$

$$5. (16m^4 n^4 - 4m^3 n^2 + 0,8m^2 n) : 4m^2 n = 4m^2 n^2 - mn + 0,2.$$

$$(2,7az^3 - 6az^2 - 0,18a) : 3az = 0,9z^2 - 2z - 0,06\frac{1}{z}.$$

$$(0,8s^3 t^2 - 4s^2 t + 0,12st) : 0,2st = 4s^2 t - 20s + 0,6.$$

$$(-42r^2 x + 56r^2 y - 3,5rz) : (-7r) = +6rx - 8ry + 0,5z.$$

$$(1,8a, b^3 - 27a^2 b^2 - 0,45ab) : (-0,9ab) = -2a^3 b^2 + 30ab - 0,5.$$

Hulkliikme korrutamine hulkliikmega.

1.

Et korrutada hulkliiget hulkliikmega, selleks
jaguhulkliikme liiget eraldi tja hulkliikme liikmest
ja saamead liikmed liita vastavalt nikkudas mngid vaitava?

Korruta:

2.	3.	4.
$\begin{array}{r} 3x + y \\ x + 3y \\ \hline 3x^2 + 4y \\ \quad 9xy + 3y^2 \\ \hline 3x^2 + 10xy + 3y^2 \end{array}$	$\begin{array}{r} a - 2b \\ a - 3b \\ \hline a^2 - 2ab \\ \quad - 3ab + 6b^2 \\ \hline a^2 + 5ab + 6b^2 \end{array}$	$\begin{array}{r} 2m - 7n \\ 5m + 7n \\ \hline 10m^2 - 35mn \\ \quad + 14mn - 49n^2 \\ \hline 10m^2 - 21mn - 49n^2 \end{array}$
5.	6.	7.
$\begin{array}{r} c^2 + c5 - 1 \\ \quad c + 3 \\ \hline c^3 + 5c^2 - c \\ \quad + 3c + 15c - 3 \\ \hline c^3 + 8c^2 + 14c - 3 \end{array}$	$\begin{array}{r} 4d^2 - d + 6 \\ \quad d - 5 \\ \hline 4d^3 - d^2 + 6d \\ \quad - 2d^2 + 5d - 30 \\ \hline 4d^3 - 21d^2 + 11d - 30 \end{array}$	$\begin{array}{r} a^2 - 2ab + b^2 \\ \quad a + b \\ \hline a^3 - 2a^2b + ab^2 \\ \quad + 3ab^2 - 2ab^2 + b^3 \\ \hline a^3 - 3a^2b - ab^2 + b^3 \end{array}$
8.	9.	10.
$\begin{array}{r} x^2 + xy + y^2 \\ \quad x - y \\ \hline x^3 + x^2y + xy^2 \\ \quad - x^2y + xy^2 - y^3 \\ \hline x^3 - y^3 \end{array}$	$\begin{array}{r} m^2 - mn + n^2 \\ \quad m + n \\ \hline m^3 - m^2n + n^2m \\ \quad + m^2n - n^2m + n^3 \\ \hline m^3 + n^3 \end{array}$	$\begin{array}{r} 3t^2 + 5tc - c^2 \\ \quad t + c \\ \hline 3t^3 + 5t^2c - tc^2 \\ \quad + 3t^2c + 5tc^2 - c^3 \\ \hline 3t^3 + 8t^2c + 4tc^2 - c^3 \end{array}$
11.	12.	
$\begin{array}{r} 4s^2 - 3s + 1 \\ s^2 + 2s - 5 \\ \hline 4s^4 - 3s^3 + 5s^2 \\ \quad + 8s^3 - 6s^2 + 2s \\ \quad - 20s^2 + 15s - 5 \\ \hline 4s^4 + 5s^3 - 25s^2 + 17s - 5 \end{array}$	$\begin{array}{r} 2 - 4x - x^2 \\ 7 + 3x - x^2 \\ \hline 14 - 28x - 7x^2 \\ \quad 6x - 12x^2 - 3x^3 \\ \quad - 2x^2 + 41x^3 + x^4 \\ \hline 14 - 22x - 21x^2 + x^3 + x^4 \end{array}$	

Korraida järgmised hulkliikmed suurenevate või vähenevate astendajate järjekorras ja leia nende korrutis!

1. $(6a^2 - 5 + 2a)(3a - 2)$

4. $(2c^2 - 3 - 4c)(c^3 - 1)$

2. $(3 + 3m^2 - 8m)(8m - 5)$

5. $(1 - 3t + t^2)(3 + t^2)$

3. $(6x^2 + y^2 - 5xy)(x - y)$

6. $(a + 1 - 2b)(a - 1)$

1. $\begin{array}{r} 6a^2 + 2a - 5 \\ 3a - 2 \\ \hline 18a^3 + 6a^2 - 15a \\ -12a^2 - 4a + 10 \\ \hline 18a^3 - 6a^2 - 19a + 10 \end{array}$	2. $\begin{array}{r} 3 - 8m + 3m^3 \\ -5 + 8m \\ \hline -15 + 40m - 15m^3 \\ + 24m - 64m^2 + 24m^4 \\ \hline -15 + 28m - 64m^2 + 15m^3 + 24m^4 \end{array}$	3. $\begin{array}{r} 6x^2 - 5xy + y^2 \\ x - y \\ \hline 6x^3 - 5x^2y + xy^2 \\ - 6x^2y + 5xy^2 - y^3 \\ \hline 6x^3 - 11x^2y + 6xy^2 - y^3 \end{array}$
4. $\begin{array}{r} 2c^2 - 4c - 3 \\ c^2 - 1 \\ \hline 2c^4 - 4c^3 - 3c^2 \\ - 2c^2 + 4c + 3 \\ \hline 2c^4 - 4c^3 - 5c^2 + 4c + 3 \end{array}$	5. $\begin{array}{r} 1 - 3t + t^2 \\ 3 + t^2 \\ \hline 3 - 9t + 3t^2 \\ + t^2 - 3t^3 + t^4 \\ \hline 3 - 9t + 4t^2 - 3t^3 - t^4 \end{array}$	6. $\begin{array}{r} a + 1 - 2b \\ a - 1 \\ \hline a^2 + a - 2ab \\ - a \\ \hline a^2 - 2ab + 1 + 2b \end{array}$
7. $\begin{array}{r} y^2 - 4y - 0,7 \\ -0,3^2 + 6y - 8 \\ \hline 0,3^2y^2 - 0,3^2y - 0,063 \\ + 6y^2 - 24y^2 - 4,2y \\ - 8y^2 + 32y + 5,600 \\ \hline 6y^3 - 31,31y^2 + 27,44y + 5,537 \end{array}$	8. $\begin{array}{r} 8z^2 - 0,6z + 0,9 \\ 0,5z^2 + 4z - 0,4 \\ \hline 4z^4 - 0,3z^3 + 0,45z^2 \\ + 3,2z^3 - 2,40z^2 + 3,60z \\ - 3,20z^2 + 9,44z - 0,36 \\ \hline 4z^4 + 31,7z^3 - 5,15z^2 + 3,84z - 0,36 \end{array}$	
9. $\begin{array}{r} 2 + \frac{1}{3}a^2 \\ - 1 - \frac{1}{3}a + 3a^3 \\ \hline -2 - \frac{1}{3}a + \frac{1}{3}a^2 \\ - a - \frac{1}{3}a^2 + \frac{1}{3}a^3 \\ + 6a^2 + \frac{1}{3}a^3 - 4,5a^4 \\ \hline -2 - \frac{1}{3}a + 7\frac{2}{3}a^2 + \frac{2}{3}a^3 - 4,5a^4 \end{array}$	10. $\begin{array}{r} \frac{1}{4}b^3 + \frac{3}{4}b + 1 \\ \frac{1}{4}b^2 + 4b - 5 \\ \hline \frac{1}{4}b^4 - \frac{1}{4}b^3 + \frac{1}{4}b^2 \\ + 6b^2 - \frac{3}{4}b^2 + 4b \\ - \frac{1}{4}b^2 + \frac{1}{4}b - 5 \\ \hline \frac{1}{4}b^4 + 5\frac{3}{4}b^2 - 9\frac{3}{4}b^2 + 7\frac{3}{4}b - 5 \end{array}$	

Arvutamise abivalemid: summa kuup, vahe kuup.

1. $(a + b)^3 = (a + b)^2(a + b) = (a^2 + 2ab + b^2)(a + b) = a^3 + 3a^2b + 3ab^2 + b^3$

Arvuta 2. $(m + n)^3$, 3. $(c + 4)^3$ ja 4. $(2a + y)^3$, kasutades selleks vabu riskikülkuid!

2. $\begin{array}{r} m^2 + 2mn + n^2 \\ m + n \\ \hline m^3 + 2m^2n + mn^2 \\ m^2n + 2mn^2 + n^3 \\ \hline m^3 + 3m^2n + 3mn^2 + n^3 \end{array}$	3. $\begin{array}{r} c^2 + 8c + 16 \\ c + 4 \\ \hline c^3 + 8c^2 + 16c \\ 4c^2 + 32c + 64 \\ \hline c^3 + 12c^2 + 48c + 64 \end{array}$	4. $\begin{array}{r} 4n^2 + 4ny + y^2 \\ 2n + y \\ \hline 8n^3 + 8n^2y + 2ny^2 \\ + 4n^2y + 4ny^2 + y^3 \\ \hline 8n^3 + 42n^2y + 8ny^2 + y^3 \end{array}$
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5. Kahe arvu summa kuup võrdub esimese liukme kuup + kolme kordse esimese liukme ruudu korrutis teise liukmega + 3 kordse esimese liukme korrutis teise liukme ruuduga + teise liukme kuup.

6. $(a - b)^3 = (a - b)^2(a - b) = (a^2 - 2ab + b^2)(a - b) = a^3 - 3a^2b + 3ab^2 - b^3$

Arvuta 7. $(c - d)^3$, 8. $(s - 3)^3$ ja 9. $(3x - y)^3$, kasutades selleks vabu riskikülkuid!

7. $\begin{array}{r} c^2 - 2cd + d^2 \\ c - d \\ \hline c^3 - 2c^2d + cd^2 \\ - c^2d + 2cd^2 - d^3 \\ \hline c^3 - 3c^2d + 3cd^2 - d^3 \end{array}$	8. $\begin{array}{r} s^2 - 6s + 9 \\ s - 3 \\ \hline s^3 - 6s^2 + 9s \\ - 3s^2 + 18s - 27 \\ \hline s^3 - 9s^2 + 27s - 27 \end{array}$	9. $\begin{array}{r} 9x^2 - 6xy + y^2 \\ 3x - y \\ \hline 27x^3 - 18x^2y + 3xy^2 \\ - 9x^2y + 6xy^2 - y^3 \\ \hline 27x^3 - 27x^2y + 9xy^2 - y^3 \end{array}$
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10. Kahe arvu vahe kuup võrdub esimese liukme kuup + kolmekordse esimese liukme ruudu korrutis teise liukmega + 3 kordse esimese liukme korrutis teise liukme ruuduga - teise liukme kuup.

Summa kuubi ja vahe kuubi valemite rakendamise.

1.

$$(a+b)^3 = a^3 + 3a^2b + 3ab^2 + b^3.$$

$$(a-b)^3 = a^3 - 3a^2b + 3ab^2 - b^3.$$

$$2. (a+1)^3 = (a+1)^2(a+1) = (a^2+2a+1)(a+1) = a^3+3a^2+3a+1.$$

$$(m-3)^3 = (m-3)^2(m-3) = (m^2-6m+9)(m-3) = m^3-9m^2+27m-27.$$

$$(5+c)^3 = (5+c)^2(5+c) = (25+10c+c^2)(5+c) = 125+75c+15c^2+c^3.$$

$$(2-x)^3 = (2-x)^2(2-x) = (4-4x+x^2)(2-x) = 8-12x+6x^2-x^3.$$

$$(s+4)^3 = (s+4)^2(s+4) = (s^2+8s+16)(s+4) = s^3+12s^2+48s+64.$$

$$3. (2m+3)^3 = (2m+3)^2(2m+3) = (4m^2+12m+9)(2m+3) = 8m^3+36m^2+54+27.$$

$$(2t-1)^3 = (2t-1)^2(2t-1) = (4t^2-4t+1)(2t-1) = 8t^3-12t^2+6t-1.$$

$$(3n-2)^3 = (3n-2)^2(3n-2) = (9n^2-12n+4)(3n-2) = 27n^3-54n^2+36n-8.$$

$$(5-2a)^3 = (5-2a)^2(5-2a) = (25-20a+4a^2)(5-2a) = 125-150a+60a^2-8a^3.$$

$$(1+3d)^3 = (1+3d)^2(1+3d) = (1+6d+9d^2)(1+3d) = 1+9d+27d^2+27d^3.$$

$$4. (3y+2z)^3 = (3y+2z)^2(3y+2z) = (9y^2+12yz+4z^2)(3y+2z) = 27y^3+54yz^2+36y^2z+8z^3.$$

$$(5a-4b)^3 = (5a-4b)^2(5a-4b) = (25a^2-40ab+16b^2)(5a-4b) = 125a^3-300a^2b+240ab^2-64b^3.$$

$$(4s+t)^3 = (4s+t)^2(4s+t) = (16s^2+8st+t^2)(4s+t) = 64s^3+48s^2t+12st^2+t^3.$$

$$(2c-5d)^3 = (2c-5d)^2(2c-5d) = (4c^2-20cd+25d^2)(2c-5d) = 8c^3-60c^2d+150cd^2-125d^3.$$

$$(m-3n)^3 = (m-3n)^2(m-3n) = (m^2-6mn+9n^2)(m-3n) = m^3-9m^2n+27mn^2-27n^3.$$

$$5. (2a-0,1b)^3 = (2a-0,1b)^2(2a-0,1b) = (4a^2-0,4ab+0,01b^2)(2a-0,1b) = 8a^3-4,2a^2b+0,06ab^2-0,001b^3.$$

$$(3c+0,1d)^3 = (3c+0,1d)^2(3c+0,1d) = (9c^2+0,6cd+0,01d^2)(3c+0,1d) = 27c^3+2,7c^2d+0,09cd^2+0,001d^3.$$

$$(n-\frac{1}{4})^3 = (n-\frac{1}{4})^2(n-\frac{1}{4}) = (n^2-\frac{1}{2}n+\frac{1}{16})(n-\frac{1}{4}) = n^3-\frac{3}{4}n^2+\frac{3}{16}n-\frac{1}{64};$$

$$21^3 = (20+1)^3 = 20^3+3\cdot 20^2+3\cdot 20+1 = 8000+1200+60+1 = 9261.$$

$$(3z+\frac{1}{4}a)^3 = 27z^3+9z^2a+3za^2+\frac{1}{64}a^3;$$

Kordamist.

$$1. 3a^2bc^3 \cdot 1,2ab^2c = 3,6a^3b^3c^4;$$

$$3. 2,4x^3y^2 \cdot 0,8x^4y^3 = 3x^7.$$

$$5. (3a-2)(a-2) = 3a^2-8a+4$$

$$7. (c+10)(c-10) = c^2-10^2$$

$$9. (2m-3)^2 = 4m^2-12m+9.$$

$$11. (0,3b+5d)^2 = 0,09b^2+3bd+25d^2.$$

$$13. (\frac{x}{2}-1)^2 = \frac{x^2}{4}-x+1.$$

$$15. -3(-2+n-n^2) = 6-3n+3n^2.$$

$$17. (7z^2-5z+2):z = 7z-5+\frac{2}{z}.$$

$$19. (1-cd)^3 = 1-3cd+3c^2d^2-c^3d^3.$$

$$20. (2z+5a)^3 = 8z^3+60z^2a+150za^2+125a^3.$$

Kirjuta korratutena järgmised hulklikmed:

$$21. c^2 - \frac{1}{2} = (c - \frac{1}{2})(c + \frac{1}{2}); \quad 22. 0,25c^3 - 0,1cd + 0,01d^2 = (0,5c - 0,1d)^2;$$

$$23. 25a^2 + 10a + 1 = (5a+1)^2; \quad 24. 1-100d = (1-10d)(1+10d).$$

$$25. 0,64 - 1,6x + x^2 = (0,8-x)^2; \quad 26. 49+28m+0,04m^2 = (7+0,2m)^2.$$

$$27. \begin{array}{r} + \\ 3b^2 + 4b - 2 \\ 5b^2 - 7b + 4 \\ \hline 2b^2 - 3b + 2. \end{array}$$

$$28. \begin{array}{r} - \\ 8d^2 - 5d - 9 \\ 75d^2 \mp 3d \pm 6 \\ \hline 3d^2 - 8d - 3. \end{array}$$

$$29. \begin{array}{r} 13 \quad 10f^2 \\ -7f \mp 3y \pm 4y^2 \\ \hline 7-3y+14y^2. \end{array}$$

$$30. \begin{array}{r} - \\ \pm 4a \mp 3b \pm 4 \\ +4a-3b+5. \end{array}$$

$$31. \begin{array}{r} + \\ 7-16r \\ -5+r-r^2 \\ \hline 2-15r-r^2. \end{array}$$

$$32. \begin{array}{r} f^2 - 2t \\ - \pm 2f \pm 4t \mp 3 \\ \hline t^2+2t^2+2t-3 \end{array}$$

$$33. \text{Korruta} \quad \begin{array}{r} 4m^2 - m 5 \\ 3m - 2 \\ \hline 12m^3 - 15m^2 \\ - 8m^2 + 10m. \\ \hline 12m^3 - 23m^2 + 10m, \end{array}$$

$$34. \text{Korruta} \quad \begin{array}{r} 1 - 0,2x + x^2 \\ 3 + 0,5x \\ \hline 3 - 0,6x + 3x^2 \\ + 0,5x - 0,1x^2 + 0,5x^3 \\ \hline 3 - 0,1x + 2,9x^2 + 0,5x^3. \end{array}$$

Kordamist.

1. $(-5n^2 yz^3) \cdot 14ny^3 z^2 = -70n^3 y^4 z^5$
3. $0,14c^4 d^3 : 7c^3 d^3 = 0,02c$
5. $(7m - 2n)(3m + n) = 21m^2 - mn - 2n^2$
7. $(1 + 5n)(1 - 5n) = 1 - 25n^2$
9. $(5 - 0,2a)^2 = 25 - 2a + 0,04a^2$
11. $(\frac{1}{4}abn + y)^2 = \frac{1}{16}a^2b^2n^2 + abny + y^2$
13. $(\frac{a}{b} - 5)(\frac{a}{b} + 5) = \frac{a^2}{b^2} - 25$
15. $2(\frac{1}{2}z^3 - 2z + \frac{1}{2}) = z^3 - 4z + 1$
17. $(-6n^2 + 0,06n^3 - 3n) : (-0,3n) = 20n - 0,2n^2 + 10$
19. $(3m - 0,2n)^3 = 27m^3 - 5,4m^2n + 0,36mn^2 - 0,008n^3$
20. $(2 + st)^3 = 8 + 12st + 6s^2t^2 + s^3t^3$
2. $(-1,5ab)(-6a^2b^2) = 9a^3b^3$
4. $4r^3s^2 : (-0,2r^3s) = -20s$
6. $(0,4t + 0,5)(2 + 5t) = 2t^2 + 3,3t + 1$
8. $(0,3 - 2c)(0,3 + 2c) = 0,09 - 4c^2$
10. $(6m + 0,5n)^3 = 36m^2 + 6mn + 0,25n^3$
12. $(1 - \frac{1}{2}nyz)^2 = 1 - \frac{1}{2}nyz + \frac{1}{4}n^2y^2z^2$
14. $(1 - 0,2m)(1 + 0,2m) = 1 - 0,04m^2$
16. $-0,5c(-3c^2 + 8c - 2) = 1,5c^3 - 4c^2 + c$
18. $(3s^3 - 2s^3 - 5s) : \frac{1}{3}s = 6s^2 - 15s$

Kirjuta korutisena järgmised hulkliikmed:

21. $4n^2 + 9 - 12n = (2n - 3)^2$
22. $\frac{c^2}{4} - 0,81 = (\frac{c}{2} - 0,9)(\frac{c}{2} + 0,9)$
23. $25a^3 - 1 = (5a - 1)(5a + 1)$
24. $1 + 4a^2c^2n^2 - 4acn = (2acn - 1)^2$
25. $25y^2 + 3y + 0,09 = (5y + 0,3)^2$
26. $\frac{1}{3}cd + \frac{1}{3}c + \frac{1}{3}d = (\frac{1}{3}c + \frac{1}{3}d)^2$
27. $\frac{0,7m^2 - 0,2m - 1}{0,3m^2 + 0,2m - 1} = \frac{m^2 - 2}{-2}$
28. $\frac{2c^2 - 5c - 3}{\pm c^2 \mp 3c \pm 2} = \frac{3c^2 - 8c - 1}{\pm c^2 \mp 3c \pm 2}$
29. $\frac{0}{\pm 3s^2 \mp 2s \pm 1} = \frac{0}{3s^2 - 2s + 1}$
30. $\frac{0,2 - 1,5a}{\pm 1,8 \mp 0,5a \pm 2a^2} = \frac{2 - 2a + 2a^2}{\pm 1,8 \mp 0,5a \pm 2a^2}$
31. $\frac{10 - 4}{\pm 5 \mp 3d \pm 4d^2} = \frac{5 + 3d}{\pm 5 \mp 3d \pm 4d^2}$
32. $\frac{0,6a - 0,5b + 0,2c - 1}{0,4a - 2,5b} = \frac{a - 3b + 0,2c - 7}{0,4a - 2,5b}$

3. Korruta $\frac{2 - 4z + z^2}{3 + 2z - 5z^2}$

$$\frac{6 - 12z + 3z^2}{+ 4z + 8z^2 + 2z^3 + 10z^2 + 20z^3 - 5z^4} = \frac{6 - 8z + 5z^2 + 22z^3 - 5z^4}{+ 10z^2 + 20z^3 - 5z^4}$$

34. Korruta $\frac{0,1t^2 - 3t + 0,5}{2t^2 - t - 2}$

$$\frac{0,2t^4 - 6t^3 + t^2}{- 0,1t^3 + 3t^2 - 0,5t} = \frac{0,2t^4 - 6,1t^3 + 4t^2 - 0,5t}{- 0,1t^3 + 3t^2 - 0,5t}$$

Alinimus paljaks!

Õpilasele.

Paranda eksimused kohe, kui oled nad avastanud: kriipsuta puhtalt läbi valevastus, nõnda et ta ikkagi jääks loetavaks, ja kirjuta õige vastus tema kohale!

Eksimused õigekirjas ja Su enda avastatud matemaatilised vead märgi ühe kriipsuga, teiste poolt leitud matemaatilised vead märgi kahe kriipsuga! Töö tulemuste tabelis loe valevastusteks ainult need, mis on märgitud kahe kriipsuga!

Töö tulemuste tabel.

a tähendab õigete vastuste arvu, b — nõutud vastuste arvu.

lk.	a	b	lk.	a	b	lk.	a	b	lk.	a	b
1			17			33			49		
2			18			34			50		
3			19			35			51		
4			20			36			52		
5			21			37			53		
6			22			38			54		
7			23			39			55		
8			24			40			56		
9			25			41			57		
10			26			42			58		
11			27			43			59		
12			28			44			60		
13			29			45			61		
14			30			46			62		
15			31			47			63		
16			32			48			64		
Kokku											

Õldse õigete vastusteid _____ =
Õldse nõutud vastusteid _____

%

Hind 30 senti.

Hoia see vihik heas korras alles:

Sa vajad teda veel!



Tallinna Eesti Kirjastus-Ühingu trükkkoda, Pikk 7. 2. 1935.