

## Hatványozás

$$\frac{(x^{-2}y^3)^4 \cdot (y^4)^3 \cdot (x^5y^3)^{-2}}{(y^5x^3)^{-1} \cdot y^{-2}} = ?$$

## Azonosságok

*Két tag összegének, különbségének négyzete:*

|                          |                          |                 |                    |
|--------------------------|--------------------------|-----------------|--------------------|
| $(5x - \frac{3}{5})^2 =$ | $(\frac{5}{2}a - 4)^2 =$ | $(a - b)^2 =$   | $(7x^3 - b^2)^2 =$ |
| $(4x - \frac{5}{2})^2 =$ | $(6x - \frac{2}{3})^2 =$ | $(4x - 8)^2 =$  | $(3x - 5)^2 =$     |
| $(6b - \frac{5}{3})^2 =$ | $(3x + 7y)^2 =$          | $(6y + 5)^2 =$  | $(2x - 6y)^2 =$    |
| $(8x - \frac{3}{2})^2 =$ | $(2y + 3)^3 =$           | $(4x - 3y)^2 =$ | $(4x - 3y)^2 =$    |
|                          | $(2z + 6)^2 =$           | $(6z + 3)^2 =$  | $(3a - b^2)^2 =$   |

*Három tag összegének, különbségének négyzete:*

|                     |                     |                     |                    |
|---------------------|---------------------|---------------------|--------------------|
| $(2x - y + 3z)^2 =$ | $(3a - 2b + c)^2 =$ | $(4a - 2 + 3c)^2 =$ | $(x - 5 + 3y)^2 =$ |
| $(a - 2x + 4)^2 =$  | $(3a - b + c)^2 =$  | $(3x - y + 5)^2 =$  | $(x + 2y - 5)^2 =$ |
| $(3x - y + 2z)^2 =$ | $(2x + y - z)^2 =$  | $(a + b + c)^2 =$   |                    |
| $(x + 2y - 3z)^2 =$ | $(a + b + c)^2 =$   | $(5 + a - b)^2 =$   |                    |
| $(x - 3y + 4z)^2 =$ | $(x + 2b - 3)^2 =$  | $(4 + a - b)^2 =$   |                    |

*Két tag összegének, különbségének köbe:*

|                |                 |                 |                 |
|----------------|-----------------|-----------------|-----------------|
| $(a + b)^3 =$  | $(2x - 5y)^3 =$ | $(2a - 3b)^3 =$ | $(3a - 2)^3 =$  |
| $(a - b)^3 =$  | $(2x - 4)^3 =$  | $(2a + 3)^3 =$  | $(3 - 4z)^3 =$  |
| $(3a - 4)^3 =$ | $(2x - y)^3 =$  | $(3x - 2)^3 =$  | $(4a + c)^3 =$  |
| $(2y + 3)^3 =$ | $(a - 3b)^3 =$  | $(3y - 6)^3 =$  | $(2a + 4c)^3 =$ |
| $(2x - 3)^3 =$ | $(4a - 5b)^3 =$ | $(3x - 2y)^3 =$ | $(4y + 1)^3 =$  |

$$(5a - 1)^3 =$$

$$(2c - 5d)^3 =$$

*Két tag négyzetének különbsége:*

$$64a^2 - 100 =$$

$$a^2 - b^2$$

$$64 - 16c^2 =$$

$$100b^4 - 36 =$$

$$81c^2 - 49 =$$

$$9c^2 - 25 =$$

*Két tag köbének összege, különbsége:*

$$8y^3 - 27 =$$

$$64a^3 - 8 =$$

$$27a^3 + 64 =$$

$$64a^3 + 8 =$$

$$8x^3 - 1 =$$

$$8y^3 - 27 =$$

$$b^3 - 27 =$$

$$y^3 - 64 =$$

$$x^3 - 27 =$$

$$a^3 + b^3 =$$

$$z^3 + 64 =$$

$$b^3 + 27 =$$

Teljes négyzetté alakítás

$$9z^2 + 6z + 1 =$$

$$4b^2 - 4b + 4 =$$

*Kiegészítés teljes négyzetté*

$$b^2 - 18b + 100 =$$

$$a^2 + 18a + \dots = \dots$$

$$a^2 - 12a + \dots = \dots$$

$$c^2 - 18c + \dots = \dots$$

$$x^2 - 16x + \dots = \dots$$

$$a^2 + 12a + \dots = \dots$$

$$x^2 - 14x + \dots = \dots$$

$$b^2 - 20b + \dots = \dots$$

$$b^2 - 10b + \dots = \dots$$

$$y^2 - 10y + \dots = \dots$$

$$y^2 - 8y + \dots = \dots$$

$$a^2 - 10a + \dots = \dots$$

$$y^2 - 12y + \dots = \dots$$

$$9x^2 - 30xy + \dots = \dots$$

$$z^2 - 14z + \dots = \dots$$

$$9a^2 + 24a + \dots = \dots$$

$$b^2 - 16b + \dots = \dots$$

$$25a^2 - 40a + \dots = \dots$$

$$x^2 + 20x + \dots = \dots$$

$$36a^2 - 48ab + \dots = \dots$$

$$b^2 - 14b + \dots = \dots$$

$$36x^2 - 60xy + \dots = \dots$$

$$16b^2 - 48bc + \dots = \dots$$

$$4x^2 - 16x + \dots = \dots$$

$$25b^2 - 70b + \dots = \dots$$

$$16c^2 - 12c + \dots = \dots$$

$$9z^2 + 30z + \dots = \dots$$

$$b^2 - 18b + 100 =$$

$$x^2 + 2x - 15 =$$

$$x^2 + 6x + 5 =$$

$$x^2 - 8x + 7 =$$

### Szorzáttá alakítás

$$4x^5 - 8x^4 + 4x^3 =$$

$$5x^3 - 20x^2 + 20x =$$

$$y^5 + 4y^4 + 4y^3 =$$

$$z^3 - 6z^2 + 9z =$$

$$a^3b^2 + 8a^3b + 16a^3 =$$

$$x^3 + 2x^2 - x - 2 =$$

$$4ab - 6a^2 + 6b^2 - 9ab =$$

$$6xy + 8y^2 + 3x^2 + 4xy =$$

$$6ab + 8a^2 - 3b^2 - 4ab =$$

$$4x^5 - 8x^4 + 4x^3 =$$

$$3y^3 - 6y^2z^2 + yz - 2z^3 =$$

$$3x^5 + 3x^3 - 6x^4 =$$

$$a^3 + a^2 - a - 1 =$$

$$a^3 - 4a^2 + 3a - 12 =$$

$$2x^5 + 12x^4 + 18x^3 =$$

$$3x^3 - 6x^2 + 3x =$$

$$2x^3 - 32x =$$

$$3xy^2 + 6xy + 3x =$$

$$4x^2 - 4xz - 3x + 3z =$$

$$ab^3 - 8ab^2 + 16ab =$$

$$a^3 + 2a^2 - 4a - 8 =$$

$$x^2y^2 + 12yx^2 + 36x^2 =$$

$$a^3 - a + 3a^2 - 3 =$$

$$x^3 - 12x^2 + 36x =$$

$$x^2y^2 + 12yx^2 + 36x^2 =$$

$$2a(x-1) + a(1-x) =$$

$$b^2x^2 - 8b^2x + 16b^2 =$$

$$a^3b - 6a^2b^2 + 9ab^3 =$$

$$a^3 - 2a^2 - 9a - 18 =$$

$$x^3y + 4x^2y^2 + 4xy^3 =$$

$$x^3 + 3x^2 - 4x - 12 =$$

$$b^2 - 18b + 100 =$$

$$x^2 + 2x - 15 =$$

$$x^2 + 6x + 5 =$$

$$x^2 - 8x + 7 =$$

### Algebrai törték szorzása, osztása

$$\frac{2ab - a^2}{4b^2 - a^2} \cdot \frac{a}{6b + 3a} =$$

$$\frac{x^2 - 25}{x^2 + 10x + 25} \cdot \frac{5x - 25}{10x^2 + 50x} =$$

$$\frac{(4x^3z)^2(y^2)^3}{(3x^2z)^3(xy^2)^5} \cdot \frac{(4x^4z)^2y^3z^4}{(3x^2yz^2)^3} =$$

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

$$\frac{4y^2 + 16y}{y^2 + 8y + 16} \cdot \frac{4y - 16}{y^2 - 16} =$$

$$\frac{4x + 8}{2x^2 - 4x} \cdot \frac{x^2 + 4x + 4}{x^2 - 4} =$$

$$\frac{a^2 + 12a + 36}{a^2 - 36} \cdot \frac{2a^2 + 12a}{4a^3 - 24a^2} =$$

$$\frac{6x^4 + 12x^3}{3x^2 - 6x} \cdot \frac{x^2 - 4}{x^2 - 4x + 4} =$$

$$\frac{a^2b^3 - 9b^5}{ab^4} : \frac{a^2 - 3ab}{3a^2b} =$$

$$\frac{a^2b - 4b^3}{3ab^2} : \frac{a^2 - 2ab}{a^2b} =$$

$$\frac{x^2 - y^2}{x^2 + 2xy + y^2} : \frac{2x - 2y}{4x^2 + 4xy} =$$

$$\frac{3a^2 - 3b^2}{a^2 + ac} : \frac{6a - 6b}{a + c} =$$

$$\frac{a^2 - b^2}{a^2} \cdot \frac{a^4}{(a+b)^2} =$$

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

$$\frac{7}{4x^3 - 36x} \cdot \frac{x^2 - 9}{14} =$$

$$\frac{a^2 - b^2}{(a+b)^2} \cdot \frac{3a+3b}{5a-5b} =$$

$$\frac{(2x^3y^4)^2(z^2)^3}{(5x^2y)^4(xy^2z)^2} : \frac{(2z)^2yz^4}{(5^2x^5z^3)^2} =$$

$$\frac{2ab - a^2}{4b^2 - a^2} \cdot \frac{6b+3a}{a} =$$

$$\frac{a^2 + 6a + 9}{2a + 6} : \frac{a^2 - 9}{4a^2 - 12a} =$$

*Algebrai törtek összeadása, kivonása*

$$\frac{2}{x^2 + 4x} + \frac{1}{x+4} - \frac{x+6}{x^2 + 8x + 16} =$$

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

$$\frac{5a}{6b^2c} - \frac{b}{12ac^2} + \frac{5c}{18a^2b^2} =$$

$$\frac{1}{3x-12} + \frac{x}{x^2-16} + \frac{x}{x^2-8x+16} =$$

$$\frac{3a^2}{4b^3c} - \frac{5b}{8c^2a} + \frac{7c^3}{12b^2a} =$$

$$\frac{5c^2}{4a^3b} - \frac{5a}{8b^2c} + \frac{7b^3}{12a^2c} =$$

$$\frac{2c^2}{3ab^3} + \frac{5a}{6bc^2} - \frac{4b^2}{9ac} =$$

$$\frac{5}{x^2+5x} - \frac{1}{x+5} - \frac{x}{x^2+10x+25} =$$

$$\frac{3}{2x^2-2x} - \frac{x}{x^2-2x+1} + \frac{1}{x-1} =$$

$$\frac{c}{8a^2b} - \frac{3b}{16ac^2} + \frac{5a}{24cb^2} =$$

$$\frac{2}{x^2+2x} + \frac{x}{(x+2)^2} - \frac{3}{3x+6} =$$

$$\frac{x}{x^2+12x+36} - \frac{6}{x^2+6x} + \frac{1}{x+6} =$$

*Összetett feladatok*

$$\left( \frac{3a}{1-3a} + \frac{2a}{3a+1} \right) : \frac{6a^2+10a}{1-6a+9a^2} =$$

$$\left( 1 - \frac{a^2}{b^2} \right) \cdot \left( a - b - \frac{a^2}{a+b} \right) =$$

$$\frac{(3a-1)(2a+1)^2 - 3a(2a+3)^2 + 1}{-28a}$$

$$\left(\frac{b^2}{a^3 - ab^2} + \frac{1}{a+b}\right) : \left(\frac{a-b}{a^2 + ab} - \frac{a}{b^2 + ab}\right) =$$

$$\left(\frac{5}{2a+3} + \frac{2}{3-2a} + \frac{2a+9}{4a^2-9}\right) : \frac{8}{4a^2+12a+9}$$

$$\left(\frac{2a+2}{a^2+2a} + \frac{a}{2a+4}\right) \cdot \frac{2a+2}{a+2} - \frac{1}{a} =$$

$$\left(\frac{a^2-3ab}{a+b} + b\right) : \left(\frac{a}{a+b} - \frac{b}{b-a} - \frac{2ab}{a^2-b^2}\right) =$$

$$\left(\frac{a}{a+1} + 1\right) : \left(1 - \frac{3a^2}{1-a^2}\right) =$$

$$\left(\frac{a}{x+a} - \frac{ax}{a^2+2ax+x^2}\right) \cdot \frac{x^2+2ax+a^2}{a^2} =$$

$$\left(\frac{a+1}{2a-2} + \frac{6}{2a^2-2} - \frac{a+3}{2a+2}\right) : \frac{3}{4a^2-4} =$$

$$\left(\frac{2a+2}{a^2+2a} + \frac{a}{2a+4}\right) : \frac{a+2}{2a} =$$

$$\left(\frac{5}{2a+3} + \frac{2}{3-2a} + \frac{2a+9}{4a^2-9}\right) : \frac{8}{4a^2+12a+9} =$$

$$\left(\frac{b}{a^2-ab} + \frac{a}{b^2-ab}\right) \cdot \frac{a^2b+ab^2}{a^2-b^2} =$$

$$\left(\frac{x+a}{a} - \frac{x-a}{x}\right) : \left(\frac{x}{x-a} - \frac{a}{x+a}\right) =$$

$$\frac{3}{a^2-6a+9} - \frac{6}{a^2-3a} + \frac{3}{a^2-9} =$$

$$\left(\frac{2x-1}{3x-6} - \frac{x+1}{2x-4}\right) \cdot \frac{x-5}{6} =$$

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