Az algebrai törtek értelmezési tartománya és műveletek az algebrai törtekkel

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1. feladat

$$x = -3, \qquad y = 5, \qquad z = -0{,}5$$

a)

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

b)

$$\frac{2xy - 4zy}{x^3y - 4xyz^2} =$$

$$= \frac{2y \cdot (x - 2z)}{xy \cdot (x - 2z) \cdot (x + 2z)} = \frac{2}{x \cdot (x + 2z)} =$$

$$= \frac{2}{(-3)\big(-3 + 2 \cdot (-0{,}5)\big)} = \frac{2}{12} = \frac{1}{6}$$

c)

$$\frac{x^2 - x^4}{x^3 - x} =$$

$$= \frac{x^2 \cdot (1 - x^2)}{x \cdot (x^2 - 1)} = \frac{-x^2 \cdot (x^2 - 1)}{x \cdot (x^2 - 1)} = \frac{-x^2}{x} = -x =$$

$$= -(-3) = 3$$

d)

$$\frac{2y+5}{x} - \frac{5}{x} =$$
$$= \frac{2y+5-5}{x} = \frac{2y}{x} =$$
$$= \frac{2 \cdot 5}{-3} = \frac{10}{-3} = -\frac{10}{3}$$

e)

$$\frac{xy}{x^2y + xy^2} \cdot \frac{x^2 - xy}{x^2 + xy} =$$
$$= \frac{xy}{xy \cdot (x+y)} \cdot \frac{x \cdot (x-y)}{x \cdot (x+y)} = \frac{x-y}{(x+y)^2} =$$
$$= \frac{-3-5}{(-3+5)^2} = \frac{-8}{2^2} = \frac{-8}{4} = -\frac{8}{4} = -2$$

f)

$$\frac{16x^2z \cdot (z+1)}{8x \cdot (z^2 + 2z + 1)} =$$
$$= \frac{16x^2z \cdot (z+1)}{8x \cdot (z+1)^2} = \frac{2xz}{z+1} =$$
$$= \frac{2 \cdot (-3) \cdot (-0{,}5)}{-0{,}5 + 1} = \frac{3}{0{,}5} = 6$$

g)

$$\frac{z}{12} \cdot \frac{6}{z} = \frac{-0{,}5}{12} \cdot \frac{6}{-0{,}5} = \frac{-3}{-6} = \frac{1}{2}$$

h)

$$\frac{24y^3}{48y^2x} =$$

$$= \frac{y}{2x} =$$

$$= \frac{5}{2 \cdot (-3)} = \frac{5}{-6} = -\frac{5}{6}$$

i)

$$\frac{9x}{5} - \frac{12y}{3} =$$

$$= \frac{27x - 60y}{15} = \frac{9x - 20y}{5} =$$

$$= \frac{9 \cdot (-3) - 20 \cdot 5}{5} = \frac{-127}{5} = -\frac{127}{5}$$

j)

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

$$= \frac{xy}{x^2y + xy^2} \cdot \frac{x^2 + xy}{x^2 - xy} = \frac{xy}{xy \cdot (x + y)} \cdot \frac{x \cdot (x + y)}{x \cdot (x - y)} =$$

$$= \frac{1}{x - y} =$$

$$= \frac{1}{-3 - 5} = \frac{1}{-8} = -\frac{1}{8}$$