$$\frac{m}{3m-2n}+\frac{2m-2n}{3m-2n}=\frac{m+(2m-2n)}{3m-2n}=\frac{m+2m-2n}{3m-2n}=\frac{3m-2n}{3m-2n}=1$$

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$$\frac{3}{x-5}-\frac{2}{x}+\frac{x-35}{x^2-25}=\frac{3}{x-5}-\frac{2}{x}+\frac{x-35}{(x+5)(x-5)}=\frac{3x(x+5)}{(x-5)x(x+5)}-\frac{2(x-5)(x+5)}{x(x-5)(x+5)}+\frac{(x-35)x}{(x+5)(x-5)x}=$$

$$=\frac{3x(x+5)-2(x-5)(x+5)+(x-35)x}{(x-5)x(x+5)}=\frac{(3x^2+15x)-(2x^2+10x-10x-50)+(x^2-35x)}{(x-5)x(x+5)}=$$

$$=\frac{(3x^2+15x)-(2x^2-50)+(x^2-35x)}{(x-5)x(x+5)}=\frac{3x^2+15x-2x^2+50+x^2-35x}{(x-5)x(x+5)}=\frac{2x^2-20x+50}{(x-5)x(x+5)}=$$

$$=\frac{(2x-10)(x-5)}{(x-5)x(x+5)}=\frac{2x-10}{x(x+5)}=\frac{2(x-5)}{x(x+5)}$$

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$$\frac{x^2-25y^2}{2x-10y}=\frac{x^2-25y^2}{2(x-5y)}=\frac{(x+5y)(x-5y)}{2(x-5y)}=\frac{x+5y}{2}$$

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$$\frac{x^4-9x^2+54x-81}{x^3+27}=\frac{(x^2+3x-9)(x^2-3x+9)}{(x+3)(x^2-3x+9)}=\frac{x^2+3x-9}{x+3}$$

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Упростим левую часть равенства:

$$\frac{4}{a-b}+\frac{9}{a+b}-\frac{8a}{a^2-b^2}=\frac{4}{a-b}+\frac{9}{a+b}-\frac{8a}{(a+b)(a-b)}=\frac{4(a+b)}{(a-b)(a+b)}+\frac{9(a-b)}{(a+b)(a-b)}-\frac{8a}{(a+b)(a-b)}=$$

$$=\frac{4(a+b)+9(a-b)-8a}{(a-b)(a+b)}=\frac{(4a+4b)+(9a-9b)-8a}{(a-b)(a+b)}=\frac{4a+4b+9a-9b-8a}{(a-b)(a+b)}=\frac{5a-5b}{(a-b)(a+b)}=$$

$$=\frac{5(a-b)}{(a-b)(a+b)}=\frac{5}{a+b}$$