**BERREKETAK**

**FITXA1**

1. Kalkulatu ondorengo berreketa hauen zenbakizko balioa

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

$$ b) \left(-3\right)^{3}= -3^{3}=-27$$

$$ c) \left(2\right)^{-2}=\left(\frac{1}{2}\right)^{2}=\frac{1}{4} $$

$$ d) 4^{-2}= \left(\frac{1}{4}\right)^{2}=\frac{1}{16} $$

$$ e) -4^{2}= -16$$

$$ f) \left(\frac{1}{2}\right)^{-3}=\left(\frac{2}{1}\right)^{3}=2^{3}=8$$

$$ g)-2^{0}=-1 $$

$$ d) \left(\frac{3}{2}\right)^{-2}=\left(\frac{2}{3}\right)^{2}=\frac{4}{9} $$

$$ e) -4^{2}= -16$$

$$ f) \left(-1\right)^{9}=-1$$

1. Kalkulatu ondorengo eragiketak, eta eman emaitza berretzailea positibo duen berreketa bakar bat erabiliz.

Adb: (77)3:72 = 77·3:72=721-2=719

$$ a) 7^{3}·\left(7·7^{3}\right)^{5}=7^{3}·\left(7^{3+1}\right)^{5}=7^{3}·7^{4·5}=7^{3+20}=7^{23} $$

$$ b) \left(-6\right)^{9}:\left(-6\right)^{-7}=\left(-6\right)^{9-\left(-7\right)}= \left(-6\right)^{16}=6^{16}$$

$$ c) \left[\left(-2\right)^{4}\right]^{-3}=\left(-2\right)^{4·(-3)}=\left(-2\right)^{-12}=\left(-\frac{1}{2}\right)^{12}=\left(\frac{1}{2} \right)^{12}=\frac{1}{2^{12}}$$

$$ d) \left(-12\right)^{3}:\left[\left(-12\right)^{4}·\left(-12\right)\right]^{-1}=\left(-12\right)^{3}:\left[\left(-12\right)^{4+1}\right]^{-1}=$$

$$ = \left(-12\right)^{3}:\left(-12\right)^{5·\left(-1\right)}= \left(-12\right)^{3-\left(-5\right)}=\left(-12\right)^{8}=12 ^{8}$$

$$ e) 15^{5}: \left(-3\right)^{5}= \left(\frac{15}{-3}\right)^{5}=\left(-5\right)^{5}=-5^{5}$$

$$ f) 81^{4}: \left(-9\right)^{4}= \left(\frac{81}{-9}\right)^{4}=\left(-9\right)^{4}=9^{4}$$

$$ g) 15^{9}:\left[\left(-5\right)^{9}·\left(-3\right)^{9}\right]=15^{9}:\left[\left(-5\right)·\left(-3\right)^{9}\right]=15^{9}:15^{9}= \left(\frac{15}{15}\right)^{9}=$$

$$ =1^{9}=1 $$

$$ h) \left(-5\right)^{6}·\left[35^{8}:\left(-7\right)^{8}\right]=\left(-5\right)^{6}·\left(\frac{35}{-7}\right)^{8}=\left(-5\right)^{6}·\left(-5\right)^{8}= $$

$$ = \left(-5\right)^{6+8}=\left(-5\right)^{14}=5^{14} $$

$$ i) \left(3^{3}\right)^{2}·\left[\left(-5\right)^{5}:\left(-5\right)^{-1}\right]= 3^{3·2}·\left[\left(-5\right)^{5-\left(-1\right)}\right]=3^{6}·\left(-5\right)^{6}=$$

$$ =\left[3·\left(-5\right)\right]^{6}= \left(-15\right)^{6}=15^{6}$$

$$ j) \left(4^{7}\right)^{4}· \left(4^{9}\right)^{-3}=4^{28}·4^{-27}= 4^{28-27}=4^{1}=4 $$

$$ k) \left(-3\right)^{4}:\left(-3\right)^{8}·\left(-3\right)=\left(-3\right)^{4-8+1}=\left(-3\right)^{-3}=\left(-\frac{1}{3}\right)^{3}=-\frac{1}{3^{3}}$$

$$ l) \left(-3\right)^{4}:\left[\left(-3\right)^{8}·\left(-3\right)\right]=\left(-3\right)^{4}:\left(-3\right)^{8+1}=\left(-3\right)^{4-9}=\left(-\frac{1}{3}\right)^{-5}=$$

$$ =\left(-3\right)^{5}=-3^{5}$$

 $m) \left(12^{4}\right)^{2}:\left[\left(-3\right)^{12}·\left(-4\right)^{12}\right]= 12^{8}:\left[\left(-3\right)·\left(-4\right)\right]^{12}=$

$$ =12^{8}:12^{12}=12^{8-12}=12^{-4}= \left(\frac{1}{12}\right)^{4}=\frac{1}{12^{4}}$$

$$ n) \left[\left(-11\right)^{5}\right]^{3}:\left[\left(-11\right)^{4}\right]^{-2}=\left(-11\right)^{15}:\left(-11\right)^{-8}=\left(-11\right)^{15-\left(-8\right)}=$$

$$ =\left(-11\right)^{23}=-11^{23}$$

$$ o) \left(3^{2}\right)^{-3}·27·9^{-4}=3^{-6}·3^{3}·\left(3^{2}\right)^{-4}=3^{-6+3-8}=\left(3\right)^{-11}=$$

$$ =\left(\frac{1}{3}\right)^{11}=\frac{1}{3^{11}}$$

$$ p) \left(2^{3}·2\right)^{2}:\left(2^{2}\right)^{4}=\left(2^{3+1}\right)^{2}:2^{8}=2^{4·2}:2^{8}=2^{8-8}=2^{0}=1$$

$$ q) \left(-20\right)^{7}:\left[\left(-4\right)^{9}·5^{9}\right]^{-1}=\left(-20\right)^{7}:\left\{\left[\left(-4\right)·5\right]^{9}\right\}^{-1}=$$

$$ = \left(-20\right)^{7}:\left[\left(-20\right)^{9}\right]^{-1}= \left(-20\right)^{7}:\left(-20\right)^{-9}=$$

$$ = \left(-20\right)^{7-(-9)}= \left(-20\right)^{16}=20^{16}$$

$$ r) \left[\left(-2\right)^{5}·\left(-3\right)^{5}\right]^{3}·\left(6^{4}\right)^{-2}=\left\{\left[\left(-2\right)·\left(-3\right)\right]^{5}\right\}^{3}·6^{-8}=$$

 $=\left[-6\right]^{15}·6^{-8}=- 6^{15-8}=- 6^{7}$

$$ s) \left(40^{9}:20^{9}\right): \left(2^{4}·2^{4}\right)=\left(40:20\right)^{9}:2^{8}=2^{9}:2^{8}=2^{9-8}=2^{1}=2$$

$$ t) \left(-3\right)^{4}·\left(-3\right)^{7}:\left[12^{2}:\left(-4\right)^{2}\right]^{}=\left(-3\right)^{4+7}:\left[12^{2}:\left(-4\right)\right]^{2}=$$

$$ =\left(-3\right)^{11}:\left(-3\right)^{2}=\left(-3\right)^{11-2}=\left(-3\right)^{9}=-3^{9}$$

1. Berreketen propietateak erabiliz, kalkulatu ondorengo eragiketak



$$ a) \frac{3^{5}·2^{2}·4}{3^{3}·9}=\frac{3^{5}·2^{2}·2^{2}}{3^{3}·3^{2}}=2^{4}$$

$$ b)\frac{32·27·3}{8·4}= \frac{2^{5}·3^{3}·3}{2^{3}·2^{2}}=3^{4}$$

$$ c) \frac{6^{3}·12^{4}·36}{27^{3}·8^{2}·64}=\frac{\left(2·3\right)^{3}·\left(2^{2}·3\right)^{4}·\left(2·3\right)^{2}}{\left[\left(3\right)^{3}\right]^{3}·\left(2^{3}\right)^{2}·2^{6}}=$$

$$ =\frac{2^{3}·3^{3}·2^{8}·3^{4}·2^{2}·3^{2}}{3^{9}·2^{6}·2^{6}}=2$$

$$ d) \frac{8·64·81·2^{4}·5^{2}}{3^{3}·2^{5}·5^{3}·6^{4}·16}=\frac{2^{3}·2^{6}·3^{4}·2^{4}·5^{2}}{3^{3}·2^{5}·5^{3}·2^{4}·3^{4}·2^{4}}=$$

$$ =\frac{2^{13}·3^{4}·5^{2}}{3^{7}·2^{13}·5^{3}}=\frac{1}{3^{3}·5}$$

$$ e) \frac{8·25·7^{3}·3^{4}}{20·21·14·7}=\frac{2^{3}·5^{2}·7^{3}·3^{4}}{2^{2}·5·3·7·2·7·7}=5·3^{3}$$

$$ f)\frac{54^{4}·10^{3}·5^{2}·15^{2}}{125^{3}·18^{7}}=\frac{\left(2·3^{3}\right)^{4}·\left(2·5\right)^{3}·5^{2}·\left(3·5\right)^{2}}{\left(5^{3}\right)^{3}·\left(2·3^{2}\right)^{7}}= $$

$$ $$

$$ =\frac{2^{4}·3^{12}·2^{3}·5^{3·}5^{2}·3^{2}·5^{2}}{5^{9}·2^{7}·3^{14}}=\frac{1}{5^{2}}$$

$$ g) \frac{8·64·81·2^{4}·5^{2}}{3^{3}·2^{5}·5^{3}·6^{4}·16}=\frac{2^{3}·2^{6}·3^{4}·2^{4}·5^{2}}{3^{3}·2^{5}·5^{3}·2^{4}·3^{4}·2^{4}}=$$

$$ =\frac{2^{13}·3^{4}·5^{2}}{3^{7}·2^{13}·5^{3}}=\frac{1}{5·3^{3}}$$

$$ e) \frac{\left(7^{3}·8\right)^{4}}{8^{2}·49^{4}·14^{3}}=\frac{\left(7^{3}·2^{3}\right)^{4}}{\left(2^{3}\right)^{2}·\left(7^{2}\right)^{4}·\left(2·7\right)^{3}}=$$

$$ =\frac{7^{12}·2^{12}}{\left(2^{3}\right)^{2}·\left(7^{2}\right)^{4}·\left(2·7\right)^{3}}=\frac{7^{12}·2^{12}}{2^{6}·7^{8}·2^{3}·7^{3}}=7·2^{3}$$

$$ h)\frac{3^{-3}·4·9^{-1}}{3^{-5}·4^{-1}}=\frac{3^{5}·4·4}{3^{3}·9}=\frac{3^{5}·2^{2}·2^{2}}{3^{3}·3^{2}}=2^{4}$$

$$ i) \frac{216·27^{-3}·64^{-1}}{12^{-4}·8^{2}·36^{-1}}=\frac{216·12^{4}·36}{8^{2}·27^{3}·64}=\frac{\left(2^{3}·3^{3}\right)·\left(2^{2}·3\right)^{4}·\left(2^{2}·3^{2}\right)}{\left(2^{3}\right)^{2}·\left(3^{3}\right)^{3}·2^{6}}$$

$$ = \frac{2^{3}·3^{3}·2^{8}·3^{4}·2^{2}·3^{2}}{2^{6}·3^{9}·2^{6}}=2$$

**4-.** Propietateak aplikatuz, kalkulatu



$$ a) \left(a^{3}\right)^{-5}·\left(a^{2}·a\right)^{5}=a^{-15}·\left(a^{3}\right)^{5}=a^{-15+15}=a^{0}=1$$

$$ b) a^{4}:\left(a^{7}:a^{5}\right)^{2}=a^{4}:\left(a^{7-5}\right)^{2}=a^{4}:a^{2·2}=a^{4-4}=a^{0}=1$$

$$ c) \left( x^{6}\right)^{3}·\left(x^{3}\right)^{-4}:\left(x^{2}\right)^{3}=x^{6·3}·x^{3·\left(-4\right)}:x^{2·3}=x^{18}·x^{-12}:x^{6}=$$

$$ =x^{18+\left(-12\right)-6}=x^{0}=1$$

$$ d) \left( b^{4}·b\right)^{6}:\left( b^{9}:b^{3}\right)^{5}=\left( b^{4+1}\right)^{6}:\left( b^{9-3}\right)^{5}=\left( b^{5}\right)^{6}:\left( b^{6}\right)^{5}=$$

$$ =b^{5·6}:b^{6·5}=b^{30-30}=b^{0}=1 $$

$$ e) \left( a^{5}·b\right)^{4}:\left( a^{10}·b^{2}\right)^{2}=\left( a^{4·5}\right)b^{4}:\left( a^{10·2}·b^{2·2}\right)=a^{20}b^{4}:\left(a^{20}·b^{4}\right)$$

$$ =b^{5·6}:b^{6·5}=b^{30-30}=b^{0}=1 $$

$$ f) \frac{\left(a^{3}\right)^{4}·\left(b^{7}\right)^{2}·a^{-4}}{a^{7}·\left(b^{4}\right)^{3}·b^{2}}=\frac{a^{3·4}·b^{7·2}}{a^{4}·a^{7}·b^{12}·b^{2}}=\frac{a^{12}·b^{14}}{a^{11}·b^{14}}=a $$

$$ $$

**5-.** Propietateak aplikatuz, kalkulatu

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$$ a)\frac{\left(2^{-5}\right)^{0}}{2^{-3}}=\frac{2^{0}}{2^{-3}}=2^{0-(-3)}=2^{3}$$

$$ b) \frac{2^{3}}{\left(2·5\right)^{-5}}=2^{3}·2^{5}·5^{5}=2^{8}·5^{5}$$

$$ c)\frac{2^{-1}·\left(2^{3}\right)^{5}·4·5^{3}}{100·2^{-2}·8}=\frac{\left(2^{3}\right)^{5}·4·5^{3}·2^{2}}{2^{1·}100·8}=\frac{2^{15}·2^{2}·5^{3}·2^{2}}{2^{1·}2^{2}·5^{2}·2^{3}}=$$

$$ =\frac{2^{19}·5^{3}}{2^{6}·5^{2}}=2^{13}·5$$

$$ d) \frac{2^{3}·8^{-3}·12^{-1}·\left(-3\right)^{2}}{6^{2}·16^{-2}·3^{-3}}=\frac{2^{3}·\left(-3\right)^{2}·16^{2}·3^{3}}{6^{2}·8^{3}·12^{1}}=$$

$$ $$

$$ =\frac{2^{3}·3^{2}·\left(2^{4}\right)^{2}·3^{3}}{\left(2·3\right)^{2}·\left(2^{3}\right)^{3}·2^{2}·3}=$$

$$ =\frac{2^{3}·3^{2}·2^{8}·3^{3}}{2^{2}·3^{2}·2^{9}·2^{2}·3}=\frac{2^{11}·3^{5}}{2^{13}·3^{3}}=\frac{3^{2}}{2^{2}}$$

$$ e)\frac{6^{4}·9^{2}·2^{-4}·3^{-5}·2^{-1}}{18^{3}·2^{-5}·3^{6}·\left[\left(3\right)^{3}\right]^{-3}}=\frac{6^{4}·9^{2}·2^{5}·\left[\left(3\right)^{3}\right]^{3}}{18^{3}·2^{4}·3^{6}·3^{5}·2^{1}}=$$

$$ $$

$$ =\frac{\left(2·3\right)^{4}·\left(3^{2}\right)^{2}·2^{5}·\left[\left(3\right)^{3}\right]^{3}}{\left(2·3^{2}\right)^{3}·2^{4}·3^{6}·3^{5}·2^{1}}=$$

$$ =\frac{2^{4}·3^{4}·3^{4}·2^{5}·3^{9}}{2^{3}·3^{6}·2^{4}·3^{6}·3^{5}·2^{1}}=\frac{2^{9}·3^{17}}{2^{8}·3^{17}}=2$$

$$ $$

$$ f) \frac{4^{4}·8^{-1}·16^{2}}{\left(\frac{1}{2}\right)^{3}·8^{6}}=\frac{4^{4}·16^{2}}{\left(\frac{1}{2}\right)^{3}·8^{6}·8^{1}}=\frac{4^{4}·16^{2}}{\left(\frac{1}{2}\right)^{3}·8^{6}·8^{1}}=\frac{\left(2^{2}\right)^{4}·\left(2^{4}\right)^{2}}{\left(\frac{1}{2}\right)^{3}·\left(2^{3}\right)^{6}·2^{3}}=$$

$$ =\frac{2^{8}·2^{8}}{2^{-3}·2^{18}·2^{3}}=\frac{2^{16}}{2^{18}}=\frac{1}{2^{2}}$$

$$ g)\frac{\frac{\left(5^{2}·5^{3}·5^{-4}\right)^{2}}{\left(5^{-2}·5^{-3}·5^{4}\right)^{3}}}{\left[\left(\frac{1}{5}\right)^{2}:\left(\frac{1}{5}\right)^{4}\right]^{4}}=\frac{\frac{\left(5^{2\mp 3-4}\right)^{2}}{\left(5^{-2-3+4}\right)^{3}}}{\left[\left(\frac{1}{5}\right)^{2-4}\right]^{4}}=\frac{\frac{\left(5^{1}\right)^{2}}{\left(5^{-1}\right)^{3}}}{\left[\left(\frac{1}{5}\right)^{-2}\right]^{4}}=$$

$$ =\frac{\frac{5^{2}}{5^{-3}}}{\left(\frac{1}{5}\right)^{-8}}=\frac{5^{2-(-3)}}{5^{8}}=\frac{5^{5}}{5^{8}}=\frac{1}{5^{3}}$$

$$h)\frac{\left(\frac{3}{2}\right)^{-2}·\left(\frac{5}{3}\right)^{2}·\left(\frac{2}{5}\right)^{-1}}{\left(\frac{5}{2}\right)^{2}·\left(\frac{3}{5}\right)^{-2}·8·\left(\frac{2}{3}\right)^{-1}:3^{-2}}=\frac{\left(\frac{2}{3}\right)^{2}·\left(\frac{5}{3}\right)^{2}·\left(\frac{5}{2}\right)^{1}}{\left(\frac{5}{2}\right)^{2}·\left(\frac{5}{3}\right)^{2}·2^{3}·\left(\frac{3}{2}\right)^{1}:\frac{1}{3^{2}}}=$$

$$ =\frac{\frac{2^{2}·5^{2}·5}{3^{2}·3^{2}·2}}{\frac{5^{2}·5^{2}·2^{3}·3·3^{2}}{2^{2}·3^{2}·2}}=\frac{\frac{2·5^{3}}{3^{4}}}{5^{4}·3}=\frac{2·5^{3}}{5^{4}·3·3^{4}}=$$

$$ $$

$$ =\frac{2}{5·3^{5}}$$