الحساب العددي

القوى

التمرين الأول

أحسب

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

$a=-8+2^2$

$a=-8+4$

$\boxed{a=-4}$

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

$b=\left(\frac{1}{2}\right)^3\times 5^2$

$b=\frac{1}{8}\times 25$

$\boxed{b=\frac{25}{8}}$

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

$c=\left[\frac{3}{4}-\frac{9}{4}\right]^{-2}$

$c=\left(-\frac{6}{4}\right)^{-2}$

$c=\left(-\frac{2}{3}\right)^2$

$\boxed{c=\frac{4}{9}}$

$d=\frac{5^7\times 4^7}{2^7}$

$d=\frac{(5\times 4)^7}{2^7}$

$d=\frac{20^7}{2^7}$

$d=\left(\frac{20}{2}\right)^7$

$\boxed{d=10^7}$

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

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

$e=\left(\frac{-\frac{1}{\cancel{4}}}{\frac{3}{\cancel{4}}}\right)^{-3}$

$\boxed{e=(-3)^3=-27}$

$f=4\times 10^{-2}\times 2\times 10^4\times\left(10^2\right)^3$

$f=8\times 10^{-2+4+6}$

$\boxed{f=8\times 10^8}$

$g=49\times\left(1-\frac{9}{2}\right)^{-2}$

$g=49\times\left(\frac{2-9}{2}\right)^{-2}$

$g=49\times\left(\frac{-7}{2}\right)^{-2}$

$g=49\times\left(-\frac{2}{7}\right)^2$

$\boxed{g=\cancel{49}\times\frac{4}{\cancel{49}}=4}$

$h=\left[\left(\frac{456}{123}\right)^{99}\right]^0$

$h=\left(\frac{456}{123}\right)^0$

$\boxed{h=1}$

$i=\frac{4\times 10^{12}}{10^4}+1.4\times 10^9$

$i=4\times 10^{12-4}+1.4\times 10^9$

$i=4\times 10^8+1.4\times 10^9$

$i=4\times 10^8+14\times 10^8$

$i=(4+14)\times 10^8$

$\boxed{i=18\times 10^8}$

التمرين الثاني

أبسط

$$A_1=\left(a^3\right)^{-2}\times\left(a^5\right)^4\times\left(a^{-3}\right)^7$$
$$A_1=a^{-6}\times a^{20}\times a^{-21}$$
$$A_1=a^{-6+20-21}$$
$$\boxed{A_1=a^{-7}}$$

$$A_2=9\times\left(-\frac{2}{9}\right)^{-2}$$
$$A_2=9\times\left(-\frac{9}{2}\right)^{2}$$
$$A_2=9\times\frac{81}{4}$$
$$\boxed{A_2=\frac{729}{4}}$$

$$A_3=\left(\frac{1}{3}\right)^{-8}\div\left(\frac{1}{3}\right)^{-5}$$
$$A_3=\left(\frac{1}{3}\right)^{-8+5}$$
$$A_3=\left(\frac{1}{3}\right)^{-3}$$
$$A_3=3^3$$
$$\boxed{A_3=27}$$

$$A_3=\left(\frac{1}{3}\right)^{-8}\div\left(\frac{1}{3}\right)^{-5}$$
$$A_3=\left(\frac{1}{3}\right)^{-8+5}$$
$$A_3=\left(\frac{1}{3}\right)^{-3}$$
$$A_3=3^3$$
$$\boxed{A_3=27}$$

$$A_8=\frac{2^n\times\left(2^{-n+3}\right)^{-2}}{2^{2n}}$$
$$A_8=\frac{2^n\times2^{2n-6}}{2^{2n}}$$
$$A_8=2^{n+2n-6-2n}$$
$$\boxed{A_8=2^{n-6}}$$

$$A_4=\left(a^{-3}\times b^2\right)^3\times\left[\left(a^4\right)^{-2}\times b^{-3}\right]^{-3}$$
$$A_4=a^{-9}\times b^6\times\left(a^{-8}\times b^{-3}\right)^{-3}$$
$$A_4=a^{-9}\times b^6\times a^{24}\times b^9$$
$$A_4=a^{-9+24}\times b^{6+9}$$
$$A_4=a^{15}\times b^{15}$$
$$\boxed{A_4=(ab)^{15}}$$

$$A_6=\frac{0.000001\times10000}{\left(10^{-5}\right)^3\times10^{-5}}$$
$$A_6=\frac{10^{-6}\times10^4}{10^{-15}\times10^{-5}}$$
$$A_6=\frac{10^{-2}}{10^{-20}}$$
$$A_6=10^{-2+20}$$
$$\boxed{A_6=10^{18}}$$

$$A_7=\frac{ab^{-2}\times\left(a^{-1}b^2\right)^3\times a^{-2}b^3}{a^{-2}\times\left(a^2b^{-1}\right)^2\left(a^3b^2\right)^{-2}}$$
$$A_7=\frac{ab^{-2}\times a^{-3}b^6\times a^{-2}b^3}{a^{-2}\times a^4b^{-2}\times a^{-6}b^{-4}}$$
$$A_7=\frac{a^{1-3-2}\times b^{-2+6+3}}{a^{-2+4-6}\times b^{-2-4}}$$
$$A_7=\frac{\cancel{a^{-4}}\times b^7}{\cancel{a^{-4}}\times b^{-6}}$$
$$A_7=b^{7+6}$$
$$\boxed{A_7=b^{13}}$$

التمرين الثالث

لدينا $a+\frac{1}{a}=\sqrt{5}$

إذن $\left(a+\frac{1}{a}\right)^2=\sqrt{5}^2$

$$a^2+\frac{1}{a^2}+2=5$$
$$a^2+\frac{1}{a^2}=5-2$$
$$\boxed{a^2+\frac{1}{a^2}=3}$$

لدينا $a^2+\frac{1}{a^2}=3$

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

$$a^4+\frac{1}{a^4}+2=9$$
$$a^4+\frac{1}{a^4}=9-2$$
$$\boxed{a^4+\frac{1}{a^4}=7}$$

التمرين الرابع

أتمم باستعمال قوة للعدد 10

$0.0000012 = 12\times10^{-7}$; $0.0731 = 73.1\times10^{-3}$; $-0.00004 = -4\times10^{-5}$

$27000000 = 2.7\times10^{7}$; $146.214 - 1.46214\times10^{2}$; $0.00321 = 32.1\times10^{-4}$

التمرين الخامس

أحدد الكتابة العلمية للأعداد التالية

$B_1 = 0.00002345$ $B_1 = 2.345\times10^{-5}$	$B_2 = -542789$ $B_2 = -5.42789\times10^{5}$	$B_3 = (-0.00009)\times(-0.0005)$ $B_3 = -9\times10^{-5}\times(-5)\times10^{-4}$ $B_3 = 45\times10^{-9} = 4.5\times10^{-8}$
$B_4 = \dfrac{48000}{0.00002}$ $B_4 = \dfrac{4.8\times10^{4}}{2\times10^{-5}}$ $B_4 = 2.4\times10^{4+5}$ $\boxed{B_4 = 2.4\times10^{9}}$	$B_5 = \dfrac{0.006\times10^{-7}\times1.1\times(10^{7})^{4}}{8.8\times(10^{7})^{3}}$ $B_5 = \dfrac{6\times10^{-3}\times10^{-7}\times1.1\times10^{28}}{8.8\times10^{21}}$ $B_5 = \dfrac{6.6\times10^{18}}{8.8\times10^{21}}$ $B_5 = 0.75\times10^{-3}$ $\boxed{B_5 = 7.5\times10^{-4}}$	$B_6 = \dfrac{3\times10^{-5} + 7.2\times10^{-7}}{2.5\times10^{3}}$ $B_6 = \dfrac{10^{-5}(3 + 7.2\times10^{-2})}{2.5\times10^{3}}$ $B_6 = \dfrac{10^{-5}\times3.072}{2.5\times10^{3}}$ $\boxed{B_6 = 1.2288\times10^{-8}}$

$B_7 = 9.08\times10^{-2} - 10^{2}$

$B_7 = 10^{2}(9.08\times10^{-4} - 1)$

$B_7 = -0999092\times10^{2}$

$B_7 = -9.99092\times10$

التمرين السادس

لدينا

$$X = \frac{a^{-2}b(a^{2}b^{-1})^{4}a^{-3}b^{2}}{ab^{-2}(a^{-1}b^{2})^{3}a^{2}b^{3}}$$

$$X = \frac{a^{-2}b\times a^{8}b^{-4}\times a^{-3}b^{2}}{ab^{-2}\times a^{-3}b^{6}\times a^{2}b^{3}}$$

$$X = \frac{a^{-2+8-3}b^{1-4+2}}{a^{1-3+2}b^{-2+6+3}}$$

$$X = \frac{a^{3}b^{-1}}{a^{\hat{a}}b^{7}}$$

$$\boxed{X = a^{3}b^{-8}}$$

لدينا

$X = a^{3}b^{-8}$

$X = (10^{2})^{3}\times(10^{-3})^{-8}$

$X = 10^{6}\times10^{24}$

$\boxed{X = 10^{30}}$