



← 1127 週作詳解，
請自行對答案訂正

利用指數律，用指數記法簡記下列各式

- (1) $(15)^3 \times (15)^7 = 15^{3+7} = 15^{10}$
- (2) $(-5)^4 \times (-5)^3 = (-5)^{4+3} = (-5)^7$
- (3) $(\frac{1}{2})^3 \times (\frac{1}{2})^5 = (\frac{1}{2})^{3+5} = (\frac{1}{2})^8$
- (4) $(-\frac{4}{5})^5 \times (-\frac{4}{5})^7 = (-\frac{4}{5})^{5+7} = (-\frac{4}{5})^{12}$
- (5) $(11)^{13} \div (11)^8 = 11^{13-8} = 11^5$
- (6) $(-5)^7 \div (-5)^3 = (-5)^{7-3} = (-5)^4$
- (7) $(-\frac{4}{5})^8 \div (-\frac{4}{5})^3 = (-\frac{4}{5})^{8-3} = (-\frac{4}{5})^5$
- (8) $(-\frac{2}{7})^{100} \div (-\frac{2}{7})^{20} = (-\frac{2}{7})^{100-20} = (-\frac{2}{7})^{80}$
- (9) $(3^5)^3 = 3^{5 \times 3} = 3^{15}$
- (10) $[(-4)^{10}]^3 = (-4)^{10 \times 3} = (-4)^{30}$
- (11) $[(\frac{2}{3})^6]^2 = (\frac{2}{3})^{6 \times 2} = (\frac{2}{3})^{12}$
- (12) $[(-\frac{7}{9})^3]^7 = (-\frac{7}{9})^{3 \times 7} = (-\frac{7}{9})^{21}$
- (13) $7^6 \times 5^6 = (7 \times 5)^6 = 35^6$
- (14) $(-5)^8 \times 4^8 = (-5 \times 4)^8 = (-20)^8$
- (15) $(\frac{5}{3})^{10} \times (\frac{6}{5})^{10} = (\frac{5}{3} \times \frac{6}{5})^{10} = 2^{10}$
- (16) $(-\frac{8}{3})^5 \div (\frac{16}{5})^5 = (-\frac{8}{3} \div \frac{16}{5})^5 = (-\frac{8}{3} \times \frac{5}{16})^5 = (-\frac{5}{6})^5$
- (17) $(-\frac{2}{3})^5 \times (-\frac{2}{3})^7 \div (-\frac{2}{3})^6 = (-\frac{2}{3})^{5+7-6} = (-\frac{2}{3})^6$
- (18) $(-7)^{100} \div (-7)^{20} \div (-7)^{10} = (-7)^{100-20-10} = (-7)^{70}$

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- (19) 已知 $(16^6)^4 = 16^a = 4^b = 2^c = 8^d$
求 a 、 b 、 c 、 d 的值

$$\begin{aligned} (16^6)^4 &= 16^{6 \times 4} \\ &= 16^{24} = (4^2)^{24} \\ &= 4^{48} = (2^2)^{48} \\ &= 2^{96} = 2^{3 \times 32} \\ &= (2^3)^{32} = 8^{32} \end{aligned}$$

A: $\begin{cases} a=24 \\ b=48 \\ c=96 \\ d=32 \end{cases}$

利用指數律，計算下列各式的值

(20) $(-3)^{10} \div (-3)^8 \times (-3)^5 \div (-3)^4$

$$\begin{aligned} &= (-3)^{10-8+5-4} \\ &= (-3)^3 \\ &= -27 \end{aligned}$$

(21) $12^7 \div 6^7 \times 5^7$

$$\begin{aligned} &= (12 \div 6 \times 5)^7 \\ &= 10^7 \\ &= 10000000 \end{aligned}$$

(22) $27^3 \times 3^2 \div 9^5$

$$\begin{aligned} &= (3^3)^3 \times 3^2 \div (3^2)^5 \\ &= 3^9 \times 3^2 \div 3^{10} \\ &= 3^{9+2-10} \\ &= 3^1 = 3 \end{aligned}$$

(23) $6^{10} \div (2^8 \times 3^8)$

$$\begin{aligned} &= 6^{10} \div (2 \times 3)^8 \\ &= 6^{10} \div 6^8 \\ &= 6^{10-8} \\ &= 6^2 \\ &= 36 \end{aligned}$$

(24) $(-\frac{10}{7})^8 \times (\frac{7}{5})^8 \div (-2)^5$

$$\begin{aligned} &= (-\frac{10}{7} \times \frac{7}{5})^8 \div (-2)^5 \\ &= (-2)^8 \div (-2)^5 \\ &= (-2)^{8-5} \\ &= (-2)^3 = -8 \end{aligned}$$

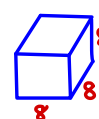
(25) $10^2 \times 10^7 \div 10^8 - 10^2$

$$\begin{aligned} &= 10^{2+7-8} - 10^2 \\ &= 10^1 - 10^2 \\ &= 10 - 100 \\ &= -90 \end{aligned}$$

(26) $(-\frac{3}{5})^4 \div (-\frac{3}{5})^3 + (-\frac{3}{5})^2 - (-\frac{3}{5})^1 - (-\frac{3}{5})^0$

$$\begin{aligned} &= (-\frac{3}{5})^{4-3} + \frac{9}{25} - (-\frac{3}{5}) - 1 \\ &= -\frac{3}{5} + \frac{9}{25} + \frac{3}{5} - 1 \\ &= \frac{9-25}{25} = -\frac{16}{25} \end{aligned}$$

- (27) 已知一正方體的邊長為 8 公分，如果其表面積為 $2^a \times 3^b$ 平方公分，體積為 2^c 立方公分，則 $a=?$ $b=?$ $c=?$



表面積 = $6 \times \text{正方形}$
 $= 6 \times 8 \times 8$
 $= 2 \times 3 \times 2^3 \times 2^3$
 $= 2^7 \times 3^1 \Rightarrow a=7, b=1$
 $(2^9 \times 3^b)$

體積 = 8^3
 $= (2^3)^3$
 $= 2^9 \Rightarrow c=9$
 $= 2^c$
A: $\begin{cases} a=7 \\ b=1 \\ c=9 \end{cases}$

- (28) 某實驗中，原有 5 個細菌，每經過 1 分鐘細菌數量會增加為原來的 3 倍，則

- (1) 2 分鐘後的細菌有多少個？
(2) 18 分鐘後的細菌數是 10 分鐘後細菌數多少倍？(以指數表示)

$5 \xrightarrow{1\text{分}} 5 \times 3 \xrightarrow{2\text{分}} 5 \times 3^2$

(1) $5 \times 3^2 = 45$ (個)

(2) $\frac{18\text{分}}{10\text{分}} = \frac{5 \times 3^{18}}{5 \times 3^{10}} = 3^{18-10} = 3^8$

(1) 45 個
A: (2) 3^8 倍

- (29) 若 $6^7 + 6^7 + 6^7 + 6^7 + 6^7 + 6^7 = 6^y$ ，
 $3^9 + 3^9 + 3^9 = 3^x$ ，求 $x-y$ 的值

$6^7 + 6^7 + 6^7 + 6^7 + 6^7 + 6^7$
 $= 6 \times 6^7$ (6個 6^7 連加)
 $= 6^{1+7}$
 $= 6^8 \Rightarrow y=8$

$3^9 + 3^9 + 3^9$
 $= 3 \times 3^9$ (3個 3^9 連加)
 $= 3^{1+9}$
 $= 3^{10} \Rightarrow x=10$

$x-y = 10-8 = 2$

A: 2