

20.

If  $\sqrt{x} \sqrt{x} \sqrt{x} \sqrt{x} \dots \sqrt{x} \dots \infty = \frac{1}{2}$  then  $x = ?$

(a)  $\frac{1}{8}$

(b)  $\frac{1}{4}$

(c)  $\frac{1}{16}$

(d)  $\frac{1}{32}$

$$(x^3)^4 = x^{12}$$

Handwritten solution:

$$\sqrt{x} \sqrt{x} \sqrt{x} \sqrt{x} \dots \sqrt{x} \dots \infty = \frac{1}{2}$$

$$\left(\sqrt{x}\right)^{\frac{1}{2}} = \frac{1}{2}$$

$$\left(x^{\frac{1}{2}}\right)^{\frac{1}{2}} = \frac{1}{2}$$

$$x^{\frac{1}{4}} = \frac{1}{2}$$

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

20.

If  $\sqrt{x} \sqrt{x} \sqrt{x} \sqrt{x} \dots \infty = \frac{1}{2}$  then  $x = ?$

(a)  $\frac{1}{8}$

(b)  $\frac{1}{4}$

~~(c)  $\frac{1}{16}$~~

(d)  $\frac{1}{32}$

$$\left(x^{\frac{1}{2}}\right)^{\frac{1}{2}} = \frac{1}{2}$$

$$x^{\frac{1}{4}} = \frac{1}{2}$$

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

$$\sqrt{x} \sqrt{x} \sqrt{x} \sqrt{x} \dots \infty = \frac{1}{2}$$

$$\left(\sqrt{x}\right)^{\frac{1}{2}} = \frac{1}{2}$$

$$\left(\sqrt{x}\right)^{\frac{1}{2}} = \frac{1}{2}$$

21.

If  $\sqrt{x} \sqrt{x} \sqrt{x} \sqrt{x} \dots \infty = \frac{1}{6}$  then  $x = ?$

~~(a)  $6^{-12}$~~

(b)  $6^{-18}$

(c)  $6^{-8}$

(d)  $6^{-16}$

$$x = \left(\frac{1}{6}\right)^{12}$$

$$x = \left(\frac{1}{6}\right)^{-12} = 6^{12}$$

$$\left(x^{\frac{1}{2}}\right)^{\frac{1}{6}} = \frac{1}{6}$$

$$x^{\frac{1}{12}} = \frac{1}{6}$$

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

$$\left(\frac{a}{b}\right)^n = \left(\frac{b}{a}\right)^{-n}$$

$$\sqrt{x} \sqrt{x} \sqrt{x} \sqrt{x} \dots \infty = \frac{1}{6}$$

$$(\sqrt{x})^{\infty} = \frac{1}{6}$$

$$(\sqrt{x})^{\frac{1}{6}} = \frac{1}{6}$$

$$\sqrt{a} \sqrt{a} \sqrt{a} \sqrt{a} \dots \infty = \frac{1}{5}$$

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

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

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

$$a^{\frac{1}{10}} = \frac{1}{5}$$

$$a = \left( \frac{1}{5} \right)^{10} = 5^{-10}$$

$a = ?$

$$\begin{aligned} \sqrt[2]{x} &= x^{\frac{1}{2}} \\ \sqrt[3]{x} &= x^{\frac{1}{3}} \\ \sqrt[4]{x} &= x^{\frac{1}{4}} \\ \sqrt[5]{x} &= x^{\frac{1}{5}} \end{aligned}$$

$$\left( x \right)^m = \left( \sqrt[m]{a} \sqrt[n]{b} \sqrt[m]{a} \sqrt[n]{b} \dots \right)^m$$

$\frac{a^m}{a^n} = a^{m-n}$

$$x^m = a \times \sqrt[n]{b} \left( \sqrt[m]{a} \sqrt[n]{b} \sqrt[m]{a} \sqrt[n]{b} \dots \right)$$

$$\left( x^m \right)^n = \left( a \times \sqrt[n]{b} \times x \right)^n$$

$$x^{mn} = a^n \times b \times x$$

$$\frac{x^{mn}}{x} = a^n \times b \Rightarrow x^{mn-1} = a^n b \Rightarrow x = \sqrt{(mn-1)} a^n \times b$$

22.

$$\sqrt[m]{a \sqrt[n]{b^m a^n b^m a^n b \dots \dots \dots \infty}} = ?$$

(a)  $mn-1 \sqrt{a^n b}$

(b)  $mn \sqrt{ab}$

(c)  $mn-1 \sqrt{b^n a}$

(d)  $mn+1 \sqrt{a^n b}$

$$mn-1 \sqrt{a^n \times b}$$

23.

$$\sqrt{2 \times \sqrt[3]{4 \times \sqrt{2 \times \sqrt[3]{4 \times \sqrt{2 \times \sqrt[3]{4 \times \dots \infty}}}}}} = ?$$

(a)  $\sqrt{2}$

(b) 2

(c) 4

(d)  $4\sqrt{2}$

$$\sqrt[4]{2 \sqrt[3]{5 \sqrt{2 \sqrt[3]{5 \dots \infty}}}}$$

$$\sqrt[5]{2^3 \times 4} = \sqrt[5]{32} = \sqrt[5]{2^5} = 2$$

$$\sqrt[5]{2^3 \times 5}$$

$$\sqrt[5]{40} = (40)^{\frac{1}{5}}$$

24.

The greatest number among  $2^{72}$ ,  $5^{36}$ ,  $11^{24}$  and  $3^{60}$  is

- (a)  $2^{72}$  → सबसे छोटा माना  
 (b)  $5^{36}$   
 (c)  $11^{24}$   
 (d)  $3^{60}$  ⇒ बड़ा मान

$6$	$3$	$2$	$5$
$72$	$36$	$24$	$60$
$2$	$5$	$11$	$3$
$2^6$	$5^3$	$11^2$	$3^5$
$64$	$125$	$121$	$243$

$3^{60}$

$10^{11}, 11^{10}$   
 $14^{13}, 13^{14}$

25.

The smallest among the number  $7^{200}$ ,  $9^{150}$ ,  $6^{250}$  and  $5^{300}$  is

$7^{200}$ ,  $9^{150}$ ,  $6^{250}$  और  $5^{300}$  निम्नलिखित में से कौन-सी संख्या सबसे छोटी है ?

(a)  $7^{200}$

(b)  $5^{300}$

(c)  $9^{150}$

(d)  $6^{250}$

Handwritten calculations in green ink:

$$7^4 = 2401$$

$$9^3 = 729$$

$$6^5$$

$$5^6$$

- # ①  $1^2 < 2^1$
- ②  $2^3 < 3^2$

③  $3^4 > 4^3$

④  $4^5 > 5^4$

1024    625

power वसा की value वसा होना है।

$10^{11} > 11^{10}$

$13^{14} > 14^{13}$

$2^3 < 3^2$

26.

Which among  $2^{1/2}$ ,  $3^{1/3}$ ,  $4^{1/4}$ ,  $6^{1/6}$  and  $12^{1/12}$  is the largest?

(a)  $2^{1/12}$

~~(b)  $3^{1/3}$~~

(c)  $4^{1/4}$

~~(d)  $6^{1/6}$~~

(e)  $12^{1/12}$

Handwritten solution showing the conversion of all terms to a common denominator of 12:

$$2^{1/2} = 2^{6/12} = 2^6 = 64$$

$$3^{1/3} = 3^{4/12} = 3^4 = 81$$

$$4^{1/4} = 4^{3/12} = 4^3 = 64$$

$$6^{1/6} = 6^{2/12} = 6^2 = 36$$

$$12^{1/12} = 12^1 = 12$$

Since  $81 > 64 > 36 > 12$ , the largest value is  $3^{1/3}$ .