

Teas 10.

$$E = \log_3(\sin^2 x + \cos^2 x + \log_{\sqrt{5}} 5) = \log_3(1 + 2) = \\ = \log_{3^2} 3 = \frac{1}{2} \quad \text{or } E = \frac{1}{2}$$

Teas 11

$$E = (25^{\frac{3}{2}} + (0,5)^{-2}) : \left(\frac{1}{3}\right)^{-1} = ((5^2)^{\frac{3}{2}} + 2^2) : 3 = \\ = (125 + 4) : 3 = 129 : 3 = 43 \quad \text{or } E = 43$$

Teas 12

$$E = (4^{\log_2 3})^{\frac{3}{2}} - \log_3 64 = \left((2^{\log_2 3})^{\frac{3}{2}}\right)^{\frac{3}{2}} - 3 = 3^3 - 3 = 27 - 3 = \\ = 24 \quad \text{or } E = 24.$$

Teas 13

$$E = 2 \log_3 4 + \log_3 48 = \log_3 4^2 - \log_3 48 = \\ = \log_3 \frac{16}{48} = \log_3 \frac{1}{3} = \log_{3^2} 3^{-1} = -\frac{1}{2} \\ \text{or } E = -\frac{1}{2}.$$

Teas 14.

$$E = \sqrt{\log_2(\sqrt{23} - \sqrt{7}) + \log_2(\sqrt{23} + \sqrt{7})} = \sqrt{\log_2(23 - 7)} = \\ = \sqrt{\log_2 16} = \sqrt{4} = 2, \quad 2 \in \mathbb{N} \\ \text{or } 2 \in \mathbb{N}$$

Teas 15

$$E = 3^{\log_3 8} - \sqrt[3]{0,027} = 3^{\log_3 2^3} - 0,3 = \\ = 3^{\log_3 2} - 0,3 = 2 - 0,3 = 1,7 \\ \text{or } E = 1,7.$$

Test 16.

$$E = 81^{\frac{3}{4}} + (925)^{-2} = (3^4)^{\frac{3}{4}} + \left(\frac{1}{4}\right)^{-2} = 3^3 + 4^2 = 27 + 16 = 43$$

Ans:  $E = 43$ .

Test 17.

$$E = \log_6 60 - \log_6 5 + \log_6 3 = \log_6 \frac{60 \cdot 3}{5} = \log_6 36 = 2$$

Ans:  $E = 2$

Test 18

$$a = \sqrt[3]{16^{\frac{3}{4}} + 9^{\log_3 19}} = \sqrt[3]{(2^4)^{\frac{3}{4}} + 3^{2 \log_3 19}} = \sqrt[3]{2^3 + 3^{\log_3 19^2}} = \sqrt[3]{8 + 19} = \sqrt[3]{27} = 3$$

$3 \in \mathbb{N}$       Ans:  $3 \in \mathbb{N}$

Test 19.

$$E = \log_8 (\sin^2 x + \cos^2 x + \log_2 8) = \log_8 (1 + 3) = \log_8 2^2 = \frac{2}{3}$$

Ans:  $E = \frac{2}{3}$

Test 20

$$E = \left[ 7^{\log_7 25} + \left(\frac{1}{81}\right)^{\frac{1}{4}} \right]^{\frac{2}{3}} = \left[ 7^{\log_7 5^2} + (3^{-4})^{\frac{1}{4}} \right]^{\frac{2}{3}} = \left[ 7^{\log_7 5} + 3 \right]^{\frac{2}{3}} = 8^{\frac{2}{3}} = (2^3)^{\frac{2}{3}} = 2^2 = 4$$

Ans:  $E = 4$

Test 21

$$E = \sqrt[3]{4 - 5 \cdot 32^{-96}} = \sqrt[3]{4 - 5 \cdot (2^5)^{-96}} = \sqrt[3]{4 - 5 \cdot 2^{-3}} = \sqrt[3]{4 - \frac{5}{8}} = \sqrt[3]{\frac{27}{8}} = \frac{3}{2}$$

Ans:  $E = \frac{3}{2}$

Тест 22

$$1) E = 2^{\log_2 7 + \log_3 \frac{1}{3}} = 2^{\log_2 7} \cdot 2^{\log_3 3^{-2}} = 7 \cdot 2^{-2} = \frac{7}{4}$$

или:  $E = \frac{7}{4}$

Тест 23.

$$E = 36^{\frac{1}{\log_6 6}} - 32^{\frac{2}{5}} = (6^{\log_6 5})^2 - (2^5)^{\frac{2}{5}} = 5^2 - 2^2 = 25 - 4 = 21$$

или:  $E = 21$

Тест 24

$$E = -\left[\sqrt[3]{\frac{8}{27}} - \sqrt[3]{\frac{125}{27}}\right] = -\left[\frac{2}{3} - \frac{5}{3}\right] = -(-1) = 1$$

или:  $E = 1$

Тест 25

$$E = 9^{\log_3 7} - \log_4 64 = (3^{\log_3 7})^2 - 3 = 7^2 - 3 = 49 - 3 = 46$$

или:  $E = 46$

Тест 26.

$$a = \sqrt{81} + \sqrt[3]{-64} + 16^{\frac{3}{4}} = 9 - 4 + (2^4)^{\frac{3}{4}} = 5 + 8 = 13$$

$$b = \log_3 27 - \sqrt{6\frac{1}{4}} + 3^{\log_3 \frac{1}{2}} = 3 - \sqrt{\frac{25}{4}} + \frac{1}{2} = 3 - \frac{5}{2} + \frac{1}{2} = 3 - 2 = 1$$

$$m_a = \frac{a+b}{2} = \frac{13+1}{2} = 7 \quad \text{или: } m_a = 7$$

Task 27

$$E = \log_2 \left( \sin \frac{\pi}{6} \right) + \left( \frac{1}{\sqrt{3}} \right)^2 \cdot \left( \frac{1}{3} \right)^{-2} = \log_2 \frac{1}{2} + \frac{4}{3} \cdot 9 =$$
$$= -1 + 12 = 11 \quad \text{or! } E = 11$$

Task 28

$$E = 2 \log_3 5 + \log_3 45 = \log_3 25 - \log_3 75 =$$
$$= \log_3 \frac{25}{75} = \log_3 \frac{1}{3} = -1 \quad \text{or! } E = -1$$

Task 29

$$E = \sqrt{27^{\frac{2}{3}} + \left( \frac{1}{4} \right)^{-2}} = \sqrt{(3^3)^{\frac{2}{3}} + 4^2} = \sqrt{9 + 16} = \sqrt{25} = 5$$
$$\text{or! } E = 5$$

Task 30

$$a = \log_2 \left( 16^{\frac{1}{2}} \right) - \log_3 \left( \frac{1}{9} \right)^{\frac{1}{2}} = \log_2 \sqrt{16} - \log_3 \sqrt{\frac{1}{9}} =$$
$$= \log_2 4 - \log_3 \frac{1}{3} = 2 + 1 = 3 \quad \text{or! } a = 3.$$

Task 31

$$E = 2 \log_3 6 - \log_3 4 = \log_3 \frac{6^2}{4} = \log_3 9 = 2$$
$$\text{or! } E = 2.$$

Task 32

$$a = 2 \log_3 5 + \log_3 75 = \log_3 \frac{25}{75} = \log_3 \frac{1}{3} = -1 \in \mathbb{Z}$$
$$\text{or! } E = -1 \in \mathbb{Z}$$

Tec 33

$$E = \log_3 54 - \log_3 2 + \log_3 81 = \log_3 \frac{54 \cdot 81}{2} = \\ = \log_3 (3^3 \cdot 3^4) = \log_3 3^7 = 7 \quad \text{or } b: E = 7.$$

Tec 34

$$a = \left(\frac{9}{4}\right)^{\frac{3}{2}} - 3 \cdot 2^{-3} = \left(\left(\frac{3}{2}\right)^2\right)^{\frac{3}{2}} - \frac{3}{8} = \frac{27}{8} - \frac{3}{8} = \frac{24}{8} = 3 \in \mathbb{N} \\ \text{or } b: a = 3 \in \mathbb{N}$$

Tec 35

$$a = \log_3 (5 - \sqrt{7}) + \log_3 (5 + \sqrt{7}) - \log_3 2 = \\ = \log_3 \frac{(5 - \sqrt{7})(5 + \sqrt{7})}{2} = \log_3 \frac{25 - 7}{2} = \log_3 9 = 2 \\ \text{or } b: a = 2.$$

Tec 36

$$E = \log_{12} 3 + \log_{12} 4 + 12^{\log_{12} 4} + \log_{\frac{1}{2}} 8 = \\ = \log_{12} (3 \cdot 4) + 12^{\log_{12} 2^2} - 3 = 1 + 2 - 3 = 0 \\ \text{or } b: E = 0.$$

Tec 37

$$a = 2^{\log_8 27} + \log_{\frac{1}{3}} 25 - \sqrt[3]{125} = \\ = 2^{\log_{2^3} 3^3} - 2 - 5 = 3 - 7 = -4 \in \mathbb{Z} \\ \text{or } b: a = -4 \in \mathbb{Z}.$$

Task 38.

$$a = 49^{1 - \log_7 2} + 5^{-\log_5 4} = \frac{49}{(7^{\log_7 2})^2} + \frac{1}{4} = \frac{49}{4} + \frac{1}{4} = \frac{50}{4} = \frac{25}{2}$$

ans:  $a = \frac{25}{2} = 12,5$

Task 39

$$E = 81^{\frac{1}{\log_5 3}} + 3^{\log_3 36} + 3^{\frac{4}{\log_3 9}} = (3^{\log_3 5})^4 + 3^{\log_3 6^2} + (3^{\log_3 7})^2 = 625 + 6 + 49 = 680$$

ans:  $E = 680$

Task 40

$$a = 2^{(\sqrt{2}+1)^2} : 2^{2\sqrt{2}} = 2^{2+2\sqrt{2}+1-2\sqrt{2}} = 2^3 = 8$$

$$\sqrt[3]{a} = \sqrt[3]{8} = 2$$

Task 41

$$E = 36^{\log_6 5} + 10^{1 - \log_2 2} - 3^{\log_3 36} = (6^{\log_6 5})^2 + \frac{10}{10^{\log_2 2}} - 3^{\log_3 6^2} = 25 + 5 - 6 = 24$$

ans:  $E = 24$

Task 42

$$E = \log_{\frac{1}{4}} \left( \log_{\frac{1}{2}} 3 \cdot 2 \cdot \frac{1}{\log_{\frac{1}{2}} 3} \right) = \log_{\frac{1}{4}} 2 = -\frac{1}{2}$$

ans:  $E = -\frac{1}{2}$

Task 43

$$E = 25^{\log_5 3\sqrt{5}} - \log_5 13 = \left( 5^{\log_5 \frac{3\sqrt{5}}{\sqrt{3}}} \right)^2 = \left( \frac{3\sqrt{5}}{\sqrt{3}} \right)^2 = \frac{9 \cdot 5}{3} = 15$$

ans:  $E = 15$

Task 44

$$E = \log_3 27 + \log_3 2 + \log_{15} \frac{1}{5} + \log_7 \sqrt[3]{7} =$$
$$= 3 + \frac{1}{3} - 2 - \frac{1}{3} = 1 \quad \text{or! } E = 1$$

Task 45

$$E = \left(\frac{8}{27}\right)^{-\frac{1}{3}} + \log_3 36 - \log_3 4 = \left(\frac{2}{3}\right)^{\frac{1}{3}} + \log_3 \frac{36}{4} =$$
$$= \frac{3}{2} + \log_3 9 = \frac{3}{2} + 2 = 3,5 \quad \text{or! } E = 3,5$$

Task 46

$$E = \frac{4}{5} \left[1 + \left(\frac{1}{4}\right)^3\right]^{\log_5 5} = \frac{4}{5} [1 + 64]^{\log_5 5} = \frac{4}{5} \cdot 5 =$$
$$= 4 \quad \text{or! } E = 4$$

Task 47

$$E = 9 \log_3 5 - \log_5 25 = 25 - 2 = 23$$
$$\text{or! } E = 23$$

Task 48

$$E = \log_3 27 - \sqrt{6\frac{1}{4}} + 3^{\log_{15} \frac{\sqrt{2}}{2}} = 3 - \sqrt{\frac{25}{4}} + 3^{\log_{3\frac{1}{2}} 2^{\frac{1}{2}}} =$$
$$= 3 - \frac{5}{2} + \frac{1}{2} = 3 - 2 = 1 \quad \text{or! } E = 1$$

Task 49

$$E = 9^{1 + \log_3 2} = 9 \cdot (3^{\log_3 2})^2 = 9 \cdot 4 = 36 = 6^2$$
$$\text{or! } E = 36 = 6^2$$

Ques 50

$$E = (94)^{-2} \cdot \left(\frac{125}{8}\right)^{-\frac{2}{3}} = \left(\frac{2}{5}\right)^{-2} \cdot \left(\frac{5}{2}\right)^{-\frac{2}{3}} =$$

$$= \frac{25}{4} \cdot \frac{4}{25} = 1 \quad \text{or } E = 1$$

Ques 51

$$a = 27^{1 - \log_3 2} = \frac{27}{(3^{\log_3 2})^3} = \frac{27}{8} = 3 \frac{3}{8}$$

or:  $a = 3 \frac{3}{8}$

Ques 52

$$a = 4^{\log_2 \sqrt{7}} + \log_5 75 - \log_5 3 = (2^{\log_2 \sqrt{7}})^2 + \log_5 \frac{75}{3} =$$

$$= 4 + 2 = 6 = 3^2 \quad \text{or } a = 9 = 3^2$$

Ques 53

$$E = 25^{-\frac{1}{\log_5 25}} - 64^{\frac{1}{6}} = (5^{\log_5 2})^2 - (2^6)^{\frac{1}{6}} = 4 - 2 = 2$$

or:  $E = 2$

Ques 54

$$a = \log_3 (3 \log_3 27) + \log_{\frac{1}{2}} (\log_2 \sqrt{2}) =$$

$$= \log_3 (3 \cdot 3) + \log_{\frac{1}{2}} \frac{1}{2} = 2 + 1 = 3$$

or:  $a = 3$

Ques 55

$$a = \log_3 18 \quad m_a = \frac{a+b}{2} = \frac{\log_3 18 + \log_3 (\frac{1}{2})}{2} =$$

$$b = \log_3 \frac{1}{2} \quad = \frac{\log_3 (18 \cdot \frac{1}{2})}{2} = \frac{1}{2} = 1$$

or: 1

Ques 56

$$E = \sqrt{10^{2 + \frac{1}{2} \log_3 16}} = \sqrt{10^2 \cdot 10^{\log_3 4}} = \sqrt{100 \cdot 4} = 10 \cdot 2 = 20$$

or:  $E = 20$

rec 57

$$E = \sqrt{25 \frac{1}{905} + 49 \frac{1}{905}} = \sqrt{(5 \log_5 6)^2 + (7 \log_7 6)^2} = \sqrt{36 + 36} = 6\sqrt{2}$$

ans:  $E = 6\sqrt{2}$

rec 58

$$E = \frac{1}{2} \log_3 36 + \log_{91} 60 = \log_3 6 - \log_3 60 = \log_3 \frac{1}{10} = -1$$

ans:  $E = -1$

rec 59

$$a = 5^{-\log_{15} 4 + 2 \log_5 3} = 5^{\log_5 16 + \log_5 9} = 5^{\log_5 (16 \cdot 9)} = 144$$

ans:  $a = 144$

rec 60

$$E = (9027)^{\frac{1}{3}} \cdot \left(\frac{\sqrt{3}}{10}\right)^{-2} = (93^3)^{\frac{1}{3}} \cdot \frac{100}{3} = 93 \cdot \frac{100}{3} = 10$$

ans:  $E = 10$