



MATHS

BOOKS - MCGROW HILL EDUCATION MATHS (HINGLISH)

SURDS AND INDICES

Illustrative Examples

1. Simplify: $(0.00032)^{\frac{3}{5}} \times \left(\frac{8}{125}\right)^{\frac{-4}{3}}$



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2. What is the quotient when $(x^{-1} - 1)$ is divided by $(x - 1)$?



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3. Find the value of $\left[(10)^{150} \div (10)^{146} \right]$.



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4. Write $4\sqrt{6}$, $\sqrt{2}$, $3\sqrt{4}$ in ascending order.



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5. If $x = y^a$, $y = z^b$ and $z = x^c$, compute abc .



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6. Find the value of

$$\left(2^{1/4} - 1\right) \left(2^{3/4} + 2^{1/2} + 2^{1/4} + 1\right)$$



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7. If $\left(\frac{a}{b}\right)^{x-1} = \left(\frac{b}{a}\right)^{x-3}$, find the value x .



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8. Find the value of

$$\frac{(243)^{0.13} \times (243)^{0.07}}{(7)^{0.25} \times (49)^{0.075} \times (343)^{0.2}}$$



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9. If $x = 3 + 2\sqrt{2}$, then the value of

$$\left(\sqrt{x} - \frac{1}{\sqrt{x}} \right) \text{ is}$$



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10. If $abc = 1$, show that

$$\frac{1}{1+a+b^{-1}} + \frac{1}{1+b+c^{-1}} + \frac{1}{1+c+a^{-1}} = 1$$



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Multiple Choice Questions

1. What is the value of $\left[\left((x^{y+1})^{\frac{y^2}{y^2-1}} \right)^{1-\frac{1}{y}} \right]$?

A. xy

B. x^y

C. y^x

D. y/x

Answer: B



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2. What is the value of

$$\frac{a^{x(y-z)}}{a^{y(x-z)}} + \left(\frac{a^y}{a^x}\right)^z$$

A. 1

B. a^x

C. a^{xy}

D. a^{xyz}

Answer: A



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3. The value of

$\left(\frac{x^a}{x^b}\right)^{a+b} \times \left(\frac{x^b}{x^c}\right)^{b+c} \times \left(\frac{x^c}{x^a}\right)^{c+a}$ is equal to

A. 0

B. 1

C. x

D. x^{a+b+c}

Answer: B



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4. The value of $\left(\frac{x^a}{x^b}\right)^{\frac{1}{ab}} \times \left(\frac{x^b}{x^c}\right)^{\frac{1}{bc}} \times \left(\frac{x^c}{x^a}\right)^{\frac{1}{ca}}$

is equal to

A. x^{abc}

B. abc

C. 1

D. 0

Answer: C



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5. The value of $\frac{2^{m+1} \cdot 3^{2m-n} \cdot 5^{m+n} \cdot 6^n}{6^m \cdot 10^{n+2} \cdot 15^m}$ is equal to

A. 50

B. $\frac{1}{25}$

C. $\frac{1}{50}$

D. $\frac{1}{5}$

Answer: C



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6. The value of $\frac{3^{2-x} \times 9^{x-2}}{3^x}$ is equal to

A. $\frac{1}{3}$

B. $\frac{1}{24}$

C. 1

D. $\frac{1}{9}$

Answer: D



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7. The value of $\frac{(27)^{n/3} \times (8)^{-n/6}}{(162)^{-n/2}}$ is equal to

A. 2^n

B. 3^n

C. 3^{3n}

D. 35^n

Answer: C



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8. The value of $\frac{6^n \times 2^{2n} \times 3^{3n}}{30^n \times 3^{2n} \times 2^{3n}}$ is equal to

A. 1

B. $(0.3)^n$

C. 3^{-n}

D. 3^{5n}

Answer: B



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9. The value of

$$\frac{2^{1/2} \times 3^{1/3} \times 4^{1/4}}{10^{-1/5} \times 5^{3/5}} + \frac{4^{-2/3} \times 5^{-7/5}}{4^{-3/5} \times 6^{-1/3}}$$

is

equal to

A. 10

B. 1

C. 6

D. 18

Answer: A



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10. The value of $\frac{2^n + 2^{n-1}}{2^{n+1} - 2^n}$ is equal to

A. 1.5

B. $\frac{2}{3}$

C. 2

D. 4

Answer: A



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11. The value of $\frac{6^{n+3} - 32 \cdot 6^{n+1}}{6^{n+2} - 2 \cdot 6^{n+1}}$ is equal to

A. 36

B. $\frac{1}{6}$

C. 2

D. 1

Answer: D



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12. If $16^{n+1} = 64 \times 4^{-n}$, the value of n is

A. $\frac{1}{3}$

B. $\frac{1}{9}$

C. $\frac{1}{2}$

D. 1

Answer: A



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13. If $9^n = \frac{9}{3^n}$, the value of n is

A. $\frac{4}{3}$

B. $\frac{1}{3}$

C. $\frac{2}{3}$

D. 2

Answer: C



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14. If $32^{x-2} = 64 + 8^x$, the value of x is

A. $1/2$

B. $1/4$

C. $1/8$

D. 2

Answer: D



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15. If $a = \frac{\sqrt{3} + \sqrt{2}}{\sqrt{3} - \sqrt{2}}$ and $b = \frac{\sqrt{3} - \sqrt{2}}{\sqrt{3} + \sqrt{2}}$, then

value of $a^2 + b^2$ is

A. 28

B. 58

C. 10

D. 98

Answer: D



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16. If $x = 2 + \sqrt{3}$ and $y = 2 - \sqrt{3}$, find the value of $x^{-2} + y^{-2}$.

A. 12

B. 14

C. 16

D. 18

Answer: B



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17. If $x = 2 + \sqrt{3}$ and $y = 2 - \sqrt{3}$, find the value of $x^{-3} + y^{-3}$.

A. 42

B. 48

C. 50

D. 52

Answer: D



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18. If $x = \frac{\sqrt{5} - \sqrt{3}}{\sqrt{5} + \sqrt{3}}$, $y = \frac{\sqrt{5} + \sqrt{3}}{\sqrt{5} - \sqrt{3}}$ find the value of $(x - y)^2$.

A. 60

B. 48

C. 35

D. 30

Answer: D



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19. If $x = \frac{\sqrt{3} + 1}{\sqrt{3} - 1}$ and $y = \frac{\sqrt{3} - 1}{\sqrt{3} + 1}$, find the value of $x^2 + xy + y^2$.

A. 18

B. 16

C. 21

D. 15

Answer: D



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20. If $a = \frac{1}{2 - \sqrt{3}}$, $b = \frac{1}{2 + \sqrt{3}}$, find the value of $\left(\frac{a + b}{a - b}\right)^2$.

A. $\frac{3}{4}$

B. $\frac{2}{3}$

C. $\frac{4}{3}$

D. $\frac{4}{5}$

Answer: C



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21. If $x = \frac{\sqrt{3} + \sqrt{2}}{\sqrt{3} - \sqrt{2}}$, find the value of $x^2 + \frac{1}{x^2}$.

A. 38

B. 98

C. 62

D. 47

Answer: B



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22. If $x = \frac{\sqrt{5} + \sqrt{3}}{\sqrt{5} - \sqrt{3}}$, find the value of $x^3 + \frac{1}{x^3}$.

A. 644

B. 512

C. 488

D. 348

Answer: C



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23. If $x = 7 + 4\sqrt{3}$, $y = 7 - 4\sqrt{3}$, find the value of $\frac{1}{x^2} + \frac{1}{y^2}$.

A. 194

B. 198

C. 212

D. 318

Answer: A



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24. If $x = 3 + \sqrt{8}$, $y = 3 - \sqrt{8}$, find the value of $x^{-3} + y^{-3}$

A. 195

B. 199

C. 198

D. 201

Answer: C



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25. If $x = 3 + \sqrt{8}$ find the value of $x^4 + \frac{1}{x^4}$

A. 1254

B. 1064

C. 1154

D. 1206

Answer: C



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26. If $x = 3 + 2\sqrt{2}$, find the value of $\sqrt{2}(x^2 - x^{-2})$.

A. 24

B. $24\sqrt{2}$

C. 48

D. $96\sqrt{2}$

Answer: C



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27. If $\sqrt{x} + \sqrt{y} = \sqrt{18 + 6\sqrt{5}}$, find the value of x .

A. 12

B. 15

C. 6

D. 8

Answer: B



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28. if $a = 7 - 4\sqrt{3}$, find the value of $\sqrt{a} + \frac{1}{\sqrt{a}}$

A. 14

B. 10

C. 9

D. 4

Answer: D



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29. Find x if $\frac{\sqrt{3x+1} + \sqrt{3x-6}}{\sqrt{3x+1} - \sqrt{3x-6}} = 7$

A. 2

B. 5

C. 3

D. 7

Answer: B



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30. Find x if $\frac{\sqrt{5x} + \sqrt{3x + 1}}{\sqrt{5x} - \sqrt{3x + 1}} = 9$.

A. 5

B. 9

C. 4

D. 1

Answer: A



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31. If $\frac{a}{b+c} = \frac{b}{c+a} = \frac{c}{a+b}$ then each fraction is equal to

A. $-1/2$

B. -1 or $-1/2$

C. $1/2$ or -1

D. $1/2$ or 2

Answer: C



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32. If
$$\frac{a}{b + c - a} = \frac{b}{c + a - b} = \frac{c}{a + b - c},$$

then each ratio is equal to

A. 1

B. $-1/2$

C. 1 or $1/2$

D. none of these

Answer: C



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33. If $\frac{x}{b+c-a} = \frac{y}{c+a-b} = \frac{z}{a+b-c}$,

then value of $x(b-c) + y(c-a) + z(a-b)$ is equal to

A. 1

B. 0

C. $1 + b + c$

D. $a^2 + b^2 + c^2$

Answer: B



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