



## MATHS

# BOOKS - MCGROW HILL EDUCATION MATHS (HINGLISH)

## FUNDAMENTALS OF ALGEBRA

### Illustrative Example

1. If  $a = 2$  and  $b = 5$ , the value of the expression  $2a - [3a + \{4b - (2a - b) + 5a\} - 7b]$  is :

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2. If  $a+b=15$  and  $ab=56$ , the value of  $(a^3 + b^3) \div (a^2 + b^2)$

is :

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3. If  $a + \frac{1}{a} = \sqrt{3}$ , the value of  $a^3 + \frac{1}{a^3}$  is :

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4. The expression  $(5x - 8)^3 - (3x - 8)^3 - 6x(5x - 8)(3x - 8)$  when simplified gives \_\_\_\_

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5. If  $M = a(m + n)$  and  $N = b(m - n)$ , then the value of

$$\left(\frac{M}{a} + \frac{N}{b}\right) \div \left(\frac{M}{a} - \frac{N}{b}\right) \text{ is:}$$

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6. If  $z$  varies as  $px + y$ , and if  $z = 3$  when  $x = 1$  and  $y = 2$ . Also if

$z = 5$  then  $x = 2$  and  $y = 3$ , find the value of  $p$ .

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7. If  $(x+a)$  be a common factor of  $x^2 + px + q$  and

$x^2 + p'x + q'$ , then the value of  $a$  is:

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8. If  $n$  is any positive interger then expression  $3^{4n} - 4^{3n}$  is exactly divisible?

A. 7

B. 12

C. 17

D. 145

**Answer: 17**

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9. For what least value of  $n$ ,  $(2^{6n} - 6^{2n})$  is divisible by ?  $n$  being even +ve,

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10. If the polynomial  $f(x) = 2x^3 + mx^2 + nx - 14$  has  $(x - 1)$  and  $(x + 2)$  as its factors, find the value of  $m \times n$ .

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11. Find the value of  $x$  if:

$$(x - 4)^3 + (x - 9)^3 + (x - 8)^3 = 3(x - 4)(x - 9)(x - 8)$$

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12. The sum of two numbers is 184. If one-third of the one exceeds one-seventh of the other by 8, find the smaller number.

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**13.** Of the two numbers, 4 times the smaller one is less than 3 times the larger one by 5. If the sum of the numbers is larger than 6 times their difference by 6, find the sum of the digits of two numbers.

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**14.** A fraction becomes  $\frac{2}{3}$  if 1 is added to both its numerator and denominator. The same fraction becomes  $\frac{1}{2}$  if 1 is subtracted from both the numerator and denominator. Such a fraction is:

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**15.** The ages of two persons differ by 16 years. If 6 years ago, the elder one be 3 times as old as the younger one, find sum of their present ages.

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**16.** One year ago, the ratio of Anil's and Sunil's age was 6: 7. Four years hence, their ratio would become 7:8. How old is Sunil?

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**Multiple Choice Questions**

1. If  $m=2$ ,  $n=3$ ,  $p=4$ ,  $q=0$ ,  $r=7$  and  $s=10$ , then the expression

$$\frac{3m + 2n}{q + p} - \frac{4p - 3n}{q + r} + \frac{2p + 3m}{q + m} \text{ has the value}$$

A. 5

B. 9

C. 11

D. 13

**Answer: B**

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2. If  $a = 29$ ,  $b = 24$  and  $c = 27$ , find the value of

$$a^3 + b^3 + c^3 - 3abc$$



A. 1620

B. 1640

C. 1520

D. 1580

**Answer: C**



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**3.** If  $x = 16$ ,  $y = 10$ ,  $z = 5$  and  $t = -1$ , find the value of

$$(x - y)(5\sqrt{x} - y) + \sqrt{(x - y)(z - t)}.$$

A. 66

B. 72

C. 76

D. 80

**Answer: A**



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4. The simplified value of the expression

$(a + b - c)^2 + 2(a + b - c)(a - b + c) + (a - b + c)^2$  is

A. 0

B.  $4a^2$

C.  $4b^2$

D.  $c^2$

**Answer: B**



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5. The value of

$$(x - y)^3 + (x + y)^3 + 3(x - y)^2(x + y) + 3(x + y)^2(x - y)$$

is

A.  $27x^3$

B.  $8(x^3 - y^3)$

C.  $8x^3y^3$

D.  $8x^3$

**Answer: D**



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6. If  $p+q=2$  ,  $pq=1$  then the value of  $p^3 + q^3 + 6p^2 + 5q^2 + 6pq$  is

A. 19

B. 18

C. 15

D. 23

**Answer: A**



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7. If  $x - \frac{1}{x} = 3$ , then the value of  $x^3 - \frac{1}{x^3}$  is

A. 27

B. 32

C. 36

D. 42

**Answer: C**



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8. If  $x=3$ ,  $y=2$  and  $z=-1$ , then the value of  $\frac{x^3 + y^3 + 1}{y^3 - z^3}$  is

A. 4

B. 1

C.  $-2$

D. 0

**Answer: A**



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9. If  $a = 15$ ,  $b = 12$  and  $c = 9$ , find the value of

$$\sqrt{\frac{(2a + 2b)(2c + a)}{2(a - b)(2b + c)}}$$

A. 10

B. 6

C. 9

D. 3

**Answer: D**



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10. If  $x=40$ ,  $y=43$ ,  $z=47$  , find the value of

$$x^3 + y^3 + z^3 - 3xyz.$$

A. 1300

B. 4520

C. 4910

D. 4810

**Answer: D**



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11. If P varies directly as QR and the values of P, Q, R be 6, 9, 10 respectively, then the value of P when Q = 5 and R = 3 is

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

B. 3

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

D. 1

**Answer: D**



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12. If  $(x+a)$  is a factor of  $f(x) = x^3 + ax^2 - 2x + a + 4$ , then a is



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

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

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

D.  $-\frac{7}{3}$

**Answer: C**



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**13.** If  $m$  is any positive integer, then the last two digits in the expression  $(81)^m(121)^m - 1$  are

A. 02

B. 12

C. 21

D. 00

**Answer: D**



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14. If  $\frac{x - a}{b + c} + \frac{x - b}{c + a} + \frac{x - c}{a + b} = 3$  then value of  $x$  is

A.  $abc$

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

C.  $a+b+c$

D.  $\frac{1}{a + b + c}$

**Answer: C**



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15. The value of  $x$  that satisfies the equation

$$\frac{4}{x-3} + \frac{5}{x-5} = \frac{9}{x-13} \text{ is}$$

A. 4

B. 3

C. 2

D. 1

**Answer: A**



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16. If  $0.3x - 0.37 = 0.37x - 0.3$ , then  $x$  has the value

A. 1

B.  $-1$

C. 2

D.  $-2$

**Answer: B**



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17. If  $\frac{x}{6} + \frac{y}{15} = 4$  and  $\frac{x}{3} - \frac{y}{12} = 4\frac{3}{4}$  find  $x$  and  $y$ .

A. (6,15)

B. (18,15)

C. (15,18)

D. (12,30)

**Answer: B**



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**18.** If  $x + y = \sqrt{3}$ ,  $x - y = \sqrt{2}$ , then the expression  $8xy(x^2 + y^2)$  has the value

A.  $5\sqrt{2}$

B.  $10\sqrt{2}$

C. 20

D. 5

**Answer: D**



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**19.** In a pair of fractions, fraction A is twice the fraction B and the product of two fractions is  $\frac{2}{25}$ . What is the value of fraction A?  $\frac{1}{5}$  b.  $\frac{1}{25}$  c.  $\frac{2}{5}$  d. Data inadequate

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

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

C.  $\frac{2}{5}$

D. None of these

**Answer: C**



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20. The difference between the numerator and the denominator of a fraction is 5. If 5 is added to its denominator, the fraction is decreased by  $1\frac{1}{4}$ . Find the value of the fraction  $\frac{1}{6}$  b.  $2\frac{1}{4}$  c.  $3\frac{1}{4}$  d. 6

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

B.  $2\frac{1}{4}$

C.  $3\frac{1}{4}$

D. 6

**Answer: B**



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21. A person's present age is  $\frac{2}{5}$ th of the age of his mother.

After 8 years, he will be one-half of the age of his mother.

How old is the mother at present?

A. 32 years

B. 36 years

C. 40 years

D. 48 years

**Answer: C**



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22. Tanya's grandfather was 8 times older to her 16 years ago. He would be 3 times of her age 8 years from now.



Eight years ago, what was the ratio of Tanya's age to that of her grandfather?

A. 1:2

B. 1:5

C. 3:8

D. 11:53

**Answer: D**



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**23.** A man was asked to state his age in years. his reply was  
Take my age 3 years hence, multiply it by 3 and then  
subtract 3 times my age 3 years age and you will know how

old I am. What is the age of the man? a. 18 years b. 20 years  
c. 24 years d. 32 years

A. 18 years

B. 20 years

C. 24 years

D. 32 years

**Answer: A**



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