



# MATHS

## BOOKS - MCGROW HILL EDUCATION MATHS (HINGLISH)

### CONDITIONAL IDENTITIES

#### Illustrative Examples

1. If  $a + b + c = 0$ , then the value of  $\frac{a^2 + b^2 + c^2}{bc + ca + ab}$  is....



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2. If  $a + b + c = 0$ , what is the value of

$$\frac{8abc}{a^3 + b^3 + c^3} ?$$



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3. 
$$\frac{(x - y)^3 + (y - z)^3 + (z - x)^3}{(x - y)(y - z)(z - x)} =$$



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4. If  $a + b + c = 0$  what is the value of

$$\frac{a^2 + b^2 + ab}{b^2 + c^2 + bc} + \frac{c^2 + ca + a^2}{b^2 + c^2 + bc} ?$$



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5. If  $x = b + c, y = c + a, z = a + b$ , then

find the value of

$$\frac{x^2 + y^2 + z^2 - yz - zx - xy}{a^2 + b^2 + c^2 - bc - ca - ab}$$



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6. If  $a + b + c = 0$ , find the value of

$$\frac{a^4 + b^4 + c^4}{a^2b^2 + c^2(a^2 + b^2)}$$



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7. If  $x + y + z = 0$ , then what is the value of

$$\frac{1}{x^2 + y^2 - z^2} + \frac{1}{y^2 + z^2 - x^2} + \frac{1}{z^2 + x^2 - y^2}$$

?



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8.

If

$$a = x(y - z), b = y(z - x) \text{ and } c = z(x - y)$$

What is the value of

$$\frac{xyz}{abc} \left( \frac{a^3}{x^3} + \frac{b^3}{y^3} + \frac{c^3}{z^3} \right) ?$$



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

is the value of  $\frac{1}{1+x} + \frac{2}{1+y} + \frac{1}{1+z}$  ?



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10. If  $x + y = 2z$ , what is the value of

$$\frac{x}{x - z} + \frac{z}{y - z}?$$



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11. If  $x = a^2 - bc$ ,  $y = b^2 - ca$ ,  $z = c^2 - ab$

then what is the value of

$$\frac{ax + by + cz}{(a + b + c)(x + y + z)}$$



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1. If  $a + b + c = 0$ , then

$(a^3 + b^3 + c^3) \div (abc)$  is equal to

A. 1

B. 2

C. 3

D. 9

**Answer: C**



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2. If  $a + b + c = 0$ , then is

$\frac{a^4 + b^4 + c^4}{a^2b^2 + b^2c^2 + c^2a^2}$  is equal to

A. 4

B. 2

C. 1

D. 16

**Answer: B**



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3. If  $a + b + c = 0$ , then

$$\frac{1}{b^2 + c^2 - a^2} + \frac{1}{c^2 + a^2 - b^2} + \frac{1}{a^2 + b^2 - c^2}$$

is equal to

A. 3

B. 6

C. 1

D. 0

**Answer: D**



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4. If  $x + y + z = 0$ , then  $\frac{x^2}{yz} + \frac{y^2}{zx} + \frac{z^2}{xy}$  is

equal to

A. 3

B. 27

C. 1

D.  $-3$

**Answer: A**



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5. If  $a + b + 2c = 0$ , then the value of  $a^3 + b^3 + 8c^3$  is equal to

A.  $3abc$

B.  $4abc$

C.  $abc$

D.  $6abc$

**Answer: D**



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6. Evaluate the expression

$$\frac{(x - y)^3 + (y - z)^3 + (z - x)^3}{(x - y)(y - z) + (z - x)}$$

in the

simplest form.

A. 1

B. 2

C. 3

D. -1

**Answer: C**



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7.

If

$$x = a(b - c), \quad y = b(c - a), \quad z = c(a - b) \quad ,$$

then the value of  $\left(\frac{x}{a}\right)^3 + \left(\frac{y}{b}\right)^3 + \left(\frac{z}{c}\right)^3$  is

$\frac{2xyz}{abc}$  (b)  $\frac{xyz}{abc}$  (c) 0 (d)  $\frac{3xyz}{abc}$

A.  $\frac{xyz}{abc}$

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

C.  $3 \frac{xyz}{abc}$

D.  $\frac{3(x + y + z)}{(abc)}$

**Answer: C**



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8. If  $a + b + c = 0$ , then  $\frac{a^2 + b^2 + c^2}{ab + bc + ca}$  is equal to

A. 2

B. 1

C. -1

D. 3

**Answer: D**



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9. If  $a + b + c = 0$  then the value of  $\frac{(a + b)(b + c)(c + a)}{abc}$  is

A. 1

B. -1

C. -3

D. 3

**Answer: B**



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10. If  $a + b + c = 0$  then the value of  $\frac{a^2(b + c) + b^2(c + a) + c^2(a + b)}{abc}$  is

A. 3

B. -3

C. -1/3

D. 1/3

**Answer: B**



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11. If  $a + b + c = 0$  then the value of  $(a + b + c)^3 - (a^3 - b^3 - c^3)$  is equal to

A.  $2abc$

B.  $abc$

C.  $-3abc$

D.  $-abc$

**Answer: C**



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12. If  $ab + bc + ca = 0$ , then what is the value of  $\left( \frac{1}{a^2 - bc} + \frac{1}{b^2 - ca} + \frac{1}{c^2 - ab} \right)$ ? (a) 0 (b) 1 (c) 3 (d)  $a + b + c$

A. 3

B.  $3abc$

C.  $abc$

D. 0

**Answer: D**



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13. If  $\frac{x}{y+z} = a$ ;  $\frac{y}{z+x} = b$  and  $\frac{z}{x+y} = c$

, then  $\frac{1}{1+a} + \frac{1}{1+b} + \frac{1}{1+c}$  is equal to (a)

2 (b) 3 (c) 6 (d)  $x + y + z$

A.  $a + b + c$

B. 3

C. 2

D. 1

**Answer: C**



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14. If  $a + b = 2c$ , then  $\frac{a}{a - c} + \frac{c}{b - c}$  is equal to

A. 0

B. -1

C. 1

D. 2

**Answer: C**



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15.  $\frac{a^2 - b^2 - 2bc - c^2}{a^2 + b^2 + 2ab - c^2}$  is equivalent to

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

A.  $\frac{a + b + c}{a - b + c}$

B.  $\frac{a - b - c}{a + b - c}$

C.  $\frac{a - b - c}{a - b + c}$

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

**Answer: B**



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16. If  $a = \frac{x+y}{z}$ ,  $b = \frac{y+z}{x}$  and  $c = \frac{z+x}{y}$ ,  
then the value of  $\frac{1}{a+1} \div \frac{1}{b+1} + \frac{1}{c+1}$  is  
equal to

A. 3

B. 2

C. 1

D. -3

**Answer: C**



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17. If  $a^2 = b + c$ ,  $b^2 = c + a$ ,  $c^2 = a + b$ , then the value of  $\frac{1}{a+1} + \frac{1}{b+1} + \frac{1}{c+1}$  is equal to

A. 4

B. 3

C. 2

D. 1

**Answer: D**



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18. If  $x = a + b$ ,  $y = b + c$ ,  $z = c + a$ , then the value of  $\frac{x^3 + y^3 + z^3 - 3xyz}{a^3 + b^3 + c^3 - 3abc}$  is equal to

A. 3

B. 2

C. 1

D.  $1/3$

**Answer: B**



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19. If  $x = a^2 - bc$ ,  $y = b^2 - ca$ ,  $z = c^2 - ab$

then what is the value of

$$\frac{(a + b + c)(x + y + z)}{ax + by + cz}$$
 is equal to

A. 3

B. 2

C. 1

D. 0

**Answer: C**



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20. If  $(a + b + c)^2 = 3(ab + bc + ca)$ , then which one of the following is true?

A.  $a \neq b \neq c$

B.  $a > b > c$

C.  $a < b < c$

D.  $a = b = c$

**Answer: D**



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