



# MATHS

## BOOKS - ICSE

### IDENTITIES

#### Example

1. Evaluate : (i)  $(2x + 3y)(3x + 4y)$



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2. Evaluate :  $(2a + 3)(5a - 7)$

A.  $9a^2 + a - 21$

B.  $10a^2 + a - 21$

C.  $8a^2 - 21$

D.  $10a^3 + a^2 - 21a$

**Answer: B**



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3. Evaluate : (iii)  $(4a - 3b)(2a + 5b)$



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4. Evaluate : (iv)  $(7x - 3)(2x - 9)$ .



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5. Evaluate : (i)  $(x - 2)(x + 2)(x^2 + 4)$



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6. Evaluate : (ii)

$$(2a - 5b)(2a + 5b)(4a^2 + 25b^2)$$



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7. Use of the formula

$$(a + b)(a - b) = a^2 - b^2 \text{ to find the value of :}$$

(i)  $107 \times 93$



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8. Use of the formula

$(a + b)(a - b) = a^2 - b^2$  to find the value of :

(ii)  $30.8 \times 29.2$



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9. Expand : (i)  $\left(2x + \frac{1}{2x}\right)^2$



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10. Expand : (ii)  $\left(3a - \frac{1}{a}\right)^2$



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**11. Expand :** (iii)  $(a + 2b - 5c)^2$



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**12. Expand :** (iv)  $(a - 2b - 5c)^2$



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**13. Expand :** (i)  $(3x + 2)^3$



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**14. Expand : (ii)  $(5y - 3x)^3$**



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**15. (i) If  $a + b = 8$  and  $ab = 15$ , find  $a^2 + b^2$ .**



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**16. (ii) If  $a - b = 3$  and  $a^2 + b^2 = 29$ , find  $ab$ .**



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17. If  $a^2 + b^2 = 73$  and  $ab = 24$ , find : (i)

$$a + b$$



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18. If  $a^2 + b^2 = 73$  and  $ab = 24$ , find : (ii)

$$a - b$$



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19. If  $a^2 + \frac{1}{a^2} = 2$ , find : (i)  $a + \frac{1}{a}$



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20. If  $a^2 + \frac{1}{a^2} = 2$ , find : (ii)  $a - \frac{1}{a}$



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21. If  $a + b + c = 9$  and  $a^2 + b^2 + c^2 = 29$ ,  
find  $ab + bc + ca$ .



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22. If  $a + b = 5$  and  $ab = 6$ , find  $a^3 + b^3$ .



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23. If  $a - \frac{1}{a} = 3$ , find  $a^3 - \frac{1}{a^3}$



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24. The sum of two numbers is 4 and their product is 3. Find : (i) the sum of their squares.



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25. The sum of two numbers is 4 and their product is 3. Find : (ii) the sum of their cubes.



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## Exercise 12 A

1. Use direct method to evaluate the following products:

(i)  $(x + 8)(x + 3)$



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2. Use direct method to evaluate the following products:

(ii)  $(y + 5)(y - 3)$



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3. Use direct method to evaluate the following products:

(iii)  $(a - 8)(a + 2)$





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4. Use direct method to evaluate the following products:

$$(iv) (b - 3)(b - 5)$$



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5. Use direct method to evaluate the following products:

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



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6. Use direct method to evaluate the following products:

$$(vi) (5a + 16)(3a - 7)$$



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7. Use direct method to evaluate the following products:

$$(vii) (8 - b)(3 + b)$$



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**8. Use direct method to evaluate :**

(i)  $(x + 1)(x - 1)$



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**9. Use direct method to evaluate :**

(ii)  $(2 + a)(2 - a)$



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**10.** Use direct method to evaluate :

$$(iii) (3b - 1)(3b + 1)$$



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**11.** Use direct method to evaluate :

$$(iv) (4 + 5x)(4 - 5x)$$



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**12.** Use direct method to evaluate :

$$(v) (2a + 3)(2a - 3)$$



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**13.** Use direct method to evaluate :

$$(vi) (xy + 4)(xy - 4)$$



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**14.** Use direct method to evaluate :

$$(vii) (ab + x^2)(ab - x^2)$$



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**15.** Use direct method to evaluate :

$$(viii) (3x^2 + 5y^2)(3x^2 - 5y^2)$$



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**16.** Use direct method to evaluate :

$$(ix) \left( z - \frac{2}{3} \right) \left( z + \frac{2}{3} \right)$$



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**17.** Use direct method to evaluate :

$$(x) \left( \frac{3}{5}a + \frac{1}{2} \right) \left( \frac{3}{5}a - \frac{1}{2} \right)$$



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**18.** Use direct method to evaluate :

$$(xi) (0.5 - 2a)(0.5 + 2a)$$



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**19.** Use direct method to evaluate :

$$(xii) \left( \frac{a}{2} - \frac{b}{3} \right) \left( \frac{a}{2} + \frac{b}{3} \right)$$



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**20.** Evaluate : (i)  $(a + 1)(a - 1)(a^2 + 1)$



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**21. Evaluate : (ii)  $(a + b)(a - b)(a^2 + b^2)$**



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**22. Evaluate : (iii)  $(2a - b)(2a + b)(4a^2 + b^2)$**



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**23. Evaluate : (iv)  $(3 - 2x)(3 + 2x)(9 + 4x^2)$**



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24. Evaluate : (v)

$$(3x - 4y)(3x + 4y)(9x^2 + 16y^2)$$



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25. Use the formula :

$$(a + b)(a - b) = a^2 - b^2 \text{ to evaluate :}$$

(i)  $21 \times 19$



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26. Use the formula :

$$(a + b)(a - b) = a^2 - b^2 \text{ to evaluate :}$$

(ii)  $33 \times 27$



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27. Use the formula :

$$(a + b)(a - b) = a^2 - b^2 \text{ to evaluate :}$$

(iii)  $103 \times 97$



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**28.** Use the formula :

$$(a + b)(a - b) = a^2 - b^2 \text{ to evaluate :}$$

(iv)  $9.8 \times 10.2$



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**29.** Use the formula :

$$(a + b)(a - b) = a^2 - b^2 \text{ to evaluate :}$$

(v)  $7.7 \times 8.3$



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30. Use the formula :

$$(a + b)(a - b) = a^2 - b^2 \text{ to evaluate :}$$

(vi)  $4.6 \times 5.4$



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31. Evaluate : (i)  $(6 - xy)(6 + xy)$



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32. Evaluate : (ii)  $\left(7x + \frac{2}{3}y\right)\left(7x - \frac{2}{3}y\right)$





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**33. Evaluate :** (iii)  $\left(\frac{a}{2b} + \frac{2b}{a}\right) \left(\frac{a}{2b} - \frac{2b}{a}\right)$



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**34. Evaluate :** (iv)  $\left(3x - \frac{1}{2y}\right) \left(3x + \frac{1}{2y}\right)$



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**35. Evaluate :** (v)  $(2a + 3)(2a - 3)(4a^2 + 9)$



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**36. Evaluate : (vi)  $(a + bc)(a - bc)(a^2 + b^2c^2)$**



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**37. Evaluate : (vii)  $(5x + 8y)(3x + 5y)$**



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**38. Evaluate : (viii)  $(7x + 15y)(5x - 4y)$**



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**39. Evaluate :** (ix)  $(2a - 3b)(3a + 4b)$



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**40. Evaluate :** (x)  $(9a - 7b)(3a - b)$



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**Exercise 12 B**

1. Expand : (i)  $(2a + b)^2$



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2. Expand : (ii)  $(a - 2b)^2$



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3. Expand :  $\left(a + \frac{1}{2a}\right)^2$



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4. Expand : (vi)  $\left(2a - \frac{1}{a}\right)^2$



**Watch Video Solution**

5. Expand : (v)  $(a + b - c)^2$



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6. Expand : (vi)  $(a - b + c)^2$



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7. Expand : (vii)  $\left(3x + \frac{1}{3x}\right)^2$



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8. Expand : (viii)  $\left(2x - \frac{1}{2x}\right)^2$



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9. Find the square of : (i)  $x + 3y$



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10. Find the square of : (ii)  $2x - 5y$



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11. Find the square of :  $a + \frac{1}{5a}$



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12. Find the square of :  $2a - \frac{1}{a}$



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13. Find the square of :  $x - 2y + 1$



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14. Find the square of : (vi)  $3a - 2b - 5c$



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15. Find the square of :  $2x + \frac{1}{x} + 1$



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16. Find the square of :  $5 - x + \frac{2}{x}$



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17. Find the square of :  $2x - 3y + z$



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18. Find the square of : (x)  $x + \frac{1}{x} - 1$



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**19.** Evaluate using expansion of  $(a + b)^2$  or

$$(a - b)^2 :$$

(i)  $(208)^2$



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**20.** Evaluate using expansion of  $(a + b)^2$  or

$$(a - b)^2 :$$

(ii)  $(92)^2$



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21. Evaluate using expansion of  $(a + b)^2$  or  $(a - b)^2$  :

(iii)  $(415)^2$



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22. Evaluate using expansion of  $(a + b)^2$  or  $(a - b)^2$  :

(iv)  $(188)^2$



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**23.** Evaluate using expansion of  $(a + b)^2$  or

$$(a - b)^2 :$$

(v)  $(9.4)^2$



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**24.** Evaluate using expansion of  $(a + b)^2$  or

$$(a - b)^2 :$$

(vi)  $(20.7)^2$



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25. Expand : (i)  $(2a + b)^3$



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26. Expand :  $(a - 2b)^3$



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27. Expand :  $(3x - 2y)^3$



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28. Expand : (iv)  $(x + 5y)^3$



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29. Expand :  $\left(a + \frac{1}{a}\right)^3$



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30. Expand :  $\left(2a - \frac{1}{2a}\right)^3$



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**31.** Find the cube of : (i)  $a + 2$



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**32.** Find the cube of : (ii)  $2a - 1$



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**33.** Evaluate:  $(2a + 3b)^3$



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34. Find the cube of : (iv)  $3b - 2a$



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35. Find the cube of : (v)  $2x + \frac{1}{x}$



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36. Find the cube of :  $x - \frac{1}{2}$



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## Exercise 12 C

1. If  $a + b = 5$  and  $ab = 6$ , find  $a^2 + b^2$



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2. If  $a - b = 6$  and  $ab = 16$ , find  $a^2 + b^2$



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3. If  $a^2 + b^2 = 29$  and  $ab = 10$ , find : (i)  $a + b$





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4. If  $a^2 + b^2 = 29$  and  $ab = 10$ , find : (ii)  
 $a - b$



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5. If  $a^2 + b^2 = 10$  and  $ab = 3$ , find : (i)  $a - b$



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6. If  $a^2 + b^2 = 10$  and  $ab = 3$ , find : (ii)  $a + b$



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7. If  $a + \frac{1}{a} = 3$ , find :  $a^2 + \frac{1}{a^2}$



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8. If  $a - \frac{1}{a} = 4$ , find :  $a^2 + \frac{1}{a^2}$



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9. If  $a^2 + \frac{1}{a^2} = 23$ , find :  $a + \frac{1}{a}$



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10. If  $a^2 + \frac{1}{a^2} = 11$ , find :  $a - \frac{1}{a}$



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11. If  $a + b + c = 10$  and  $a^2 + b^2 + c^2 = 38$ ,

find :  $ab + bc + ca$



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12. Find :  $a^2 + b^2 + c^2$ , if  
 $a + b + c = 9$  and  $ab + bc + ca = 24$



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13. Find :  $a + b + c$ , if  
 $a^2 + b^2 + c^2 = 83$  and  $ab + bc + ca = 71$ .



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14. If  $a + b = 6$  and  $ab = 8$ , find :  $a^3 + b^3$ .



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15. If  $a - b = 3$  and  $ab = 10$ , find :  $a^3 - b^3$ .



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16. Find :  $a^3 + \frac{1}{a^3}$ , if  $a + \frac{1}{a} = 5$ .



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17. Find :  $a^3 - \frac{1}{a^3}$ , if  $a - \frac{1}{a} = 4$ .



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18. If  $2x - \frac{1}{2x} = 4$ , find : (i)  $4x^2 + \frac{1}{4x^2}$



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19. If  $2x - \frac{1}{2x} = 4$ , find : (ii)  $8x^3 - \frac{1}{8x^3}$



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20. If  $3x + \frac{1}{3x} = 3$ , find : (i)  $9x^2 + \frac{1}{9x^2}$



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21. If  $3x + \frac{1}{3x} = 3$ , find : (ii)  $27x^3 + \frac{1}{27x^3}$



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22. The sum of the squares of two numbers is 13 and their product is 6. Find :

(i) the sum of the two numbers.



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**23.** The sum of the squares of two numbers is 13 and their product is 6. Find :

(ii) the difference between them.



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## Exercise 12 D

1. Evaluate : (i)  $\left(3x + \frac{1}{2}\right)\left(2x + \frac{1}{3}\right)$



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2. Evaluate : (ii)  $(2a + 0.5)(7a - 0.3)$



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3. Evaluate : (iii)  $(9 - y)(7 + y)$



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4. Evaluate : (iv)  $(2 - z)(15 - z)$



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5. Evaluate : (v)  $(a^2 + 5)(a^2 - 3)$



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6. Evaluate : (vi)  $(4 - ab)(8 + ab)$



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7. Evaluate : (vii)  $(5xy - 7)(7xy + 9)$





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8. Evaluate : (viii)  $(3a^2 - 4b^2)(8a^2 - 3b^2)$



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9. Evaluate : (i)  $\left(2x - \frac{3}{5}\right)\left(2x + \frac{3}{5}\right)$



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10. Evaluate : (ii)  $\left(\frac{4}{7}a + \frac{3}{4}b\right)\left(\frac{4}{7}a - \frac{3}{4}b\right)$



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**11. Evaluate : (iii)  $(6 - 5xy)(6 + 5xy)$**



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**12. Evaluate : (iv)  $\left(2a + \frac{1}{2a}\right)\left(2a - \frac{1}{2a}\right)$**



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**13. Evaluate : (v)  $(4x^2 - 5y^2)(4x^2 + 5y^2)$**



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**14. Evaluate : (vi)  $(1.6x + 0.7y)(1.6x - 0.7y)$**



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**15. Evaluate : (vii)  $(m + 3)(m - 3)(m^2 + 9)$**



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16. Evaluate : (viii)

$$(3x + 4y)(3x - 4y)(9x^2 + 16y^2)$$



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17. Evaluate : (ix)  $(a + bc)(a - bc)(a^2 + b^2c^2)$



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18. Evaluate : (x)  $203 \times 197$



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19. Evaluate : (xi)  $20.8 \times 19.2$



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20. Find the square of : (i)  $3x + \frac{2}{y}$



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21. Find the square of : (ii)  $\frac{5a}{6b} - \frac{6b}{5a}$



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22. Find the square of : (iii)  $2m^2 - \frac{2}{3}n^2$



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23. Find the square of : (iv)  $5x + \frac{1}{5x}$



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24. Find the square of : (v)  $8x + \frac{3}{2}y$



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25. Find the square of : (vi) 607



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26. Find the square of : (vii) 391



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27. Find the square of : (viii) 9.7



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28. If  $a + \frac{1}{a} = 2$ , find : (i)  $a^2 + \frac{1}{a^2}$



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29. If  $a + \frac{1}{a} = 2$ , find : (ii)  $a^4 + \frac{1}{a^4}$



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30. If  $m - \frac{1}{m} = 5$ , find : (i)  $m^2 + \frac{1}{m^2}$



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31. If  $m - \frac{1}{m} = 5$ , find : (ii)  $m^4 + \frac{1}{m^4}$



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32. If  $m - \frac{1}{m} = 5$ , find : (iii)  $m^2 - \frac{1}{m^2}$



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33. If  $a^2 + b^2 = 41$  and  $ab = 4$ , find : (i)  $a - b$



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34. If  $a^2 + b^2 = 41$  and  $ab = 4$ , find : (ii)  
 $a + b$



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35. If  $2a + \frac{1}{2a} = 8$ , find : (i)  $4a^2 + \frac{1}{4a^2}$



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36. If  $2a + \frac{1}{2a} = 8$ , find : (ii)  $16a^4 + \frac{1}{16a^4}$



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37. If  $3x - \frac{1}{3x} = 5$ , find : (i)  $9x^2 + \frac{1}{9x^2}$



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38. If  $3x - \frac{1}{3x} = 5$ , find : (ii)  $81x^4 + \frac{1}{81x^4}$



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39. Expand : (i)  $(3x - 4y + 5z)^2$



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40. Expand : (ii)  $(2a - 5b - 4c)^2$



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41. Expand :  $(5x + 3y)^3$



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42. Expand : (iv)  $(6a - 7b)^3$





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43. If  $a + b + c = 9$  and  $ab + bc + ca = 15$ ,  
find :  $a^2 + b^2 + c^2$ .



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44. If  $a + b + c = 11$  and  $a^2 + b^2 + c^2 = 81$ ,  
find :  $ab + bc + ca$ .



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45. If  $3x - 4y = 5$  and  $xy = 3$ , find :  
 $27x^3 - 64y^3$ .



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46. If  $a + b = 8$  and  $ab = 15$ , find :  $a^3 + b^3$ .



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47. If  $3x + 2y = 9$  and  $xy = 3$ , find :  
 $27x^3 + 8y^3$ .





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**48.** If  $5x - 4y = 7$  and  $xy = 8$ , find  $125x^3 - 64y^3$ .



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**49.** The difference between two numbers is 5 and their product is 14. Find the difference between their cubes.



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