MATHS

BOOKS - SWAN PUBLICATION

ALGEBRAIC EXPRESSIONS AND IDENTITIES

Question

1. Find the value of the expression $2y - 5$, for the given values of y i.e., $y = 2, 5 - 3, 0, \frac{5}{2}, \frac{-7}{3}$

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Try These

1. Give five examples of expressions containing one variable and five examples of expression containing two variables.

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2. Show on the number line x, $x-4$, $2x+1$, $3x-2$.

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3. Identify the coefficient of each term in the expression $x^2y^3+10x^2y+5y^2-20$

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4. Classify the following polynomials as monomials , binomials,trinomials : $-z+5(x+y+z)$, $y+z+100$, $ab-ac$, 17.

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5. Construct:

3 binomials with only x as a varialble.

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6. Construct:

3 binomials with x and y as variables.

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7. Construct:

3 monomials with x and y as variables.

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8. Construct:

2 polynomials with 4 or more terms.

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9. Why are 7x and 7y not like ?

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10. Why are rice and dals not washed repeatedly?

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11. Why are 7x and $5x^2$ not like ?

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12. Write two terms which are like

6 xy

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13. Write two terms which are like

$4mn^2$

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14. Write two terms which are like

$5l$

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15. Can you think of two more such situations., where we may need to multiply algebraic compressions ?

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16. Find $3x \times 2y \times 5z$

First find $3x \times 2y$ and multiply it by $5z$,

or first find $2y \times 5z$ and multiple it by 3x.

Is the result the same ? What do you observe ?

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17. Does not order in which you carry out the multiplication matter ?

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18. Find the product :

$x(3x + 5xy)$

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19. Find the product :

$a^2(2ab - c)$

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20. Find the product :

$\left(4p^2 + 5p - 7\right) \times 3p$

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21. Verify Identity (IV), for $a = 1, b = 3, x = 5$.

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22. Consider the special case of identity(iv) with b=-a.What do you get ?Is it related to identity(iii)?

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23. Consider,the special case of identity (iv) with a=-c and b = -c.What do you get ?Is it related to Identity(ii)?

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24. Consider the special case of identity(iv) with b=-a.What do you get ?Is it related to identity(iii)?

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Exercise 9 1

1. Identify the terms, their coefficients for each of the expresion :

$5xyz^2 - 3xy$

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2. Identify the terms, their coefficients for each of the expresion :

$1 + 2x + x^2$

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3. Identify the terms, their coefficients for each of the expresion :

$4x^2y^2 - 4x^2y^2z^2 + z^2$

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4. Identify the terms, their coefficients for each of the expresion :

$3 - pq + qr - rp$

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5. Identify the terms and their factors in the following algebraic expressions by tree diagrams

$\frac{3}{2}x^3 + 2x^2y^2 - 7y^3$

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6. Identify the terms, their coefficients for each of the following expressions: 0.3a – 0.6ab + 0.5b

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7. Classify the following polynomials as monomials, binomials, trinomials. Which polynomials do not fit in any of these three categories

$x + y, 1000, x + x^2 + x^3 + x^4, 7 + y + 5x, 2y - 3y^2, 2y - 3y^2 + 4y^3, 5x - 4y$

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8. Add the

$ab, \ -bc, bc, \ -ca, ca, \ -ab$

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9. Add the following: a – b + ab, b – c + bc, c – a + ac

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10. Classify the polynomials as monomlals, binomials, trinomials. Whish polynomials do not fit in any these three categories ?

Add the

$2p^2q^2 - 3pq + 4, 5 + 7pq - 3p^2q^2$

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11. Add the following: $l^2 + m^2, m^2 + n^2, n^2 + l^2, 2lm + 2mn + 2nl$

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12. Subtract : $4a - 7ab + 3b + 12$ from $12a - 9ab + 5b - 2$

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13. Subtract : $3xy + 5yz - 7zx$ from $5xy - 2yz - 2zx + 10xyz$

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14. Subtract $4p^2q - 3pq + 5pq^2 - 8p + 7q - 10$ from $18 - 3p - 11q + 5pq - 2pq^2 + 5p^2q$

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Exercise 9 2

1. Find the product of the pair of monomials :

$7, 4p$

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2. Find the product of the pair of monomials :

$-4p, 7p$

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3. Find the product of the pair of monomials :

$-7p, 4pq$

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4. Find the product of the following pairs of monomials: $4p^3$, – 3p

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5. Find the product of the following pairs of monomials: 4p, 0

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6. Find the areas of rectangles with the following pairs of monomials as their lengths and breadths espectively.

$(p, q), (10m, 5n), \left(20x^2, 5y^2\right), \left(4x, 3x^2\right), (3mn, 4np)$

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7. Complete the table of products:

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8. Obtain the volume of rectangular boxes with the following length, breadth and height respectively: $5a, 3a^2, 7a^4$

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9. Obtain the volume of rectangular boxes with the following length, breadth and height respectively: 2p, 4q, 8r

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10. Obtain the volume of rectangular boxes with the following length, breadth and height respectively: xy, $2x^2y$, $2xy^2$

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11. Obtain the volume of rectangular boxes with the following length, breadth and height respectively: a, 2b, 3c

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12. Obtain the product of : xy, yz, zx

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13. Obtain the product of : $a, -a^2, a^3$

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14. Obtain the product of : $2, 4y, 8y^2, 16y^3$

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15. Obtain the product of : a, 2b, 3c, 6abc

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16. Obtain the product of : m, – mn, mnp

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Exercise 9 3

1. Carry out the multiplication of the expressions in each of the following pairs : 4p, q + r

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2. Carry out the multiplication of the expressions in each of the following pairs : ab, a – b

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3. Carry out the multiplication of the expression in each of the pair :

$a - b, 7a^2b^2$

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4. Carry out the multiplication of the expressions in each of the following pairs : $a^2 - 9, 4a$

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5. Carry out the multiplication of the expressions in each of the following pairs : pq + qr + rp, 0

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6. Complete the table :

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7. Find the product :

$\left(a^2\right) \times \left(2a^2\right) \times \left(4a^{26}\right)$

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8. Find the product :

$$\left(\frac{2}{3}xy\right) \times \left(\frac{-9}{10}x^2y^2\right)$$

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9. Find the product :

$$\left(-\frac{10}{3}pq^3\right) \times \left(\frac{6}{5}p^3q\right)$$

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10. Find the product :

$$x \times x^2x^2 \times x^3 \times x^4$$

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11. Simplify : $3x(4x - 5) + 3$ and find its values for

$$x = -3$$

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12. Simplify : $3x(4x-5)+3$ and first its values for $x=\frac{-1}{2}$

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13. Simplify $a\left(a^2+a+1\right)+5$ and find its value for : a = 0,

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14. Simplify $a\left(a^2+a+1\right)+5$ and find its value for : a = 1

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15. Simplify $a\left(a^2+a+1\right)+5$ and find its value for : a = – 1.

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16. Add : $2p(p-q), q(q-r)$ and $r(r-p)$

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17. Add: 2x (z – x – y) and 2y (z – y – x)

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18. Subtract: 3l (l – 4 m + 5 n) from 4l (10 n – 3 m + 2 l)

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19. Subtract: 3a (a + b + c) – 2 b (a – b + c) from 4c (– a + b + c)

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Exercise 9 4

1. Multiple the binomial :

$(2x + 5)$ and $(4x - 2)$

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2. Multiply the binomials : (y – 8) and (3y – 4)

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3. Multiply the binomials : (2.5l – 0.5m) and (2.5l + 0.5m)

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4. Multiply the binomial :

$(a + 3b)$ and $(x - 5)$

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5. Multiply the binomials : $\left(2pq + 3q^2\right)$ and $\left(3pq - 2q^2\right)$

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6. Multiply the binomial :

$\left(\frac{3}{4}a^2 + 3b^3\right)$ and $4\left(a^2 - \frac{2}{3}b^2\right)$

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7. Find the product : (5 – 2x) (3 + x)

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8. Find the product :

$(x - 7y)(7x + y)$

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9. Find the product : $(a^2 + b)(a + b^2)$

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10. Find the product : $(p^2 - q^2)(2p + q)$

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11. Simplify : $(x^2 - 5)(x + 5) + 25$

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12. Simplify : $(a^2 + 5)(b^3 + 3) + 5$

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13. Simplify : $\left(t+s^2\right)\left(t^2-s\right)$

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14. Simplify : (a + b) (c – d) + (a – b) (c + d) + 2 (ac + bd)

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15. Simplify :

$(c+y)(2x+y)+(x+2y)(x-y)$

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16. Simplify : $(x+y)\left(x^2-xy+y^2\right)$

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17. Simplify : (1.5x – 4y)(1.5x + 4y + 3) – 4.5x + 12y

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18. Simplify : (a + b + c)(a + b – c)

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Exercise 9 5

1. Use a suitable identity to get each of the following products : (x + 3) (x + 3)

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2. Use a suitable identity to get each of the following products : (2y + 5) (2y + 5)

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3. Use a suitable identity to get each of the following products : (2a – 7) (2a – 7)

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4. Use a suitable identity to get each of the following products : $\left(3a - \frac{1}{2}\right)\left(3a - \frac{1}{2}\right)$

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5. Use a suitable identity to get each of the following products : (1.1m – 0.4) (1.1m + 0.4)

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6. Use a suitable identity to get each of the following products : $(a^2 + b^2)(-a^2 + b^2)$

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7. Use a suitable identity to get each of the following products : (6x – 7) (6x + 7)

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8. Use a suitable identity to get each of the following products : (– a + c) (– a + c)

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9. Use a suitable identity to get each of the following products : $\left(\frac{x}{2}+\frac{3y}{4}\right)\left(\frac{x}{2}+\frac{3y}{4}\right)$

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10. Use a suitable identity to get each of the following products : (7a – 9b) (7a – 9b)

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11. Use the identity $(x + a)(x + b) = x^2 + (a + b)x + ab$ to find the product :

$(x + 2)(x + 7)$

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12. Use the identity $(x + a)(x + b) = x^2 + (a + b)x + ab$ to find the following products: (4x + 5) (4x + 1)

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13. Use the identity $(x+a)(x+b) = x^2 + (a+b)x + ab$ to find the following products: (4x – 5) (4x – 1)

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14. Use the identity $(x+a)(x+b) = x^2 + (a+b)x + ab$ to find the following products: (4x + 5) (4x – 1)

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15. Use the identity $(x+a)(x+b) = x^2 + (a+b)x + ab$ to find the following products: (2x + 5y) (2x + 3y)

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16. Use the identity $(x+a)(x+b) = x^2 + (a+b)x + ab$ to find the following products: $\left(2a^2 + 9\right)\left(2a^2 + 5\right)$

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17. Use the identity $(x + a)(x + b) = x^2 + (a + b)x + ab$ to find the following products: (xyz – 4) (xyz – 2)

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18. Find the following squares by using the identities : $(b - 7)^2$

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19. Find the following squares by using the identities : $(xy + 3z)^2$

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20. Find the following squares by using the identities : $\left(6x^2 - 5y\right)^2$

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21. Find the following squares by using the identities : $\left(\frac{2}{3}m + \frac{3}{2}n\right)^2$

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22. Find the following squares by using the identities : $(0.4p - 0.5q)^2$

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23. Find the following squares by using the identities : $(2xy + 5y)^2$

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24. Simplify :

$(a^2 + b^2)^2$

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25. Simplify : $(2x+5)^2-(2x-5)^2$

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26. Simplify : $(7m-8n)^2+(7m+8n)^2$

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27. Simplify : $(4m+5n)^2+(5m+4n)^2$

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28. Simplify :

$(2.5p-15q)^2-(1.5p-2.5q)^2$

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29. Simplify : $(ab+bc)^2-2ab^2c$

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30. Simplify : $\left(m^2-n^2m\right)^2+2m^3n^2$

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31. Show that: $(3x+7)^2-84x=(3x-7)^2$

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32. Show that: $(9p-5q)^2+180pq=(9p+5q)^2$

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33. Show that: $\left(\frac{4}{3}m-\frac{3}{4}n\right)^2+2mn=\frac{16}{9}m^2+\frac{9}{16}n^2$

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34. Show that: $(4pq + 3q)^2 - (4pq - 3q)^2 = 48pq^2$

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35. Show that: (a – b) (a + b) + (b – c) (b + c) + (c – a) (c + a) = 0

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36. Using identities, evaluate: 71^2

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37. Using identities, evaluate: 99^2

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38. Using identities, evaluate: 102^2

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39. Evaluate: $(998)^2$

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40. Using identities, evaluate :

5.2^2

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41. Using identities, evaluate: 297×303

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42. Using identities, evaluate :

78×82

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43. Using identities,evaluate:

52^2.

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44. Using identities, evaluate :

1.05×9.5

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45. Using $a^2 - b^2 = (a + b)(a - b)$, find: $51^2 - 49^2$

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46. Using $a^2 - b^2 = (a + b)(a - b)$, find: $(1.02)^2 - (0.98)^2$

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47. Using $a^2 - b^2 = (a + b)(a - b)$, find: $153^2 - 147^2$

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48. Using $a^2 - b^2 = (a + b)(a - b)$, find: $12.1^2 - 7.9^2$

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49. Using $(x + a)(x + b) = x^2 + (a + b)x + ab$, find: 103×104

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50. Using $(x+a)(x+b) = x^2 + (a+b)x + ab$, find: 5.1×5.2

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51. Using $(x+a)(x+b) = x^2 + (a+b)x + ab$, find: 103×98

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