

CLASS NOTES

Class: VIII

Topic: CH-9, Algebraic Expressions and Identities

Subject: MATHEMATICS

EXERCISE -- 9.5

Q5. Show that :

Solution:

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| <p>(i) $(3x + 7)^2 - 84x = (3x - 7)^2$ LHS = $(3x + 7)^2 - 84x$ $= (9x^2 + 42x + 49) - 84x$ [Using: $(a + b)^2 = a^2 + 2ab + b^2$] $= 9x^2 - 42x + 49$ RHS = $(3x - 7)^2$ $= (3x)^2 - 2(3x)(7) + (7)^2$ $= 9x^2 - 42x + 49$ \therefore LHS = RHS</p> | <p>(ii) $(9p - 5q)^2 + 180pq = (9p + 5q)^2$ LHS = $(9p - 5q)^2 + 180pq$ $= \{(9p)^2 - 2(9p)(5q) + (5q)^2\} + 180pq$ [Using: $(a - b)^2 = a^2 - 2ab + b^2$] $= 81p^2 - 90pq + 25q^2 + 180pq$ $= 81p^2 + 90pq + 25q^2$ RHS = $(9p + 5q)^2$ $= (9p)^2 + 2(9p)(5q) + (5q)^2$ $= 81p^2 + 90pq + 25q^2$ \therefore LHS = RHS</p> |
| <p>(iv) $(4pq + 3q)^2 - (4pq - 3q)^2 = 48pq^2$ LHS = $(4pq + 3q)^2 - (4pq - 3q)^2$ $= \{(4pq)^2 + 2(4pq)(3q) + (3q)^2\}$ $\quad - \{(4pq)^2 - 2(4pq)(3q) + (3q)^2\}$ $= \{16p^2q^2 + 24pq^2 + 9q^2\}$ $\quad - \{16p^2q^2 - 24pq^2 + 9q^2\}$ $= 16p^2q^2 + 24pq^2 + 9q^2 - 16p^2q^2$ $\quad + 24pq^2 - 9q^2$ $= 48pq^2 =$ RHS \therefore LHS = RHS [Using: $(a + b)^2 = a^2 + 2ab + b^2$] [Using: $(a - b)^2 = a^2 - 2ab + b^2$]</p> | <p>(v) $(a - b)(a + b) + (b - c)(b + c) + (c - a)(c + a) = 0$ LHS = $(a - b)(a + b) + (b - c)(b + c) + (c - a)(c + a)$ $= a^2 - b^2 + b^2 - c^2 + c^2 - a^2$ $= (a^2 - a^2) + (-b^2 + b^2) + (-c^2 + c^2)$ $= 0 + 0 + 0 = 0 =$ RHS \therefore LHS = RHS [Using $a^2 - b^2 = (a + b)(a - b)$]</p> |

Q6. Using identities, evaluate:

Solution:

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| <p>(i) $71^2 = (70 + 1)^2$ $= (70)^2 + 2 \times 70 \times 1 + (1)^2$ [Using: $(a + b)^2 = a^2 + 2ab + b^2$] $= 4900 + 140 + 1$ $= 5041$</p> | <p>(ii) $99^2 = (100 - 1)^2$ $= (100)^2 - 2 \times 100 \times 1 + (1)^2$ [Using: $(a - b)^2 = a^2 - 2ab + b^2$] $= 10000 - 200 + 1$ $= 9801$</p> |
| <p>(iii) $102^2 = (100 + 2)^2$ $= (100)^2 + 2(100)(2) + (2)^2$ [Using: $(a + b)^2 = a^2 + 2ab + b^2$] $= 10000 + 4000 + 4$ $= 10404$</p> | <p>(iv) $998^2 = (1000 - 2)^2$ $= (1000)^2 - 2(1000)(2) + (2)^2$ [Using: $(a - b)^2 = a^2 - 2ab + b^2$] $= 1000000 - 4000 + 4$ $= 996004$</p> |
| <p>(v) $(5.2)^2 = (5.0 + 0.2)^2$ $= (5.0)^2 + 2(5.0)(0.2) + (0.2)^2$ [Using: $(a + b)^2 = a^2 + 2ab + b^2$]</p> | <p>(vi) $297 \times 303 = (300 - 3) \times (300 + 3)$ $= (300)^2 - (3)^2$ [Using: $(a - b)(a + b) = a^2 - b^2$]</p> |

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| $= 25 + 2 + 0.01$ $= 27.04$ | $= 90000 - 9$ $= 89991$ |
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| <p>(viii) $8.92 = (9 - 0.1)^2$ $= (9)^2 - 2(9)(0.1) + (0.1)^2$ [Using: $(a - b)^2 = (a^2 - 2ab + b^2)$] $= 81 - 1.8 + 0.01$ $= 79.21$</p> | <p>(ix) $1.05 \times 9.5 = \frac{1}{10} \times 10.5 \times 9.5$ $= \frac{1}{10} \times (10 + 0.5)(10 - 0.5)$ $= \frac{1}{10} \times [(10)^2 - (0.5)^2]$ $= \frac{1}{10} \times [100 - 0.25]$ [$\therefore (a + b)(a - b) = a^2 - b^2$] $= \frac{1}{10} \times 99.75 = 9.975$</p> |
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Q7. Using $a^2 - b^2 = (a + b)(a - b)$, find:

Solution:

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| <p>(i) $(51)^2 - (49)^2$ $= (51 + 49)(51 - 49)$ $= (100) \times (2) = 200$</p> | <p>(ii) $(1.02)^2 - (0.98)^2$ $= (1.02 + 0.98)(1.02 - 0.98)$ $= (2) \times (0.04) = 0.08$</p> |
| <p>(iii) $(153)^2 - (147)^2$ $= (153 + 147)(153 - 147)$ $= (300) \times (6) = 1800$</p> | <p>(iv) $(12.1)^2 - (7.9)^2$ $= (12.1 + 7.9)(12.1 - 7.9)$ $= (20.0) \times (4.2) = 84$</p> |

Q8. Using $(x + a)(x + b) = x^2 + (a + b)x + ab$, find:

Solution:

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| <p>(i) 103×104 $= (100 + 3) \times (100 + 4)$ $= (100)^2 + (3 + 4)(100) + (3)(4)$ $= 10000 + 700 + 12$ $= 10712$</p> | <p>(ii) 5.1×5.2 $= (5 + 0.1) \times (5 + 0.2)$ $= (5)^2 + (0.1 + 0.2)(5) + (0.1)(0.2)$ $= 25 + 1.5 + 0.02$ $= 26.52$</p> |
| <p>(iii) 103×98 $= (100 + 3)(100 - 2)$ $= (100)^2 + [3 + (-2)](100) + (3)(-2)$ $= 10000 + 100 - 6$ $= 10094$</p> | <p>(iv) 9.7×9.8 $= (10 - 0.3)(10 - 0.2)$ $= (10)^2 + [(-0.3) + (-0.2)](10) + (-0.3)(-0.2)$ $= 100 + (-0.5)10 + 0.06$ $= 100 - 5 + 0.06$ $= 95.06$</p> |

ASSIGNMENT: Left sub-parts of Q6. Practice similar sums from R.S.Agrawal(reference book

NOTE: The students are advised to write these whole exercise in their Maths CW notebook.

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"THIS CONTENT IS ABSOLUTELY PREPARED AT HOME"

