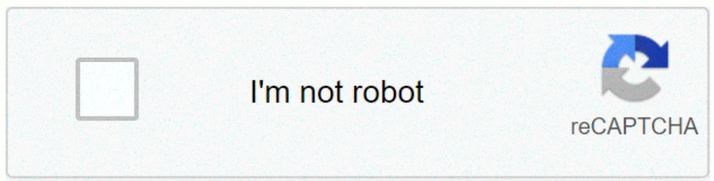

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Download pdf of RD Sharma Solutions For Class 8 Mathematics Chapter 3 Squares and Square Roots Access answers to Math RD Sharma Solutions For Class 8 Chapter 3 - Squares and Square Roots EXERCISE 3.1 PAGE NO: 3.4 1. Which of the following numbers are perfect squares? (i) 484 (ii) 625 (iii) 576 (iv) 941 (v) 961 (vi) 2500 Solution: (i) 484 First find the most important factors for 484 484 = 2×2×11×11 By grouping the main factors into straight pairs we get, = (2×2) × (11×11) When observing, none of the primary factors are omitted. ∴ 484 is a perfect square. (ii) 625 First find the most important factors for 625 625 = 5×5×5×5 By grouping the main factors in straight pairs we get, = (5×5) × (5×5) Upon observation, none of the main factors are omitted. ∴ 625 is a perfect square. (iii) 576 First find the main factors for 576 576 = 2××2×2××2×2×3×3 by grouping the main factors into straight pairs, = (2×2) × (2×2) × (2×2) × (3×3) Upon observation, none of the primary factors are omitted. ∴ 576 is a perfect square. (iv) 941 First find the main factors for 941 941 = 941 × 1 We know that 941 itself is a determining factor. ∴ 941 is not a perfect square. (v) 961 First find the main factors for 961 961 = 31×31 By grouping the main factors into straight pairs we get, = (31×31) Upon observation, none of the main factors are omitted. ∴ 961 is a perfect seat. (vi) 2500 First find the most important factors for 2500 2500 = 2×2×5×5×5×5 By grouping the main factors into straight pairs we get, = (2×2) × (5×5) × (5×5) Upon observation, none of the primary factors omitted. ∴ 2500 is a perfect space. 2. Show that each of the following numbers is a perfect square. Also find the number whose square is the given number in each case: (i) 1156 (ii) 2025 (iii) 14641 (iv) 4761 Solution: (i) 1156 First find the main factors for 1156 1156 = 2×2×17×17 By grouping the main factors into equal pairs we get, = (2×2) × (17×17) When observing, none of the main factors are omitted. ∴ 1156 is a perfect square. To find the square of the given 1156 = (2×17) × × = 34 × 34 = (34)2 ∴ 1156 is a square of 34. (ii) 2025 First find the most important factors for 2025 2025 = 3×3×3×3×5×5 By grouping the factors most important in even pairs, = (3×3) × (3×3) × (5×5) Upon observation, none of the primary factors are omitted. ∴ 2025 is a perfect space. To find the square of the given number 2025 = (3×3×5) × (3×3×5) = 45 × 45 = (45)2 ∴ 2025 is a square of 45. (iii) 14641 First find the main factors for 14641 14641 = 11×11×11×11111111 By grouping the main factors into straight pairs we get, = (11×11) × (11×111) Upon observation, none of the main factors are omitted. ∴ 14641 is a perfect square. To find the square of the given number 14641 = (11×11) × (11×11) = 121 × 121 = (121)2 ∴ 14641 is a square of 121. (iv) 4761 First find the main factors for 4761 4761 = 3×3×23×23 By grouping the main factors in straight pairs we get, = (3×3) × (23×23) By observing, none of the main factors are omitted. ∴ 4761 is a perfect seat. To find the square of the given number 4761 = (3×23) × (3×23) = 69 × 69 = (69)2 ∴ 4761 is a square of 69. Find the smallest number, by which the given number should be multiplied so that the product is a perfect square: (i) 23805 (ii) 12150 (iii) 7688 Solution: (i) 23805 First find the most important factors for 23805 23805 = 3×3×23×23×5 By grouping the main factors in straight pairs = (3×3) × (23×23) × 5 When observation prime factor 5 is omitted. So times by 5 we get, 23805 × 5 = (3×3) × (23×23) × (5×5) = (3× ×23) × (3×5×23) = 345 × 345 = (345)2 ∴ The product is squared at 345. (ii) 12150 First find the most important factors for 12150 12150 = 2×3×3×3×3×5×5 By grouping the main factors into straight pairs, = 2×3 × (3×3) × (3×3) × (5×5) Upon observation, main factors 2 and 3 are omitted. So times by 2×3 = 6 we get, 12150 × 6 = 2×3 × (3×3) × (3×3) × (5×5) × 2 × 3 = (2×××3 ×× (× 2×3×3×3×3×5) = 270 × 270 = (270)2 ∴ The product is squared at 270. (iii) 7688 First find the main factors for 7688 7688 = 2×2×31×31×2 By grouping the main factors into straight pairs we get, = (2×2) × (31×31) × 2 Upon observation, prime factor 2 is omitted. So times by 2 we get, 7688 × 2 = (2×2) × (31×31)× (2×2) = (2×31× <9>2) × (2×31×2) = 124 × 124 = (124)2 ∴ The product is squared at 124. 4th Find the smallest number by which the given number should be divided, so the resulting number is a perfect square: (i) 14283 (ii) 1800 (iii) 2904 Solution: (i) 14283 First find the main factors for 14283 14283 = 3×3×3×23×23 By grouping the most important factors into even pairs, = (3×3) × (23×23) × 3 When observation prime factor 3 is omitted. So divide by 3 to remove 3 we get, 14283/3 = (3×3) × (23×23) = (3×23) × (3×23) = 69 × 69 = (69)2 ∴ 69. ii) 1800 First, the most important factors for 1800 = 2×2×5×5×3×3×2 By grouping the main factors into straight pairs, we get, = (2×2) × (5×5) × (3×3) × 2 For observation, the primary factor 2 is omitted. So divide by 2 to eliminate 2 we get, 1800/2 = (2×2) × (5×5) × (3×3) = (2×5×3) × (2×5×3) = 30 × 30 = (30)2 ∴ The result is squared at 30. (iii) 2904 First find the main factors for 2904 2904 = 2×2×11×11×2×3 By grouping the main factors into straight pairs, = (2×2) × (11×11) × 2 × 3 When observation, prime factors 2 and 3 are omitted. So divide by 6 to remove 2 and 3 we get, 2904/6 = (2×2) × (11×11) = (2×11) × (2×11) = 22 × 22 = (22)2 ∴ Erende is squared at 22. Which of the following numbers are perfect squares? 11, 12, 16, 32, 36, 50, 64, 79, 81, 111, 121 Solution: 11 it is a prime number of itself. So it's not a perfect square. 12 is not a perfect square. 16= (4)2 16 is a perfect square. 32 is not a perfect square. 36= (6)2 36 is a perfect square. 50 is not a perfect square. 64= (8)2 64 is a perfect square. 79 it's a prime number. So it's not a perfect square. 81= (9)2 81 is a perfect square. 111 it's a prime number. So it's not a perfect square. 121= (11)2 121 is a perfect square. 6. Using prime factorization method, find which of the following numbers are perfect squares? 189, 225, 2048, 343, 441, 2961, 11025, 3549 Solution: 189 primary factors are 189 = 32×3×7 Since it does not have equal few factors 189 is not a perfect square. 225 primary factors are 225 = (5×5) × (3×3) Since 225 have even pairs of factors. ∴ It's a perfect square. 2048 primary factors are 2048 = (2×2) × (2×2) × (2×2) × (2×2) × (2×2) × 2 Since it does not have equal pairs of factors 2048 is not a perfect square. 343 primary factors are 343 = (7×7) × 7 Since it does not have even few factors 2048 is not a perfect square. 441 primary factors are 441 = (7×7) × (3×3) Since 441 have even pairs of factors. ∴ It's a perfect square. 2961 prime factors are 2961 = (3×3) × (3×3) × (3×3) × (2×2) Since 2961 have equal few factors. ∴ It's a perfect square. 11025 primary factors are 11025 = (3×3) × (5×5) × (7×7) Since 11025 have equal few factors. ∴ It's a perfect square. 3549 primary factors are 3549 = (13×13) × 3 × 7 Since it does not have even pairs of factors 3549 is not a perfect square. 7. By what number should each of the following numbers multiplied to get a perfect square in each case? Also find the number whose square is the new number. (i) 8820 (ii) 3675 (iii) 605 (iv) 2880 (v) 4056 (vi) 3468 (vii) 7776 Solution: (i) 8820 First find the main factors for 8820 8820 = 2× <7>2×3×3×7×7×5 By grouping the main factors in straight pairs, we get, = (2×2) × (3×3) × (7×7) × 5 On observation, factor 5 has been omitted. So, times by 5 we get, 8820 × 5 = (2×2) × (3×3) × (7×7) × (5×5) = (2×3×7×5) × (2×3×77×5) = × 210 = (210)2 ∴ Product is squared at 210. (ii) 3675 First find the main factors for 3675 3675 = 5×5×7××7×3 By grouping the main factors into straight pairs we get, = (5×5) × (7×7) × 3 Upon observation, prime factor 3 is omitted. So times by 3 we get, 3675 × 3 = (5×5) × (7×7) × (3×3) = (5× 105×× ×3) × (5×7×3) = 105 × 105 = (105)2 ∴ Product is squared at 105. (iii) 605 First find the main factors for 605 605 = 5×11×11 By grouping the main factors into straight pairs, we get, = (11×11) × 5 Upon observation, prime factor 5 is omitted. So times by 5 we get, 605 × 5 = (11×11) × (5×5) = (11×5) × (11×5) = 55 × 55 = (55)2 ∴ The product is squared at 55. (iv) 2880 First find the main factors for 2880 2880 = 5×3×3×2×2×2×2×2×2 By grouping the main factors into straight pairs, = (3×3) × (2×2) × (2×2) × (2×2) × 5 Upon observation, the primary factor 5 is omitted. So times by 5 we get, 2880 × 5 = (3×3) × (2×2) × (2×2) × (2×2) × (5×5) = (3×2) × (2×2) × (5×5) = (3×2) ×2×2×5) × (3×2×2×2×2) = 120 × 120 = (120)2 ∴ The product is squared at 120. (v) 4056 First find the main factors for 4056 4056 = 2×2×13×13×2×3 By grouping the main factors into straight pairs, = (2×2) × (13×13) × 2 × 3 Upon observation, prime factors 2 and 3 are omitted. So times by 6 we get, 4056 × 6 = (2×2) × (13×13) × (2×2) × (3×3) = (2××2 × (2×13×2×3×3×2×2×2) = 156× 156 = (156)2 ∴ The product is squared at 156. (vi) 3468 First find the main factors for 3468 3468 = 2×2×17×17×3 By grouping the main factors into straight pairs we get, = (2×2) × (17×17) × 3 Upon observation, prime factor 3 is omitted. So times by 3 we get, 3468 × 3 = (2×2) × (17×17) × (3×3) = (2× 17×3) × (2×17×3) = 102 × 102 = (102)2 ∴ The product is squared at 102. (vii) 7776 First find the main factors for 7776 7776 = 2×2×2×2×3×3××3×2×3 by grouping the main factors in straight pairs, = (2×2) × (2×2) × (3×3) × (3×3) × 2 × 3 Upon observation, the main factors 2 and 3 are omitted. Så gange med 6 vi får, 7776 × 6 = (2×2) × (2×2) × (3×3) × (3×3) × (2×2) × (3×3) = (2×3) = (2×3) = (2×3) = (2×3) = (2×3) = (2×3) = (2×3) = (2×3) = (2××3) = (2××3) = (2×3) = (2×3× <3>2×3×3×2×3) × (2×2×3×3×2×3) = 216 × 216 = (216)2 ∴ Produktet er kvadratet på 216. 8. With which numbers should each of the following be divided to get a perfect square in each case? Also find the number whose square is the new number. (i) 16562 (ii) 3698 (iii) 5103 (iv) 3174 (v) 1575 Solution: (i) 16562 First find the most important factors for 16562 16562 = 7×7×13×13×2 By grouping the main factors in equal pairs we get, = (7×7) × (13×13) × 2 On observation, prime factor 2 is omitted. So divide by 2 to remove 2 we get, 16562/2 = (7×7) × (13×13) = (7×13) × (7×13) = 91 × 91 = (91)2 ∴ Worse is squared at 91. (ii) 3698 First find the main factors for 3698 3698 = 2×43×43 By grouping the main factors into equal we get, = (43×43) × 2 Upon observation, prime factor 2 is omitted. So divide by 2 to remove 2 we get, 3698/2 = (43×43) = (43)2 ∴ the result is square of 43. (iii) 5103 First find the main factors for 5103 5103 = 3×3×3×3×3×3×7 By grouping the main factors into straight pairs, = (3×3) × (3×3) × (3×3) × 7 Upon observation, the primary factor 7 is omitted. So divide by 7 to eliminate 7 we get, 5103/7 = (3×3) × (3×3) × (3×3) = (3×3×3) × (3×3×3) = 27 × 27 = (27)2 ∴ End is squared at 27. (iv) 3174 First find the most important factors for 3174 3174 = 2×3×23×23 By grouping the main factors into straight pairs we get, = (23×23) × 2 × 3 When observed, prime factors 2 and 3 are omitted. Then divide by 6 to remove 2 and 3 we get, 3174/6 = (23×23) = (23)2 ∴ the result is squared at 23. (v) 1575 First find the main factors for 1575 1575 = 3×3×5×5×7 By grouping the main factors into straight pairs we get, = (3×3) × (5×5) × 7 Upon observation, prime factor 7 is omitted. So divide by 7 to remove 7 we get, 1575/7 = (3×3) × (5×5) = (3×5) × (3×5) = 15 × 15 = (15)2 ∴ The result is square of 15. Find the largest number of two digits, which is a perfect square. Solution: We know that the double-digit largest number is 99 ∴ Largest double-digit perfect square number is 99-18 = 81 10. Find the smallest number of three digits, which is perfectly square. Solution: We know that the three-digit largest number is 100 To find the square root of 100 ∴ is the smallest number of three digits, which is a perfect square, 100 itself. 11. Find the smallest number by which 4851 should be multiplied to make the product a perfect square. Solution: First find the main factors for 4851 4851 = 3×3×7×7×11 By grouping the main factors into straight pairs, = (3×3) × (7×7) × 11 ∴ The minimum number by which 4851 must be multiplied to make the product a perfect square is 11. 12. Find the smallest number that 28812 should be divided so that the quotient becomes a perfect square. Solution: First find the most important factors for 28812 28812 = 2×2×3×7×7×7×7 By grouping the main factors into straight pairs we get, = (2×2) × 3 × (7×7) × (7×7) ∴ The minimum number by which 28812 should be divided to make the quotient a perfect square is 3. 13. Find the smallest number that 1152 should be split so that it becomes a perfect square. Also find the number whose square is the resulting number. Solution: First find the most important factors for 1152 1152 = 2×2×2×2×2×2×2×3×3 By grouping the main factors into straight pairs, = (2×2) × (2×2) × (2×2) × (3×3) × 2 ∴ The minimum number by which 1152 should be divided so that the quotient becomes a perfect square is 2. The number by division, 1152/2 = 576 prime factors for 576 = 2×2×2×2×2×2×3×3 By grouping the main factors into straight pairs we = (2×2) × (2×2) × (2×2) × (3×3) = 26 × 32 = 242 ∴ The resulting number is squared at 24. EXERCISE 3.2 PAGE NR: 3.18 1. The following numbers are not perfect squares. Give rise. (i) 1547 (ii) 45743 (iii)8948 (iv) 333333 Solution: The numbers ending with 2, 3, 7 or 8 are not a perfect square. So (i) 1547 (ii) 45743 (iii) 8948 (iv) 333333 Are not perfect squares. 2. Show that the following numbers are not perfect squares: (i) 9327 (ii) 4058 (iii)22453 (iv) 743522 Solution: The numbers end with 2, 3, 7 or 8 is not a perfect

square. So (i) 9327 (ii) 4058 (iii) 22453 (iv) 743522 Are not perfect squares. 3. The square of which of the following numbers would be an old number? — 731 (ii) 3456 (iii)5559 (iv) 42008 Solution: We know that the square of an even number is even numbers. The square of an odd number is odd numbers. (i) 731 Since 731 is an odd number, the square of the given number is also odd. (ii) 3456 Since 3456 is an equal, the square of the given number is also equal. (iii) 5559 Since 5559 is an odd number, the square of the given number is also unequal. (iv) 42008 Since 42008 is an equal number, the square of the given number is also equal. 4. What will the unit digit be for the squares of the following numbers? (i) 52 (ii) 977 (iii) 4583 (iv) 78367 (v) 52698 (vi) 99880 (vii) 12796 (viii) 55555 (ix) 53924 Solution: (i) 52 Unit digit (52)2 = (22) = 4 (ii) 977 Unit digit (977)2 = (72) = 49 = 9 (iii) 94583 Unit Digit (4583)) 2 = (32) = 9 (iv) 78367 Unit digit (78367)2 = (72) = 49 = 9 (v) 52698 Unit digit of (52698)2 = (82) = 64 = 4 (vi) 99880 Unit digit of (99880)2 = (02) = 0 (vii) 12796 Unit digit of (12796)2 = (62) = 36 = 6 (viii) 55555 Unit digit of (55555)2 = (52) = 25 = 5 (ix) 53924 Unit digit of (53924)2 = (42) = 16 = 6 5. Observe the following pattern 1+3 = 22 1+3+5 = 32 1+3+5+7 = 42 And type the value of 1+3+5+7+9+......... up to n terms. Solution: We know that the given pattern is the square of the given number on the right side equals the sum of the given numbers on the left side. ∴ the value of 1+3+5+7+9+......... up to n terms = n2 (since there are only n terms). 6th Observe the following pattern 22 -12 = 2 + 1 32 – 22 = 3 + 2 42 - 32 - 4 + 3 52 – 42 = 5 + 4 And find the value of ((i) 1002 -992 (ii)1112 – 1092 (iii) 992 – 962 Solution: (i) 1002 -992 100 + 199 = 199 (ii) 1112 – 1092 (1112 – 1102) + (1102 - 1092) (111 + 110) + (100 + 109) 440 (iii) 992 – 962 (100 + 109) 440 (iii) 992 – 962 (02). - 982) + (982 - 972) + (972 - 962) (99 + 98) + (98 + 97) + (97 + 96) 585 7. Which of the following triplets are pythagorean? (i) (8, 15, 17) (ii) (18, 80, 82) (iii) (14, 48, 51) iv) (10, 24, 26) (v) (16, 63, 65) (vi) (12, 35, 38) Solution: (i) (8, 15, 17) LHS = 82 + 152 = 289 RHS = 172 = 289 LHS = RHS ∴ The given triplet is a pythagorical. (ii) (18, 80, 82) LHS = 182 + 802 = 6724 RHS = 822 = 6724 LHS = RHS ∴ triplet is a pythagorean. iii) (14, 48, 51) LHS = 142 + 482 = 2500 RHS = 512 = 2601 LHS ≠ RHS ∴ The given triplet is not pythagoric. (iv) (10, 24, 26) LHS = 102 + 242 = 676 RHS = 262 = 676 LHS = RHS ∴ The given triplet is a pythagorean. v) (16, 63, 65) LHS = 162 + 632 = 4225 RHS = 652 = 4225 LHS = RHS ∴ The given triplet is a pythagorean. (vi) (12, 35, 38) LHS = 122 + 352 = 1369 RHS = 382 = 1444 LHS ≠ RHS ∴ The given triplet is not pythagoric. 8th The following pattern (1×2) + (2×3) = (2×3×4)/3 (1×2) + (2×3) + (3×4) = (1×2) + (2×3) + (3×4) = (1×2 3×4×5)/3 (1×2) + (2×3) + (3×4) + (4×5) = (4×5×× <14>6)/3 Find the value of (1×2) + (2×3) + (3×4) + (4×5) + (5×6) Solution: (1××4) + 2) + (2×3) + (3×4) + (4×5) + (5×6) = (5×6×7)/3 = 70 9. Observe the following pattern 1 = 1/2 (1×(1+1)) 1+2 = 1/2 (2×(2+1)) 1+2+3 = 1/2 (3×(3+1)) 1+2+3+3+3+3 34 = 1/2 (4×(4+1)) And find the values for each of the following: (i) 1+2+3+4+5++50 (ii) 31+32+....+50 Solution: We know that R.H.S = 1/2 [No. in L.H.S × (No. of terms + 1)] (if only when L.H.S starts with 1) (i) 1+3+4+5+...+50 = 1/2 (5×(5+1)) 25 × 51 = 1275 (ii) 31+32+.2 ...+50 = (1+2+3+4+5+...+50) – (1+2+3+...+30) 1275 - 1/2 (30×(30+1)) 1275 – 465 810 10. Følgende mønster 12 = 1/6 (1×(1+1)×(2×1+1)) 12+22 = 1/6 (2×(2+1)×(2×2+1))) 12+22+32 = 1/6 (3×(3+1)×(2×3+1))) 12+22+32+42 = 1/6 (4×(4+1)×(2×4+1))) Og find værdierne af hvert af følgende: (i) 12+22+32+42+...+102 (ii) 52+62+72+82+92+102+112+122 Løsning: RHS = 1/6 [(Nr. i L.H.S) × (Nr. af vilkår + 1) × (2 × Nr. af vilkår + 1)] (i) 12+22+32+42+...+102 = 1/6 (10×(10+1)×(2×10+1)) = 1/6 (2310) = 385 (ii) 52+62+72+82+92+102+112+122 = 012+22+32+...+122 – (12+22+32+42) 1/6 (12×(12+1)×(2×× <1> <3>12+1)) – 1/6 (4×(4+1)×(2×4+1)) 650-30 620 11. Which of the following numbers are squares of even numbers? 121, 225, 256, 324, 1296, 6561, 5476, 4489, 373758 Solution: We know that only even numbers are the squares of even numbers. So 256, 324, 1296, 5476, 373758 are even numbers, since 373758 is not a perfect square ∴ 256, 324, 1296, 5476 are squares of even numbers. 12. By simply examining the unit digits, can you see which of the following non-heroes seats? (i) 1026 (ii) 1028 (iii)1024 (iv) 1022 (v) 1023 (vi) 1027 Solution: We know that numbers ending with 2, 3, 7, 8, cannot be a perfect square. ∴ 1028, 1022, 1023 and 1027 cannot be whole squares. 13. Which of the numbers you can not decide if they are squares. Solution: We know that the natural numbers like 0, 1, 4, 5, 6 or 9 cannot be determined for sure whether they are squares or not. Type five numbers that you can't determine if they're square just by looking at the device digit. Solution: We know that any natural number ending with 0, 1, 4, 5, 6, or 9 may or may not be a square number. Here are the five examples you can not decide whether they are square or not just by looking at the devices place: (i) 2061 Device ciffs are 1. So it may or may not be a square number (ii) 1069 The unit digit is 9. So it may or may not be a square number (iii) 1234 The unit digit is 4. So it may or may not be a square number (iv) 56790 The unit digit is 0. So it may or may not be a square number (v) 76555 The unit digit is 5. So it may or may not be a square number 15. Write true (T) or false (F) for the following statements. (i) The number of digits in a square number is equal. (ii) The square of a prime is prime. (iii) The sum of two square numbers is a square number. (iv) The difference between two square numbers is a square number. (v) The product of two square numbers is a square number. vi) No square number is negative. vii) There is no square number between 50 and 60. viii) There are 14 square kilometers up to 200. Solution: (i) False because 169 is a square number with odd digit. (ii) False because the square of 3 (which is prime) is 9 (which is not prime). (iii) False because the sum of 22 and 32 is 13, which is not square number. (iv) False because the difference between 32 and 22 is 5, which is not square number. (v) True enough, because the square of 22 and 32 is 36, which is square of 6 (vi) True, because (-2)2 is 4, which is not negative. (vii) True, because since there is no square number between them. viii) True, because the fourteen numbers up to 200 are: 1, 4, 9, 16, 25, 36, 49, 64, 81, 100, 121, 144, 169, 196. EXERCISE 3.3 PAGE NR.: 3.32 1. Find the squares of the following numbers using column method. The result is checked by finding the square using the usual multiplication: (i) 25 (ii) 37 (iii) 54 (iv) 71 (v) 96 Solution: i) 25 So here a = 2 and b = 5 Column I Column II Column III a2 4 +2 6 2ab 20 +2 22 b2 25 6 2 5 ∴ 252 = 625 Where can it be expressed as 252 = 25× 25 = 625 (ii) 37 Saw here here , a = 3 and b = 7 Column I Column II Column II Column III a2 9 +4 13 2ab 42 +4 46 b2 49 13 6 9 ∴ 372 = 1369 Where, it can be expressed as 252 = 37× 37 = 1369 (iii) 54 So here, a = 5 and b = 4 Column I Column III column III a2 25 +4 29 2ab 40 +1 41 b2 16 29 1 6 ∴ 542 = 2916 Where , it can be expressed as 542 = 54 × 54 = 2916 (iv) 71 So here a = 7 and b = 1 Column I Column III column III a2 49 +1 50 2ab 14 +0 14 b2 01 50 4 1 ∴ 712 = 5041 Where, it can be expressed as 712 = 71 × 71 = 5041 (v) 96 So here, a = 9 and b = 6 Column I Column III column III a2 81 +11 92 2ab 108 +3 111 b2 36 92 1 6 ∴ 962 = 9216 Where it may be expressed as 962 = 96 × 96 = 9216 2. Find the squares of the following numbers using diagonal method: (i) 98 (ii) 273 (iii) 348 (iv) 295 (v) 171 Solution: (i) 98 Step 1: Get the number and count the number of digits in it. Leave n digits in the number to be squared. Step 2: Draw square and divide it into n2 sub-squares of the same size by (n - 1) horizontal and (n - 1) vertical lines. Step 3: Draw the diagonals for each under square. Step 4: Type the digits of the number to be squared along the left vertical side sand the upper horizontal side of the squares. Step 5: Multiplie each digit to the left of the square with each digit on top of the column one by one. The unit digit of the product below the diagonal and the digit above the diagonal of the corresponding sub-square. Step 6: Start under the lowest diagonal sum the digits along the diagonals then achieved. Type the units digit of the sum and take the bear, the dozens digit (if any) to the diagonal above. Step 7: Get the necessary square by typing the digits from the left side. ∴ 982 = 9604 (ii) 273 Step 1: Get the number and count the number of digits in it. Leave n digits in the number to be squared. Step 2: Draw square and divide it into n2-under squares of the same size by drawing (n - 1) horizontal and (n - 1) vertical lines. Step 3: Draw the diagonals for each under square. Step 4: Type the digits of the number to be squared along the left vertical side sand the upper horizontal side of the squares. Step 5: Multiplie each digit to the left of the square with each digit on top of the column one by one. The unit digit of the product below the diagonal and the digit above the diagonal of the corresponding sub-square. Step 6: Start under the lowest diagonal sum the digits along the diagonals then achieved. Type the units digit of the sum and take the bear, the dozens digit (if any) to the diagonal above. Step 7: Get the necessary square by typing the digits from the left side. ∴ 2732 = 74529 (iii) 348 Step 1: Get the number and count the number of digits in it. Leave n digits in the number to be squared. Step 2: Draw square and divide it into n2-under squares of the same size by drawing (n - 1) horizontal and (n - 1) vertical lines. Step 3: Draw the diagonals for each under square. Step 4: Type the digits of the number to be squared along the left vertical side sand the upper horizontal side of the squares. Step 5: Multiplie each digit to the left of the square with each digit on top of the column one by one. The unit digit of the product below the diagonal and the digit above the diagonal of the corresponding sub-square. Step 6: Start under the lowest diagonal sum the digits along the diagonals then achieved. Type the units digit of the sum and take the bear, the dozens digit (if any) to the diagonal above. Step 7: Get the necessary square by typing the digits from the left side. ∴ 3482 = 121104 (iv) 295 Step 1: Get the number and count the number of digits in it. Leave n digits in the number to be squared. Step 2: Draw square and divide it into n2-under squares of the same size by drawing (n - 1) horizontal and (n - 1) vertical lines. Step 3: Draw the diagonals of each Step 4: Type the digits of the number to be squared along the left vertical side sand the upper horizontal side of the squares. Step 5: Multiplie each digit to the left of the square with each digit on top of the column one by one. The unit digit of the product below the diagonal and the digit above the diagonal of the corresponding sub-square. Step 6: Start under the lowest diagonal sum the digits along the diagonals then achieved. Type the units digit of the sum and take the bear, the dozens digit (if any) to the diagonal above. Step 7: Get the necessary square by typing the digits from the left side. ∴ 2952 = 87025 (v) 171 Step 1: Get the number and count the number of digits in it. Leave n digits in the number to be squared. Step 2: Draw square and divide it into n2-under squares of the same size by drawing (n - 1) horizontal and (n - 1) vertical lines. Step 3: Draw the diagonals for each under square. Step 4: Type the digits of the number to be squared along the left vertical side sand the upper horizontal side of the squares. Step 5: Multiplie each digit to the left of the square with each digit on top of the column one by one. The unit digit of the product below the diagonal and the digit above the diagonal of the corresponding sub-square. Step 6: Start under the lowest diagonal sum the digits along the diagonals then achieved. Type the units digit of the sum and take the bear, the dozens digit (if any) to the diagonal above. Step 7: Get the necessary square by typing the digits from the left side. ∴ 1712 = 29241 3. Find the squares of the following numbers: (i) 127 (ii) 503 (iii) 450 (iv) 862 (v) 265 Solution: (i) 127 1272 = 127 × 127 = 16129 (ii) 503 5032 = 503 × 503 = 253 450 × 450 = 203401 (iv) 862 8622 = 862 = 862 × 862 = 743044 (v) 265 2652 = 265 × 265 = 70225 4. The squares of the following numbers are: (i) 425 (ii) 575 (iii)405 (iv) 205 (v) 95 (vi) 745 (vii) 512 (viii) 995 Solution: (i)425 4252 = 42 5 × 425 = 180625 (ii) 575 5752 = 575 × 575 = 330625 (iii)405 4052 = 405 × 405 = 16402 5 (iv) 205 2052 = 205 × 205 = 42025 (v) 95 952 = 95 × 95 = 9025 (vi) 745 7452 = 745 × 95 745 = 555025 (vii) 512 5122 = 512 × 512 = 262144 (viii) 995 9952 = 995 × 995 = 990025 5. Find the squares of the following numbers using the identity (a+b) 2= a2+2ab+b2: (i) 405 (ii) 510 (iii) 1001 (iv) 209 (v) 605 Solution: (i) 405 We know, (a+b) 2= a2+2ab+b2 405 = (400+5)2 = (400)2 + 52 + 2 (400) (5) = 160000 + 25 + 4000 = 164025 (ii) 510 We know, (a+b) 2= a2+2ab+b2 510 = (500+10)2 = (500)2 + 102 + 2 (500) (10) = 250000 + 100 + 10000 = 260100 (iii) 1001 We know , (a+b) 2= a2+2ab+b2 1001 = (1000+1)2 = (1000)2 + 12 + 2 (1000) (1) = 100000 + 1 + 2000 = 1002001 (iv) 209 We know, (a+b) 2= a2+2ab+b2 209 = (200+9)2 = (200)2 + 92 + 2 (200) (9) = 40000 + 81 + 3600 = 43681 (v) 605 We know, (a+b) 2= a2+2ab+b2 605 = = (600)2 + 52 + 2 (600) (5) = 360000 + 25 + 6000 = 366025 6. Find the squares of the following numbers using the identity (a-b) 2= a2-2ab+b2 (i) 395 (ii) 995 (iii)495 (iv) 498 (v) 99 (vi) 999 (vii)599 Solution: (i) 395 We know, (a-b) 2= a2-2ab+b2 395 = (400-5)2 = (400)2 + 52 – 2 (400) (5) = 160000 + 25 – 4000 = 156025 (ii) 995 We know, (a-b) 2= a2-2ab+b2 995 = (1000-5)2 = (1000)2 + 52 – 2 (1000) (5) = 1000000 + 25 – 10000 = 990025 (iii) 495 We know , (a-b) 2 = a2-2ab+b2 495 = (500-5)2 = (500)2 + 52 – 2 (500) (5) = 250000 + 25 – 5000 = 245025 (iv) 498 We know, (a-b) 2= a2-2ab+b2 498 = (500-2)2 = (500)2 + 22 – 2 (500) (2) = 250000 + 4 – 2000 = 248004 (v) 99 We know, (a-b) 2= a2-2ab+b2 99 = (100-1)2 = (100)2 + 12 – 2 (100) (1) = 10000 + 1 – 200 = 9801 (vi) 999 We know , (a-b) 2= a2-2ab+b2 999 = (10000-1)2 = (1000)2 + 12 – 2 (1000) (1) = 1000000 + 1 – 2000 = 998001 (vii) 599 We know, (a-b) 2= a2-2ab+b2 599 = (600-1)2 = (600)2 + 12 – 2 (600) (1) = 360000 + 1 – 1200 = 358801 7. Find the squares of the following numbers by visual method: (i) 52 (ii) 95 (iii) 505 (iv) 702 (v) 99 Solution: (i) 52 We know (a+b) 2= a2+2ab+b2 52 = (50+2)2 = (50)2 + 22 + 2 (50) (2) = 2500 + 4 + 200 = 2704 (ii) 95 We know, (a-b) 2= a2-2ab+b2 95 = (100-5)2 = (100)2 + 52 – 2 (100) (5) = 10000 + 25 – 1000 = 9025 (iii) 505 We know , (a+b) 2= a2+2ab+b2 505 = (500+5)2 = (500)2 + 52 + 2 (500) (5) = 250000 + 25 + 5000 = 255025 (iv) 702 We know, (a+b) 2= a2+2ab+b2 702 = (700+2)2 = (700)2 + 22 + 2 (700) (2) = 490000 + 4 + 2800 = 492804 (v) 99 We know, (a-b) 2= a2-2ab+b2 99 = (100-1)2 = (100)2 + 12 – 2 (100) (1) = 10000 + 1 – 200 = 9801 EXERCISE 3.4 SIDE NR. : 3.38 1.Enter the possible unit digits for the square root of the following numbers. Which of these numbers are odd square roots? (i) 9801 (ii) 99856 (iii) 998001 (iv) 65766025 Solution: (i) 9801 We know, that the unit digit of 9801 is 1 unit digit of square root = 1 or 9 Since the number is odd, the square root is also odd (ii) 99856 We know that unit digit of 99856 = 6 Unit digit of square root = 4 or 6 Since the number is even , the square root is also even (iii) 998001 We know , that unit digit of 998001 = 1 Unit digit of square root = 1 or 9 Since the number is odd, square root is also strange (iv) 657666025 We know that unit digit of 657666025 = 5 Unit digit of square root = 5 Since the number is odd, square root is also odd, square root is also odd, square root is also odd, square root is also odd, square root is also 2. Find the square root of each of the following by prime factorization. (i) 441(ii) 196 (iii) 529 (iv) 1764 (v) 1156 (vi) 4096 (vii) 7056 (viii) 8281 (ix) 11664 (x) 47089 (xi) 24336 (xii) 190969 (xiii) 586756 (xiv) 27225 (xv) 3013696 Solution: (i) 441 First let's find the most important factors for 441 = 3×3×7×7 = 32×72 √441 = 3×7 = 21 (ii) 196 First's find the main factors for 196 = 2×2×7×7 = 22×72 √196 = 2×7 = 14 (iii) 529 Let's first the main factors for 529 = 23×23 = 232 √529 = 23 (iv) 1764 Let's first find the most important factors for 1764 = 2×2×3×3× <2> <3>×7 = 22×32×72 √1764 = 2×3×7 = 42 (v) 1156 Let's first find the main factors for 1156 = 2×× <2> <0>2×17×17 = 22×172 √1156 = 2×17 = 34 (vi) 4096 First let's find the main factors for 4096 = 2×× < 1> <7>2×2×2×2×2×2×2×2×2×2×2 = 212 √4096 = 26 = 64 (vii) 7056 First, let's find the main factors for 7056 = 2×2×2×2×21×21 = 22× 2×22×212 √7056 = 2×2×21 = 84 (viii) 8281 First let's find the main factors for 8281 = 91×91 = 912 √8281 = 91 (ix) 11664 Let's first find the most important factors for 11664 = 2×2×2×2×3×3× 3×3×3×3 = 22×22×32×32×32 √11664 = 2×2×3×3×3 = 108 (x) 47089 Let's first find the main factors for 47089 = 217×217 = 2172 √47089 = 217 (xi) 24336 Firstly let's find the main factors for 24336 = 2 2×2×2×2×3×3××13 = 22×222××32×132 √24336 = 2×2×3××3 190969 First let's find primary factors for 190969 = 23×23×19×19 = 232×192 √190969 = 23×19 = 437 (xiii) 586756 First let's find the main factors for 586756 = 2×2×383×383 = 22×3832 √58 2×383 = 766 (xiv) 27225 First let's find primary factors for 27225 = 5×5×3×3×11×11 = 52×32×112 √27225 = 5×3×11 = 165 (xv) 3013696 Let's first find the main factors for 3013696 = 2×2×2×2×2×2×217×217 = 26×2172 √3013696 = 23×217 = 1736 3.Find the minimum number , with which 180 should be multiplied so that it becomes a perfect square. Also find the square root of the perfect square so achieved. Solution: First, let's find the main factors for 180 = (2 × 2) × (3 × 3) × 5 = 22 × 32 × 5 To make the unarthly 5 in the couple, times the number by 5 180 × 5 = 22 × 32 × 52 ∴ The square root of √ (180 × 5) = 2 × 3 × 5 = 30 4. Find the smallest number with which to multiply 147 to make it a perfect square. Also find the square root of the number so obtained. Solution: First, let's find the main factors for 147 = (7 × 7) × 3 = 72 × 3 To make the paired 3 to the couple, times the number by 3 147 × 3 = 72 × 32 ∴ The square root of √ (147 × 3) = 7 × 3 = 21 5. Find the smallest number that 3645 should be split so that it becomes a perfect square. Also find the square root of the resulting number. Solution: First, let's find the main factors for 3645 = (3 × 3) × (3 × 3) × (3 × 3) × 5 = 32 × 32 × 32 × 5 To make the unpaid 5 in the couple, the number 3645 shall be divided by 5 3645 ÷ 5 = 32 × 32 × 32 ∴ The square root of the √ (3645 ÷ 5) = 3 × 3 × 3 = 27 6. Find the smallest number by which 1152 should be split to become a square. Also find the square root of the number so obtained. Solution: Let's first find the most important factors for 1152 = (2 × 2) × (2 × 2) × (2 × 2) × 2 × (3 × 3) 22 × 22 × 32 × 2 To make the paired 2-2 in paired, the number 1152 shall be divided by 2 1152 ÷ 2 = 22 × 22 × 22 × 32 ∴ The square root of √ (1152 ÷ 2) = 2 × 2 × 2 × 3 = 24 7. The product of two numbers is 1296. If one number is 16 times the other, find the numbers. Solution: Let's consider two numbers a and b So we know that one of the numbers a =16b a × b = 1296 16b × b = 1296 16b2 = 1296 b2 = 1296/16 = 81 b = 9 a = 16b = 16(9) = 144 ∴ a =144 and b=98. A welfare association collected Rs 202500 as a donation from the residents. If each paid as many rupees as there were residents, find the number of residents. Solution: Let's consider the total residents as a So, each paid Rs. a Total collection = a (a) = a2 We know total assembly = 202500 a = √ 202500 a = √a(2 × 2 × 3 × 3 × 3 × 3 × 5 × 5 × 5 × 5) = 2 × 3 × 3 × 5 × 5a = 450 ∴ Total residents = 450 9. One company collected Rs 92.16. Each member collected as many paise as there were members. How many members were there and how much did each one contribute? Solution: Let's consider that there were few members, each attributed to a paise a (a), i.e. total cost collected = 9216 paise a2 = 9216 a = √9216 = 2 × 2 × 2 × 12 = 96 ∴ There were 96 members in the community and each contributed 96 paise 10. A community collected Rs 2304 as fees from its students. If each student paid as many paise as there were students in the school, how many students were there in the school? Solution: Let's consider the number of school children that each student contributed with a paise Total money obtained = a2304 paise a = √2304 a = √2 × 2 × 2 × 2 × 2 × × <0> 2 × 2 × 3 × 3 a = 2 × 2 × 2 × 2 × 3 a = 48 ∴ There were 48 pupils at the school 11. The area of a square field is 5184 m2. A rectangular field, the length of which is twice the width, has its circumference corresponding to the circumference of the square field. Locate the area of the rectangular field. Solution: Let's consider the side of the square as an a2 = 5184 m2 a = √5184m a = 2 × 2 ×2 × 9 = 72 m Girth of square = 4a = 4(72) = 288 m Perimeter of rectangle = 2 (l + b) = circumference of the square field = 288 m 2 (2b + b) = 288 b = 48 and l = 96 Rectangle area = 96 × 48 m2 = 4608 m2 12. Find the smallest square number, exactly shareable with each of the numbers: (i) 6, 9, 15 and 20 (ii) 8, 12, 15 and 20 Solution: i) 6, 9, 15 and 20 First, take L.C.M for 6, 9, 15, 20, which is 180 So the main factors of 180 = 22 × 32 × 5 To make it a perfect square, we need to multiply the number by 5 180 × 5 = 22 × 32 × 52 ∴ 900 is the least square kilometer shareable by 6, 9, 15 and 20 (ii) 8, 2, 15 and 20 First take L.C.M for 8, 2, 15, 20, which is 360 So the main factors of 360 = 22 × 32 ×2 × 5 To make it a perfect square , we have to multiply the number by 2 × 5 = 10 360 × 10 = 22 × 32 × 52 × 22 3600 is the minimum square kilometre number that can be shared by 8, 12, 15 and 20 13. Locate the square roots of 121 and 169 using the repeated subtraction method. Solution: Let's find the square roots of 121 and 169 using repeated subtraction 121 – 1 = 120 120 – 3 = 117 117 – 5 = 112 112 – 7 = 105 10 5 - 9 = 96 96 - 11 = 85 85 - 13 = 72 72 - 15 = 57 57 - 17 = 40 40 - 19 = 21 21 - 21 = 0 Clear, we have performed surgery 11 times ∴ √121 = 11 169 – 1 = 168 168 – 3 = 165 165 – 5 = 160 160 – 7 = 153 153 – 9 = 144 144 - 11 = 133 133 – 13 = = 120 120 - 15 = 105 105 – 17 = 88 88 – 19 = 69 69 – 21 = 48 48 – 23 = 25 25 – 25 = 0 It is clear that we have performed subtraction 13 times ∴ √169 = 13 14. Type the primary factorization of the following numbers and thus find their square roots. (i) 7744 (ii) 9604 (iii) 5929 (iv) 7056 Solution: (i) 7744 Prime factors of 7744 is 7744 = 22 × 22 × 22 × 2014112 ∴ Square Root of 7744 is √7744 = 2 × 2 × 2 × 11 = 88 (ii) 9604 Prime factors of 9604 is 9604 = 22 × × × 72 ∴ Square Root of 9604 is √9604 = 2 × 7 × 7 = 98 (iii) 5929 Prime factors 5929 is 5929 = 5929 = 5929112 × 72 ∴ Square Root of 5929 is √5929 = 11 × 7 = 77 (iv) 7056 Primary factors of 7056 is 7056 = 22 × 22 × 72 × 32 ∴ The square root of 7056 is √7056 = 2 × 2 × 7 × 3 = 84 15. Class VIII students at a school donated Rs 2401 to the PM's National Relief Fund. Each student donated as many rupees as the number of students in the class, find the number of students in the class. Solution: Let's consider the number of students as an Each student termed a rupee So the total amount collected is a × a rupees = 2401 a2 = 2401 a = √2401 a = 49 ∴ There are 49 students in the class. A PT teacher wants to arrange maximum possible number of 6000 students in a field so that the number of rows is equal to the number of columns. Find the number of rows if 71 were left out after the event. Solution: Let's consider the number of rows as a no. of columns = a total number of students who sat in the field = a2 Total student a2 + 71 = 6000 a2 = 5929 a = √5929 a = 77 ∴ the total number of rows is 77. EXERCISE 3.5 SIDE NO: 3.43 1.Find the square root of each of the following by long subdivision method: (i) 12544 (ii) 97344 (iii) 286225 ((iv) 390625 (v) 363609 (vi) 974169 (vii) 120409 (viii) 1471369 (ix) 2916 9653449 (xi) 1745041 (xii) 4008004 (xiii) 20657025 (xiv) 1525472 01 (xv) 20421361 (xvi)62504836 (xvii) 82264900 (xviii) 3226694416 (xix) 96407522209 (xx) 3915380329 Solution: (i) 12544 Using long division method ∴ square root of 12544 √12544 = 112 (ii) 97344 Using long division method ∴ the square root of 97344 √97344 = 312 (iii) 286225 Using long division ∴ square root of 286225 √286225 = 535 (iv) 390625 Using long subdivision method ∴ square root of 390625 √390625 = 625 (v) 363609 By using long division method ∴ the square root of 363609 √36369 = 603 (vi) 974169 By using long division method ∴ the square root of 974169 √974169 = 987 (vii) 120409 City using long division method ∴ the square root of 120409 √120409 = 347 (viii) 1471369 By using long method division ∴ the square root of 1471369 √1471369 = 1213 (ix) 291600 By using long division method ∴ the square root of 291600 √291600 = 540 (x) 9653449 By using long division method ∴ the square root of 9653449 √9653449 = 3107 (xi) 1745041 By using long division ∴ √ <2> <4> the square root of 1745041 √1745041 = 1321 (xii) 4008004 By using long division method ∴ the square root of 4008004 √4008004 = 2002 (xiii) 20657025 By using long division method ∴ the square root of 20657025 √20657025 = 4545 (xiv) 152547201 By using long division method ∴ the square root of 152547201 √152547201 = 12351 (xv) 20421361 using City long division ∴ square root of 20421361 √20421361 = 4519 (xvi) 62504836 Using long division method ∴ the square root of 62504836 √62504836 = 7906 (xvii) 82264900 Using long division method ∴ square root of 82264900 √82264900 = 9070 (xviii) 3226694416 Using long division method ∴ the square root of 3226694416 √3226694416 = 56804 (xix) 6407522209 Using long division method ∴ square root of 6407522209 √6407522209 = 80047 (xx) 3915380329 Using long division method ∴ square root of 3915380329 √3915380329 = 62573 2. Find the smallest number to be subtracted from the following numbers to make them a perfect square: (i) 2361 (ii) 194491 (iii) 26535 (iv) 161605 (v) 4401624 Solution: (i) 2361 Using long division method ∴ 57 must be pulled from 2361 to get a perfect square. (ii) 194491 Using long division method ∴ 10 must be drawn from 194491 to get a perfect square. (iii) 26535 By applying long division method ∴ 291 must be subtracted from 26535 to get a perfect square. (iv) 161605 By applying long division method ∴ 1 must be subtracted from 161605 to get a perfect square. v) 4401624 By applying long division ∴ 20 must be subtracted from 4401624 for a perfect square. 3. Find the minimum number to add to the following numbers to make them a perfect square: (i) 5607 (ii)4931 (iii) 4515600 (iv) 37460 (v) 506900 Solution: (i) 5607 Using long subdivision method The rest is 131 Since (74)2 < 5607 We take, the next perfect square number, ie (75)2 (75)2 = 5625 > 5607 So, that number , to be added = 5625 – 5607 = 18 (ii) 4931 Using long division method The rest is 31 Page, (70)2 < 4931 We take, the next perfect square number, ie(71)2 (71)2 = 5041 > 4931 So the number to be added = 5041 – 4931 = 110 (iii) 4515600 Using long division method The rest is 4224 (2124)2 < 4515600 We take, the next perfect square number, i.e., (2125)2 (2125)2 = 4515625 > 4515600 So the number to be added = 4515625 – 4515600 = 25 (iv) 37460 Using long division method The rest is 211 Ago, (193)2 < 37460 We take, the next perfect square number, ie(194)2 (194)2 = 37636 > 37460 So the number to be added = 37636 – 37460 = 176 (v) 506900 Using long division method The rest is 1379 Ago, (711)2 < 506900 We take, the next perfect square number, ie (712)2 (712)2 = 506944 > 506900 So the number to be added = 506944 – 506900 = 44 4. Find the largest number of 5 digits, which is a perfect square. Solution: We know that the largest 5-digit number is 99999 Using long division method The rest is 143 So the largest 5-digit perfect square number is: 99999 - 143 = 99856 ∴ 99856 is the required largest 5 digit perfect square number. 5. Find the smallest number of 4 digits, which is a perfect square. Solution: We know that the minimum 4-digit number is 1000 Using long division method The rest is 39 Ago, (31)2 < 1000 We take, the next perfect square number, ie (32)2 (32)2 = 1024 > 1000 ∴ 1024 is the required minimum number 4 digit number, which is a perfect square. 6. Find the minimum number of six digits, which is a perfect square. Solution: We know that the minimum 6-digit number is 100000 Using long division method The rest is 144 Since, (316)2 < 100000 We take, the next perfect square number, ie(317)2 (317)2 = 100489 > 100000 ∴ 100489 is the required minimum 6-digit number, which is a perfect square. 7. Find the largest number of 4 digits, which is a perfect square. Solution: We know that the largest 4-digit number is 9999 Using long division method The rest is 198 So the largest 4-digit perfect square number is: 9999 - 198 = 9801 ∴ 9801 is the required largest 4-digit perfect square number. 8. A general arranges his soldiers in rows to form a perfect square. He notes that 60 soldiers have been omitted. If the total number of soldiers be 8160, find the number of soldiers in each row Solution: We know that the total number of soldiers = 8160 Number of soldiers omitted = 60 Number of soldiers arranged in rows to form a perfect square = 8160 - 1 60 = 8100 ∴ number of soldiers in each row = √8100 = √ (9×9×10×10) = 9×10 = 90 9. The area of a square field is 60025m2. A man cycles along the 18-mile-high border. In how much time will he return at square one? Solution: We know that area of square field = 60025 m2 m2 Speed cyclist = 18 km / h = 18 × (1000/60×60) = 5 m / s2 Area = 60025 m2 Side2 = 60025 Page = √60025 = 245 We know, Total length of limit = 4 × Page = 4 × 245 = 980 m ∴ Time it takes to return to the starting point = 980/5 = 196 seconds = 3 minutes 16 seconds 10. The cost of leveling and turning a square at Rs 2.50 per m2 is Rs13322.50 Find the cost of fencing it at Rs 5 per meter. Solution: We know that the cost of leveling and turning a square lawn = 2.50 per m2 Total cost of leveling and turning = Rs. 13322.50 Total area of square lawn = 13322.50/2.50 = 5329 m2 Side2 = 5329 Side of square lawn = √5329 = 73 m, length of the lawn = 4 × 73 = 292 m ∴ Lawn fencing at Rs 5 per meter = 292 × 5 = Rs. 1460 11. Find the largest number of three digits, which is a perfect square. Solution: We know that the largest 3-digit number is 999 Using long division method The rest is 38 So the largest 3-digit perfect square number is: 999 - 38 = 961 ∴ 961 is the required largest 3-digit perfect square number. 12. Find the smallest number to add to 2300 to make it a perfect square. Solution: Using long division method let's find the square root of 2300 The rest is 91 Page, (47)2 < 2300 We take, the next perfect square number, ie (48)2 (48)2 = 2304 > 2300 ∴ The minimum number to be added to 2300 to get a perfect square is 2304 - 2300 = 4 EXERCISE 3.6 PAGE NO: 3.48 1. Find the square root of: (i) 441/961 (ii) 324/841 (iii) 4 29/29 (iv) 2 14/25 (v) 2 137/196 (vi) 23 26/121 (vii) 25 544/729 (viii) 75 46/49 (ix) 3 942/2209 (x) 3 334/3025 (xi) 21 2797/3364 (xii) 38 11/25 (xiii) 23 394/729 (xiv) 21 51/169 (xv) 10 151/225 Solution: (i) 441/961 The square root of √441/961 = 21/31 (ii) 324/841 The square root of √324/841= 18/29 (iii) 4 29/29 The square root of √(4 29/29) = √(225/49) = 15/7 (iv) 2 14/25 The square root of √(2 14/25) = √(64/25) = 8/5 (v) 2 137/196 The square root of √2 137/196 = √ (529/196) = 23/14 (vi) 23 26/121 The square root of √(23 26/121) = √(2809/121) = 53/11 (vii) 25 544/729 The square root of √(25 544/729) = √(18769/729) = 137/27 (viii) 75 46/49 The square root of √(75 46/49) = √(3721/49) = 61/7 (ix) 3 942/2209 The square root of √(3 942/2209) = √(7569/2209) = 87/47 (x) 3 334/3025 Square root of √(3 334/3025) = √(9409/3025) = 97/55 (xi) 21 2797/3364 Square root of √(21 2797/3364) = √(734411 /3364) = 271/58 (xii) 38 11/25 Square root of √(38 11/25) = √(961/25) = 31/5 (xiii) 23 394/729 Square root of √(29). 23 394/729) = √(17161/729) = 131/27 = 4 23/27 (xiv) 21 51/169 Square root of √(21 51/169) = √(3600/3 3169) = 60/13 = 4 8/13 (xv) 10 151/225 Square root of √(10 151/225) = √(2401/225) = 49/15 = 3 4/15 2. Find the value of: (i) √80/√405 (ii) √441/√625 (iii) √1587/√1728 (iv) √72 ×√338 (v) √45 × √20 Solution: (i) √80/√405 √80/√405 = √16/√81 = 4/9 (ii) √441/√625 √441/10 √625 = 21/25 (iii) √1587/√1728 √1587/√1728 = √529/√576 = 23/24 (iv) √ √72 ×√338 √72 ×√338 = √(2×2×2×3×3) ×√(2×13×13) Using the formula √a × √b = = √(2×2×2×3×3×2×13×13) = 22 × 3 × 13 = 156 (v) √45 × √20 √45 × √20 = √(5×3 × √ × √(5×2×2) Using the formula √a × √b = √(a×b) = √(5×3×3××5×2×2) = 5 × 3 × 2 = 30 3. The area of a square field is 80 244/729 square meters. Locate the length of each side of the field. Solution: We know that the given area = 80 244/729 m2 = 58564/729 m2 If L is the length of each page L2 = 58564/729 L = √ (L 58564/729) = √58564/√729 = 242/27 = 8 26/27 ∴ Length is 8 26/27 4. The area of a square field is 30 1/4m2. Calculate the length of the side of the square. Solution: We know that the given area = 30 1/4 m2 = 121/4 m2 If L is the length of each page, L2 = 121/4 L = √(121/4) = √121/√4 = 11/2 ∴ Length is 11/2 5. Find the length of a side of a square playground whose area is equal to the area of a rectangular field of dimensions 72m and 338 m. Solution: Using the field area of rectangular field = l × b = 72 × 338 m2 = 24336 m2 Square area is L2 = 24336 m L = √24336 = 156 m ∴ The length of the side of the square playground is 156 m. EXERCISE 3.7 PAGE NR: 3.52 Find the square root of the following decimal number: 1. 84.8241 Solution: Using long-sharing method ∴ square root of 84.8241 √84.8241 = 9.21 2. 0.7225 Solution: Using long ∴, the square root is 0.7225 √0.7225 = 0.85 3. 0.813604 Solution: Using long division method ∴ square root of 0.813604 √0.813604 = 0.902 4. 0.00002025 Solution: Using long division method ∴ square root of 0.000020202025 √0 ,00002025 = 0,0045 5. 150.0625 Løsning: Ved hjælp af lang division metode ∴ kvadratroden af 150,0625 √150,0625 = 12,25 6. 225.6004 Løsning: Ved hjælp af lang division metode ∴ kvadratroden af 225.6004 √225.6004 = 15.02 7. 3600.720036 Løsning: Ved hjælp af lang division metode ∴ kvadratroden af 3600,720036 √3600,720036 = 60,006 8. 236.144689 Løsning: Ved hjælp af lang division metode ∴ kvadratroden af 236.144689 √236.144689 = 15.367 9. 0,00059049 Løsning: Ved hjælp af lang division metode ∴ kvadratroden af 0,00059049 √0,00059049 = 0,0243 10. 176.252176 Løsning: Ved hjælp af lang division metode ∴ kvadratroden af 176.252176 √176.252176 = 13.276 11. 9998.0001 Løsning: Ved hjælp af lang division metode ∴ kvadratroden af 9998,0001 √9998,0001 = 99,99 12. 0.00038809 Løsning: Ved hjælp af lang division metode ∴ kvadratroden af 0,00038809 √0 .00038809 = 0.0197 13. What is the fraction that, when multiplied by itself, gives 227.798649? Solution: Let's consider a number a Where, a = √227.798649 = 15,093 Using long division method let's check ∴ 15,093 is the fraction that when multiplied by itself gives 227.798649. The area of a square playground is 256.6404 square meters. Find the length of one side of the playground. Solution: We know that the given area a square playground = 256.6404 ie L2 = 256.6404 m2 L = √256.6404 = 16.02 m Using long division method let's check ∴ the length of one side of the playground is 16.02 m. 15. What is the fraction which, when multiplied by itself gives 0.00053361? Solution: Let's consider a number a Where, a = √0.00053361 = 0.0231 Using long division method let's check ∴.0231 is the fraction, which when multiplied by itself gives 0.00053361. 16. Simplify: (i) (√59.29 – √5.29)/ (√59.29 + √5.29) (ii) (√0.2304 + √0.1764)/ (√0.2304 – √0.1764) Solution: (i) (√59.29 – √5.29)/ (√59.29 + √5.29) Firstly let us find the square root √59.29 and √5.29 √59.29 = √5929/ √100 = 77/10 = 7.7 √5.29 = √5.29/ √100 = 23/10 = 2.3 So, (7.7 – 2.3)/ (7.7 + 2.3) = 54/10 = 0.54 (ii) (√0.2304 + √0.1764)/ (√0.2304 – √0.1764) Firstly let us find the square root √0.2304 and √0.1764 √0.2304 = √2304/ √10000 = 48/100 = 0.48 √0.1764 = √1764/ √10000 = 42/100 = 0.42 So, (0.48 + 0.42)/ (0.48 – 0.42) = 0.9/0.06 = 15 17. Evaluate √50625 and thus find the value of √506.25 + √5.0625 Solution: Using long division method let's find √50625 So now, √506.25 = √50625/ √100 = 225/10 = 22.5 √5,0625 = √50625/ √10000 = 225/100 = 2.25 So equate in the above equation we get, √506.25 + √5.0625 = 22.5 + 2.25 = 24.75 18. Find the value of √103.0225 and thus find the value of (i) √10302.25 (ii) √1.030225 Solution: Using long division method let us find √103.0225 = √(1030225/10000) = √1030225/√10000 So now, (i)√ 10302,25 = √(1030225/ 100) = 1015/ 10 = 101.5 (ii)√1,030225 = √1030225/ √1000000 = 1015/1000 = 1.015 EXERCISE 3.8 PAGE NO: 3,56 1. Find the square root of each of the following correctly to three decimal places. i) 5 (ii) 7 (iii) 17 (iv) 20 (v) 66 (vi) 427 (vii) 1,7 (viii) 23,1 (ix) 2,5 (x) 237,615 (xi) 15,3215 (xii) 0,9 (xiii) 0,1 (xii) 0,1 (xiii) 0,1 (xii) 0,1 (xii) 0,1 (xiii) 0,1 (xii) 0,1 (xiii) 0,1 (xii) 0,1 (xii)v) 0,016 (xv) 0,00064 (xvi) 0,019 (xvii) 7/8 (xviii) 5/12 (xix) 2 1/2 (xx) 287 5/8 Løsning: (i) 5 Ved hjælp af lang inddelingsmetode ∴ kvadratroden af 5 er 2,0 236 (ii) 7 Ved hjælp af lang divisionsmetode ∴ er kvadratroden af 7 2,646 (iii) 17 Ved hjælp af lang divisionsmetode ∴ er kvadratroden af 17 4,123 (iv) 20 Ved hjælp af lang opdelingsmetode ∴ kvadratroden på 20 er 4,472 (v) 66 Ved hjælp af lang divisionsmetode ∴ kvadratroden af 20 er 4,472 (v) 66 Ved hjælp af lang divisionsmetode ∴ kvadratroden af 20 er 4,472 (v) 66 ved hjælp af langdelingsmetode ∴ kvadratroden af 20 er 4,472 (v) 66 ved hjælp af lang divisionsmetode ∴ kvadratroden at 20 is 4,472 (v) 66 using long division method ∴ square root of 20 is 4,472 (v) 66 using long division method ∴ square root of 20 is 4,472 (v) 66 using long division method ∴ square root of 20 is 4,472 (v) 66 using long division method ∴ ∴ <3> <5> square root of 20 is 4,472 (v) 66 using the square root of 66 is 8,124 (vi) 427 Using long division method ∴ square root of 427 is 20,664 (vii) 1.7 using long division method ∴ square root of 1.7 is 1,304 (viii) 23.1 Using long division method ∴ square root of 1.7 is 1,304 (viii) 23.1 Using long division method ∴ square root of 1.7 is 1,304 (viii) 23.1 Using long division method ∴ square root of 1.7 is 1,304 (viii) 23.1 Using long division method ∴ square root of 1.7 is 1,304 (viii) 23.1 Using long division method ∴ square root of 1.7 is 1,304 (viii) 23.1 Using long division method ∴ square root of 1.7 is 1,304 (viii) 23.1 Using long 23.1 is 4,806 (ix) 2.5 Using long division method ∴ square root of 2.5 is 1,581 (x) 237,615 Using long division method ∴ square root of 237,615 is 15.415 (xi) 15.3215 Using long division method ∴ square root of 15.3215 is 3.914 (xii) 0.9 0.9 using long division method ∴ square root of 0.9 is 0.949 (xiii) 0.1 Using long division method ∴ square root of 0.1 is 0.316 (xiv) 0.016 Using long division method ∴ square root of 0 .016 is 0.126 (xv) 0.00064 Using long division method ∴ the square root of 0.00064 0.025 (xvi) 0.019 Using long splitting method is ∴ square root of 0.0 0 025 (xvi) 0.019 Using long splitting method ∴ square root of 0.0 0 0.0 00.0019 is 0.138 (xvii) 7/8 Using long division method ∴ square root of 7/8 is 0.935 (xviii) 5/12 Using long division method ∴ square root of 5/12 is 0.6 45 (xix) 2 1/2 Using long division method ∴ the square root of 5/2 is 1,581 (xx) 287 5/8 Using long division method ∴ square root of 2301/8 is 16,960 2. Find the square root of 12.0068 correctly for four decimal places. Solution: By using long division method ∴ square root of 12.0068 is 3.4651 3. Find the square root of 11 correct to five decimal places. Solution: By using long ∴ the square root of 11 is 3.31662 4. Give this: √2 = 1,414, √3 = 1,732, √5 = 2,236 and √7 = 2,646, evaluate each of the following: (i) √ (144/7) (ii) √ (2500/3) Solution: (i) √ (144/7) Let's simplify the given equation √ (144/7) = √ (12×12)/ √7 = 12/ 2,646 = 4,12)/ √7 = 12/ 2,646 = 4,646 0535 (ii) √ (2500/3) Let's now simplify the given equation √ (2500/3) = √ (5×5× 10×10) /√3 = 5×10/ 1,732 = 50/1,732 = 28,867 5. Given that √2 = 1.414, √3 = 1.732, √5 = 2.236 and √7 = 2.646 find the square roots of the following: (i) 196/75 (ii) 400/63 (iii) 150/7 (iv) 256/5 (v) 27/50 Solution: (i) 196/75 Let us find the square root for196/75 √(196/75) = √(196)/ √ (75) = √(14×14)/ √ (5×5×3) = 14/ (5√3) = 14/ (5×1.732) = 14/8.66 = 1.617 (ii) 400/63 Let us find the square root for400/63 √(400/63) = √(400)/ √ (63) = √(20×20)/ √ (3×3×7) = 20/ (3√7) = 20/ (3×2.646) = 20/7.938 = 2.520 (iii) 150/7 Let us find the square root for150/7 √(150/7) = √(150)/ √ (7) = √(3×5×5×2)/ √ (7) = (5√3×√2)/ (√7) = 5×1.732×1.414/ (2.646) = 12.245/2.646 = 4.628 (iv) 256/5 Let us find the square root for256/5 √(256/5) = √(256)/ √ (5) = √(16×16)/ √ (5) = 16/ (√5) = 16/2.236 = 7.155 (v) 27/50 Let us find the square root for27/50 √(27/50) = √(27)/ √ (50) = √(3×3×3)/ √ (5×5×2) = (3√3)/ (5√2) = (3×1.. 732)/ (5×1,414) = 5.196/7.07 = 0.735 EXERCISE 3.9 PAGE NR: 3,61 Use square root table finds square roots of the following: 1. 7 Solution: From square root table we know, The square root of 7 is: √7 = 2,645 ∴ The square root of 7 is 2,645 2. 15 Solution: From the square root table we know, The square root of 7 is: √15 = 3.8729 ∴ Square Root of 15 is 3,873 3. 74 Solution: From the square root table we know, The square root of 74 is: √74 = 8.6023 ∴ Square Root of 74 is 8,602 4. 82 Solution: From the square root table we know, Square root of 74 is 8,602 4. 82 Solution: From the square root table we know, Square root of er: √82 = 9,0553 ∴ Kvadratroden af 82 er 9,055 5. 198 Løsning: Fra kvadratroden tabel vi kender, Square rod af 198 er: √198 = 14,0712 ∴ Kvadratroden af 198 er 14,071 6. 540 Løsning: Fra kvadratroden bordet vi kender, Kvadratroden af 540 er: √540 = 23,2379 ∴ Kvadratroden af 540 er 23,24 7. 8700 Løsning: Fra kvadratroden bordet vi kender, Kvadratroden af 8700 er: √8700 = 93,2737 ∴ Kvadratroden af 8700 er 93,27 8. 3509 Løsning: Fra kvadratroden bordet vi kender, Kvadratroden af 3509 er: √3509 = 59,2368 ∴ Kvadratroden af 3509 er 59,235 9. 6929 Løsning: Fra kvadratroden bordet vi kender, Kvadratroden af 6929 er: √6929 = 83,2406 ∴ Kvadratroden af 6929 er 83,239 10. 25725 Løsning: Fra kvadratroden bordet vi kender, Kvadratroden af 25725 er : √25725 = 160.3901 ∴ Square Root of 25725 is 160.41 11. 1312. Løsning: Fra kvadratroden tabel vi kender, Kvadratroden af 1312 er: √1312 = 36,2215 ∴ Kvadratroden af 1312 er 36,22 12. 4192 Løsning: Fra kvadratroden bordet vi kender, Kvadratroden af 4192 er: √4192 = 64,7456 ∴ Kvadratroden af 4192 er 64,75 13. 4955 Løsning: Fra kvadratroden bordet vi kender, Kvadratroden af 4955 er: √4955 = 70,3917 ∴ Kvadratroden af 4955 er 70,39 14. 99/144 Løsning: Fra kvadratroden tabel vi kender, Kvadratroden af 99/144 er: √(99/144) = 0,82915 ∴ Kvadratroden af 99/144 er 0,829 15. 57/169 Løsning: Fra kvadratroden tabel vi kender, Kvadratroden af 57/169 er: √(57/169) = 0,58207 ∴ Kvadratroden af 57/169 er 0,581 16. 101/169 Løsning: Fra kvadratroden tabel vi kender, Kvadratroden af 101/169 er: √(101/169) = 0,77306 ∴ Kvadratroden af 57/169 er 0,773 17. 13,21 Løsning : From the square root table we know, the square root of 13.21 is: √13.21 = 3.6345 ∴ Square Root of 13.21 is 3,635 18. 21.97 Solution: From the square root table we know, the square root of 21.97 is: √ 21.97 = 4.6872 ∴ Square Root of 21.97 is 4.6872 19. 110 Solution: From the square root table we know, the square root of 110 is: √110 = 10.4880 ∴ The square root of 110 is 10,488 20. 1110 Solution: From the square root table we know, the square root of 1110 is: √1110 = 33.3166 ∴ Square Root of 1110 is 33,317 21. 11,1166 ∴ Square Root of 1110 is 33,317 21. 11,11,1 11 Solution: From the square root table we know, the square root of 11.11 is: √11.11 = 3.33316 ∴ Square Root of 11.11 is 3,333 22. The area of a square field is 325m2. Find the approximate length on one side of the field. Solution: We know that the given area of the field = 325 m2 To find the approximate length of the side of the field we will need to calculate the square root of 325 √325 = 18,027 m ∴ The approximate length of one side of the field is 18,027 m 23. Find the length of a side of a square whose area is equal to the area of a rectangle with pages 240 m and 70 m. Solution: We know that from the question, Area of square = Area of rectangle Page2 = 240 × 70 Page = √(240 × 70) = 20√(42) = 20 × 6.48 = 129.60 m ∴ The length of the side of the square is 129.60 m RD Sharma solutions for Class 8 Mathematics Chapter 3 – Squares and Square Roots Chapter 3, Squares and Square Roots contains nine exercises. RD Sharma Solutions is provided here, which includes answers to all the questions present in these exercises. Let us look at some of the concepts discussed in this chapter. Perfect square or square numbers. Properties and patterns for some square numbers. Product of two consecutive odd or consecutive even numbers. Column method for square double digits. Diagonal method for squared a number. Definition of square roots. The square root of a perfect square by the primary factorization method. The square root of a perfect square by the long division method. Square roots for a decimal number. Square root of fractions. Chapter Map of RD Sharma Solutions for Class 8 Mathematics Chapter 3 - Squares and Square Roots RD Sharma Solutions for Class 8 Mathematics Chapter 3 - Squares and Square Roots deal with the properties of perfect squares, which in turn help solve problems easily and quickly. By learning these concepts thoroughly, we can find the squares and square roots of the given number without using a calculator. Calculator.

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