

Property of Square Roots of Equal Numbers

For any real numbers r and s :

$$r^2 = s^2 \text{ if and only if } r = s \text{ or } r = -s.$$

Oral Exercises

Simplify.

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|----------------------------|----------------------------|-------------------------------|-------------------------------|------------------------------------|
| 1. $\sqrt{25x^2}$ | 2. $\sqrt{144y^2}$ | 3. $\sqrt{81a^4}$ | 4. $\sqrt{64x^2y^2}$ | 5. $\sqrt{0.09c^2}$ |
| 6. $\sqrt{\frac{x^2}{49}}$ | 7. $\sqrt{\frac{16}{a^4}}$ | 8. $\sqrt{\frac{x^4y^4}{64}}$ | 9. $\sqrt{\frac{r^6s^6}{36}}$ | 10. $\sqrt{\frac{m^{16}}{100n^8}}$ |

Written Exercises

Simplify.

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|--|---------------------------------------|----------------------------------|-------------------------------------|
| A 1. $\sqrt{121a^2}$ | 2. $\sqrt{100z^2}$ | 3. $\sqrt{28x^2}$ | 4. $\sqrt{32b^4}$ |
| 5. $-\sqrt{9c^4}$ | 6. $-\sqrt{64x^2}$ | 7. $-\sqrt{25d^6}$ | 8. $-\sqrt{16d^8}$ |
| 9. $\sqrt{80a^2b^2}$ | 10. $\sqrt{49a^2b^2}$ | 11. $\sqrt{75r^3}$ | 12. $\sqrt{80n^6}$ |
| 13. $\pm\sqrt{54x^2y^3}$ | 14. $\pm\sqrt{56r^6s^4}$ | 15. $-\sqrt{144x^2z^2}$ | 16. $-\sqrt{400a^6b^4}$ |
| 17. $\pm\sqrt{\frac{100r^{10}}{121}}$ | 18. $\pm\sqrt{\frac{256}{400s^{12}}}$ | 19. $\sqrt{\frac{x^4y^6}{4r^2}}$ | 20. $\sqrt{\frac{45m^3n^2}{5mn^4}}$ |
| 21. $\sqrt{\frac{64g^{18}}{8100h^{20}}}$ | 22. $\sqrt{\frac{324r^{50}}{49}}$ | 23. $-\sqrt{3.24x^4}$ | 24. $\sqrt{1.96k^6}$ |
| 25. $\sqrt{y^2 - 8y + 16}$ | 26. $\sqrt{m^2 - 12m + 36}$ | | |

Solve.

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|----------------------|---------------------|----------------------|-----------------------|
| 27. $x^2 = 25$ | 28. $n^2 = 64$ | 29. $x^2 - 4 = 0$ | 30. $d^2 - 49 = 0$ |
| 31. $0 = a^2 - 100$ | 32. $0 = m^2 - 81$ | 33. $2m^2 - 50 = 0$ | 34. $50b^2 - 450 = 0$ |
| 35. $81y^2 - 16 = 0$ | 36. $9c^2 - 64 = 0$ | 37. $0 = 81z^2 - 49$ | 38. $0 = 80p^2 - 125$ |

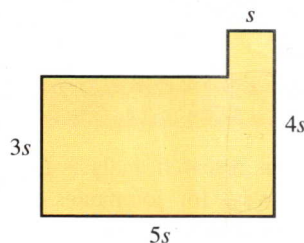
Find both roots of each equation to the nearest tenth.

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|-----------------------------------|-----------------------------------|-----------------------|-----------------------|
| B 39. $x^2 = 618$ | 40. $a^2 = 154$ | 41. $0.38 = r^2$ | 42. $0.29 = k^2$ |
| 43. $c^2 - 212 = 0$ | 44. $w^2 - 204 = 0$ | 45. $y^2 - 10.25 = 0$ | 46. $n^2 - 13.08 = 0$ |
| 47. $9z^2 = 513$ | 48. $7z^2 = 133$ | 49. $0 = 4b^2 - 0.48$ | 50. $0 = 6n^2 - 0.42$ |
| C 51. $0.13m^2 = 9.36$ | 52. $9k^2 = 168$ | | |
| 53. $(x + 1)^2 + (x - 1)^2 = 176$ | 54. $(a + 3)^2 + (a - 3)^2 = 256$ | | |

Problems

Solve. Find each answer to the nearest tenth. Use 3.14 for π . A calculator may be helpful.

- A**
1. Find the length of a side of a square whose area is 300 cm^2 .
 2. Find the length of a side of a square whose area is the same as that of a rectangle 24 cm by 30 cm.
 3. The length of the base of a triangle is 3 times the length of its altitude. Find the length of the base if the area of the triangle is 54 m^2 .
 4. Find the length of a side of a square if its area is the same as the area of a triangle with an altitude of 18 cm and a base of 11 cm.
 5. The search for a missing boat covered a circular region with an area of 164 km^2 . What was the radius of the search region?
 6. If the area of the figure at the right below is 600 mm^2 , find s .



Ex. 6

- B**
7. The formula $s = 4.9t^2$ gives the approximate distance traveled in t seconds by an object falling from rest. How long does it take a rock falling from rest to travel 1587.6 m?
 8. A circle inside a square just touches its sides. If the area of the circle is 341.9 cm^2 , what is the length of a side of the square?
 9. An old water pipe is to be replaced by a new one so that twice as much water can flow through the pipe. What is the ratio of the radius of the new pipe to that of the old pipe?

Let a , b , and c be the lengths of the sides of a triangle. Let $s = \frac{1}{2}(a + b + c)$. Then the area, A , of the triangle is $A = \sqrt{s(s - a)(s - b)(s - c)}$. Find the area, to the nearest tenth, of a triangle with sides of the given lengths.

- C**
10. 8 cm, 10 cm, and 14 cm
 11. 14 m, 19 m, and 25 m
 12. 6 cm, 6 cm, and 6 cm