Squares and Square Roots

To square a number, multiply the number by itself.

Practice: Solve.

1. 12^2 **2.** 0.6^2 **3.** $(-9)^2$ **4.** $\left(\frac{10}{11}\right)^2$

Squares and Square Roots are Inverse Operations.
If $x^2=y$ then x is a square root of y.

Every positive number has two square roots. You will only need to indicate the positive square root of a number unless this symbol appears before the radical:

$$\pm\sqrt{}$$

Practice: Solve without a calculator.

1. $\sqrt{49}$ **2.** $\sqrt{0.25}$ **3.** $\sqrt{\frac{4}{9}}$ **4.** $\pm\sqrt{810{,}000}$

The following square roots should be easy to calculate in your head.
Double check by squaring your answer.

Practice: Solve without a calculator.

1. $\sqrt{12{,}100}$ **2.** $\sqrt{0.16}$ **3.** $\sqrt{10{,}000}$

4. $\sqrt{1.44}$ **5.** $\sqrt{0.0001}$ **6.** $\sqrt{64{,}000}$

Be careful and check your work on these.

Squares and Square Roots

Simplifying radical expressions.
There are several easy rules you must know for simplifying square roots.

Fractions:

$$\sqrt{\frac{49}{64}} = \frac{\sqrt{49}}{\sqrt{64}} = \frac{7}{8} \qquad \sqrt{\frac{100}{9}} = \frac{10}{3} \qquad \sqrt{\frac{a}{b}} = \frac{\sqrt{a}}{\sqrt{b}}$$

Products:

$$\sqrt{81 \cdot 121} = \sqrt{81} \cdot \sqrt{121} = 9 \cdot 11 = 99 \qquad \sqrt{ab} = \sqrt{a} \cdot \sqrt{b}$$

Practice: Solve without a calculator.

1. $\sqrt{\frac{9}{100}}$ **2.** $\sqrt{25 \cdot 144}$ **3.** $\sqrt{\frac{169}{400}}$

4. $\sqrt{\frac{25}{6{,}400}}$ **5.** $\sqrt{32 \cdot 50}$ (tricky… think!)

Simplifying irrational radical expressions.
Irrational numbers are non-terminating, non-repeating decimals.
Some square roots cannot be simplified into integers, fractions, or decimals.

Example: Simplify.

1. $\sqrt{40}$ **2.** $\sqrt{75}$ **3.** $\sqrt{\frac{18}{25}}$

Practice: Simplify.

1. $\sqrt{490}$ **2.** $\sqrt{99}$ **3.** $\sqrt{\frac{48}{49}}$

Squares and Square Roots

Multiplying Radical Expressions.
Use the rules we have discovered to simplify these more difficult expressions.

Examples: Simplify.

1. $2\sqrt{5}\cdot 3\sqrt{15}$ **2.** $\sqrt{35}\cdot 3\sqrt{5}$ **3.** $\sqrt{\frac{6}{35}}\cdot\sqrt{\frac{50}{21}}$

Practice: Simplify.

1. $5\sqrt{3}\cdot 2\sqrt{15}$ **2.** $\sqrt{18}\cdot 2\sqrt{6}$ **3.** $\sqrt{\frac{49}{10}}\cdot\sqrt{\frac{5}{18}}$

Working with variables:
Don't be tricked by these easy ones!

Examples: Simplify.

1. $\sqrt{x^2}$ **2.** $\sqrt{x^{10}}$ **3.** $\sqrt{x^{25}}$ **4.** $\sqrt{9x^2y^3}$ **5.** $\sqrt{\frac{x^{11}}{4xy^6}}$

Practice: Simplify.

1. $\sqrt{x^{16}}$ **2.** $\sqrt{x^{10}}$ **3.** $\sqrt{x^{49}}$ **4.** $\sqrt{300x^6}$ **5.** $\sqrt{\frac{x}{4x^3}}$

Name_____ Period _____

Squares and Square Roots

Algebra 11.1

Practice: Simplify completely. All answers should be left in radical form. DO NOT USE A CALCULATOR.

1. $\sqrt{1.21} =$

2. $\sqrt{4{,}900} =$

3. $\sqrt{36 \cdot 81} =$

4. $\sqrt{16 \cdot 169} =$

5. $\sqrt{32} =$

6. $\sqrt{75} =$

7. $\sqrt{\frac{25}{64}} =$

8. $\frac{\sqrt{4}}{\sqrt{144}} =$

9. $\sqrt{\frac{1}{9}} =$

10. $3\sqrt{490} =$

11. $2\sqrt{3} \cdot 5\sqrt{15} =$

12. $2\sqrt{5} \cdot 3\sqrt{10} =$

Squares and Square Roots

Practice: Simplify completely. All answers should be left in radical form. DO NOT USE A CALCULATOR.

13. $\sqrt{x^6 y^2} =$

14. $\sqrt{a^2 b^5} =$

15. $\sqrt{\dfrac{5x^2}{16x^4}} =$

16. $\dfrac{\sqrt{x^3}}{\sqrt{xy^4}} =$

17. $\dfrac{\sqrt{5}}{\sqrt{20}} =$

18. $\dfrac{\sqrt{45}}{\sqrt{5}} =$

19. $\sqrt{\dfrac{4x^2}{y^6}} =$

20. $\sqrt{\dfrac{75x^{11}}{3y^2}} =$

21. $\sqrt{\dfrac{2x}{15}} \cdot \sqrt{\dfrac{12}{5x}} =$

22. $\sqrt{\dfrac{15}{98xy}} \cdot \sqrt{\dfrac{18x}{5y}} =$

Rationalizing the Denominator

Algebra 11.4

Simplified Radicals must NOT have a radical in the denominator.
Removing the radical is called **Rationalizing the Denominator.**

Examples: Simplify.

1. $\dfrac{3}{\sqrt{5}}$ **2.** $\sqrt{\dfrac{1}{2}}$ **3.** $\sqrt{\dfrac{35}{112}}$

Practice: Simplify.

1. $\dfrac{3}{\sqrt{15}}$ **2.** $\sqrt{\dfrac{3}{8}}$ **3.** $\sqrt{\dfrac{12}{21}}$

4. $\dfrac{3}{\sqrt{2}} \cdot \dfrac{\sqrt{5}}{4}$ **5.** $\sqrt{\dfrac{8x}{5}} \cdot \sqrt{\dfrac{2x}{3y}}$

Combining Like Radicals

Examples: Simplify.

1. $3\sqrt{5} + 7\sqrt{5}$ **2.** $4\sqrt{7} - \sqrt{7}$ **3.** $\sqrt{24} + \sqrt{150}$

Practice: Simplify.

1. $6\sqrt{2} + \sqrt{2}$ **2.** $7\sqrt{3} - \sqrt{48}$ **3.** $\sqrt{20} + \sqrt{45}$

Harder Practice: Simplify.

1. $\dfrac{5\sqrt{3} + \sqrt{3}}{2}$ **2.** $\dfrac{5\sqrt{2}}{7} + \dfrac{2\sqrt{2}}{7}$ **3.** $\dfrac{\sqrt{12}}{7} + \dfrac{\sqrt{27}}{14}$

Distribution and FOIL

Use Distribution and FOIL with radicals just as you would with integers.

Distribution Examples: Simplify.

1. $\sqrt{6}\left(7\sqrt{10}-2\right)$ **2.** $4\sqrt{3}\left(2+\sqrt{21}\right)$

Practice: Simplify.

1. $\sqrt{30}\left(7\sqrt{3}-\sqrt{2}\right)$ **2.** $5\sqrt{7}\left(4+\sqrt{14}\right)$

FOIL Examples: Simplify.

1. $\left(2\sqrt{3}-2\right)\left(3\sqrt{2}+3\right)$ **2.** $\left(4\sqrt{2}-5\right)\left(2\sqrt{6}+1\right)$

Practice: Simplify.

1. $\left(7\sqrt{3}-5\right)\left(\sqrt{3}-1\right)$ **2.** $\left(2-\sqrt{8}\right)\left(\sqrt{2}+3\right)$

FOIL Examples: Perfect Squares and Difference of Squares.

1. $(3\sqrt{7}-2)(3\sqrt{7}+2)$ **2.** $(6\sqrt{5}-5)^2$

FOIL Practice: Perfect Squares and Difference of Squares.

1. $(2\sqrt{7}-8)^2$ **2.** $(\sqrt{6}-\sqrt{2})(\sqrt{6}+\sqrt{2})$

Name_____ Period _____

Distribution and FOIL

Algebra 11.4

Review:
Rationalize each denominator.

1. $\dfrac{3\sqrt{2}}{\sqrt{7}}$ **2.** $\sqrt{\dfrac{7}{10}}$ **3.** $\dfrac{5}{\sqrt{3}+2}$

To rationalize a complex radical denominator, multiply by the CONJUGATE.
The conjugate is the expression which makes the denominator a difference of squares.

Examples:
Rationalize each denominator.

1. $\dfrac{3}{\sqrt{7}-1}$ **2.** $\dfrac{\sqrt{2}-3}{3+\sqrt{2}}$ **3.** $\dfrac{5\sqrt{10}}{\sqrt{10}+4}$

Practice:
Rationalize each denominator.

1. $\dfrac{\sqrt{5}}{\sqrt{15}-3}$ **2.** $\dfrac{\sqrt{5}-7}{7+\sqrt{5}}$ **3.** $\dfrac{5\sqrt{2}}{\sqrt{8}+3}$

Radicals Quiz Review

Algebra 11.4

Simplify:

100. $\sqrt{75}$

200. $2\sqrt{6}\cdot 3\sqrt{30}$

300. $\sqrt{\frac{2}{5}}\cdot\sqrt{\frac{3}{10}}$

400. $\sqrt{\frac{5}{8x^3}}\cdot\sqrt{\frac{12x}{2}}$

Rationalizing the Denominator:
Simplify and Rationalize each denominator.

100. $\frac{4}{\sqrt{5}}$

200. $\sqrt{\frac{40}{3}}$

300. $\frac{2}{\sqrt{3}}+\frac{7}{\sqrt{3}}$

400. $\frac{\sqrt{14}}{7}+\frac{3}{\sqrt{14}}$

FOIL and Distribution: Simplify each and rationalize all denominators.

100. $\sqrt{3}(\sqrt{6}-1)$

200. $(1-2\sqrt{5})(\sqrt{5}-7)$

300. $\frac{2}{5-\sqrt{3}}$

400. $\frac{2-\sqrt{3}}{\sqrt{3}+2}$

Name_____ Period _____

Radicals Practice Quiz

Algebra 11.4

Simplify each: Answers should be in simplest radical form. Rationalize all denominators.
CALCULATORS WILL NOT BE ALLOWED ON THIS QUIZ.

1. $\sqrt{14,400}$

1. _____

2. $\sqrt{25 \cdot 49}$

2. _____

3. $\sqrt{\frac{32}{81}}$

3. _____

4. $\sqrt{4x^5y^{16}}$

4. _____

5. $\sqrt{8a^7}$

5. _____

6. $\sqrt{14x} \cdot \sqrt{10x}$

6. _____

7. $\frac{\sqrt{5}}{\sqrt{24x}}$

7. _____

Name_____ Period _____

Radicals Practice Quiz

Algebra 11.4

Simplify each: Answers should be in simplest radical form. Rationalize all denominators.
CALCULATORS WILL NOT BE ALLOWED ON THIS QUIZ.

8. $\sqrt{12}+5\sqrt{3}$

8. _____

9. $\sqrt{72}-\sqrt{50}$

9. _____

10. $5\sqrt{3}\left(2-\sqrt{6}\right)$

10. _____

11. $\sqrt{x}\left(x\sqrt{3}-\sqrt{x}\right)$

11. _____

12. $(\sqrt{3}-5)(\sqrt{6}+2)$

12. _____

13. $(\sqrt{5}-1)(\sqrt{5}+1)$

13. _____

14. $\dfrac{4\sqrt{2}}{\sqrt{2}-6}$

14. _____

Name_____ Period _____

Squares and Square Roots

Algebra 11.1

Practice: Simplify completely. All answers should be left in radical form. DO NOT USE A CALCULATOR.

1. $\sqrt{121} =$

2. $\sqrt{0.36} =$

3. $\sqrt{1.44} =$

4. $\sqrt{225} =$

5. $\sqrt{60} =$

6. $\sqrt{50} =$

7. $\sqrt{40} =$

8. $\sqrt{27} =$

9. $\sqrt{144 \cdot 25} =$

10. $\sqrt{21 \cdot 6} =$

11. $\sqrt{9 \cdot 225} =$

12. $\sqrt{30 \cdot 18} =$

13. $\sqrt{11 \cdot 22} =$

14. $\sqrt{2 \cdot 2 \cdot 2 \cdot 3 \cdot 5 \cdot 5} =$

15. $\sqrt{\frac{36}{49}} =$

16. $\sqrt{\frac{4}{169}} =$

17. $\sqrt{\frac{5}{25}} =$

18. $\sqrt{\frac{11}{44}} =$

19. $\sqrt{\frac{27}{64}} =$

20. $\sqrt{\frac{12}{25}} =$

21. $\sqrt{\frac{12}{3}} =$

22. $\frac{\sqrt{5}}{\sqrt{7}} =$

23. $\sqrt{\frac{49}{3}} =$

24. $\frac{8}{\sqrt{2}} =$

25. $\sqrt{\frac{13}{32}} =$

26. $\sqrt{\frac{16}{15}} \cdot \frac{\sqrt{3}}{\sqrt{8}} =$

Name_____ Period _____

Squares and Square Roots

Algebra 11.1

Practice: Simplify completely. All answers should be left in radical form. DO NOT USE A CALCULATOR.

27. $\sqrt{x^6} =$

28. $\sqrt{x^7} =$

29. $\sqrt{x^8} =$

30. $\sqrt{x^9} =$

31. $\sqrt{xy^2} =$

32. $\sqrt{x^{25}y^{49}} =$

33. $\sqrt{4x^3} =$

34. $\sqrt{12x^9y^2} =$

35. $\sqrt{144x} \cdot \sqrt{x} =$

36. $\sqrt{21x} \cdot \sqrt{7x^9} =$

37. $3\sqrt{2} + 2\sqrt{2} =$

38. $\sqrt{12} + 5\sqrt{3} =$

39. $\sqrt{54} + \sqrt{24} =$

40. $\sqrt{9x} + \sqrt{4x} =$

41. $\sqrt{\dfrac{x^2}{y^4}} =$

42. $\sqrt{\dfrac{4x^9}{25}} =$

43. $\sqrt{\dfrac{a^9}{a^7}} =$

44. $\sqrt{\dfrac{1}{a^8}} =$

45. $\dfrac{\sqrt{x}}{\sqrt{4x}} =$

46. $\sqrt{\dfrac{12xy}{3y}} =$

47. $\dfrac{2}{\sqrt{x}} =$

48. $2\sqrt{7}\left(\sqrt{7} - 2\right) =$

49. $\dfrac{36\sqrt{2} + 8\sqrt{3}}{4} =$

50. $(\sqrt{3} - 4\sqrt{2})(\sqrt{3} + 4\sqrt{2}) =$

Name_____ Period _____

Squares and Square Roots

Algebra 11.1

Practice: Simplify completely. All answers should be left in radical form. DO NOT USE A CALCULATOR.

1. $\sqrt{144} =$

2. $\sqrt{0.49} =$

3. $\sqrt{1.21} =$

4. $\sqrt{900} =$

5. $\sqrt{48} =$

6. $\sqrt{72} =$

7. $\sqrt{45} =$

8. $\sqrt{32} =$

9. $\sqrt{49 \cdot 100} =$

10. $\sqrt{15 \cdot 18} =$

11. $\sqrt{6 \cdot 24} =$

12. $\sqrt{17 \cdot 17} =$

13. $\sqrt{40 \cdot 20} =$

14. $\sqrt{2 \cdot 5 \cdot 5 \cdot 5 \cdot 5 \cdot 7} =$

15. $\sqrt{\frac{33}{11}} =$

16. $\sqrt{\frac{49}{169}} =$

17. $\sqrt{\frac{8}{64}} =$

18. $\sqrt{\frac{7}{63}} =$

19. $\sqrt{\frac{20}{25}} =$

20. $\sqrt{\frac{40}{18}} =$

21. $\sqrt{\frac{7}{8}} =$

22. $\frac{\sqrt{10}}{\sqrt{3}} =$

23. $\sqrt{\frac{16}{3}} =$

24. $\frac{4}{3\sqrt{2}} =$

25. $\sqrt{\frac{3}{44}} =$

26. $\sqrt{\frac{14}{15}} \cdot \frac{\sqrt{3}}{\sqrt{7}} =$

Name_____ Period _____

Squares and Square Roots

Algebra 11.1

Practice: Simplify completely. All answers should be left in radical form. DO NOT USE A CALCULATOR.

27. $\sqrt{x^{16}} =$

28. $\sqrt{x^{25}} =$

29. $\sqrt{x^{36}} =$

30. $\sqrt{x^{49}} =$

31. $\sqrt{ax^{6}} =$

32. $\sqrt{x^{3}y^{5}} =$

33. $\sqrt{9x^{9}} =$

34. $\sqrt{2x^{2}y^{2}} =$

35. $\sqrt{2x} \cdot \sqrt{2} =$

36. $\sqrt{15x^{3}} \cdot \sqrt{5x^{5}} =$

37. $5\sqrt{7} + 6\sqrt{7} =$

38. $\sqrt{32} + 5\sqrt{2} =$

39. $\sqrt{20} + \sqrt{45} =$

40. $\sqrt{25x^{2}} + \sqrt{16x^{2}} =$

41. $\sqrt{\dfrac{a^{12}}{b^{6}}} =$

42. $\sqrt{\dfrac{2x^{3}}{9x}} =$

43. $\sqrt{\dfrac{x^{23}}{x^{17}}} =$

44. $\sqrt{\dfrac{2}{x^{8}}} =$

45. $\dfrac{\sqrt{x}}{2\sqrt{y}} =$

46. $\sqrt{\dfrac{24x^{2}}{3y}} =$

47. $\dfrac{2x}{\sqrt{x^{3}}} =$

48. $3\sqrt{5}\left(3\sqrt{5} - 2\right) =$

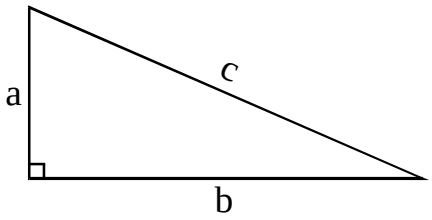
49. $\dfrac{15\sqrt{3} + 25\sqrt{5}}{10} =$

50. $(3\sqrt{3} - \sqrt{2})(3\sqrt{3} + \sqrt{2}) =$

The Pythagorean Theorem

Algebra 11.4

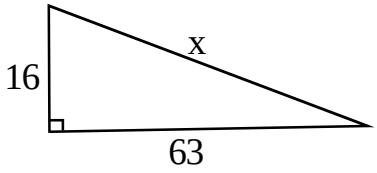
The Pythagorean Theorem:
The sum of the squares of the legs of a right triangle is equal to the square of its hypotenuse.



Simply: $a^2 + b^2 = c^2$
Where a and b are the legs and c is the hypotenuse.
The hypotenuse is the longest side, always opposite the right angle.

Examples: Find the missing length x.

1.



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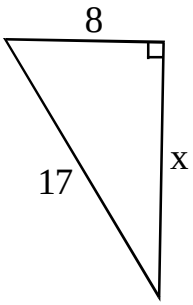
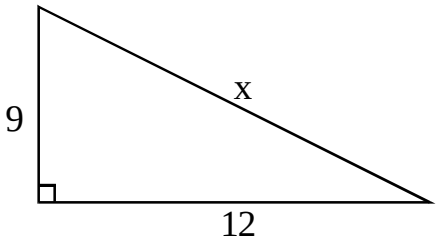
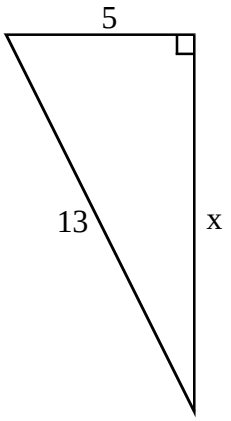


Practice: Find the missing length x.

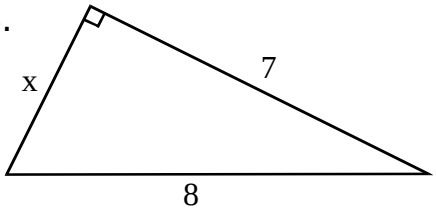
1.



2.

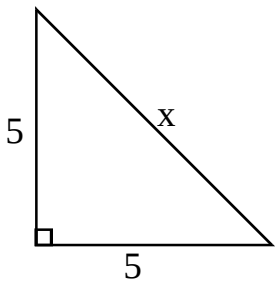


3.

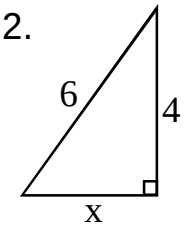


Practice: Find the missing length x. LEAVE ANSWERS IN RADICAL FORM.

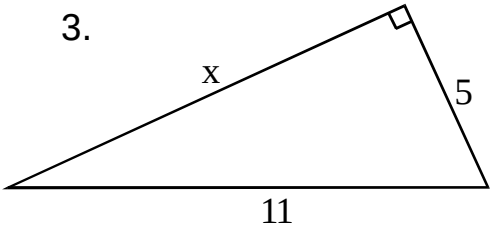
1.



2.



3.



The Pythagorean Theorem

Algebra 11.2

Many word problems can be solved using the Pythagorean Theorem.

Examples: Solve each using the Pythagorean Theorem.

1. A rectangle has a diagonal length of 7cm and a width of 3cm. Find its area (leave in simplified radical form).

2. The wire supporting a 20-foot tall phone pole is attached to the top of the pole, and to the ground 12 feet from the pole. How long is the wire?

Practice: Solve each using the Pythagorean Theorem.

1. Find the hypotenuse of a right triangle whose legs are 7 and 24 inches long.

2. What is the length of the diagonal of a square that has 2-inch sides? (Leave in simplified radical form.)

3. If you walk 1 mile north, then 3 miles east, then three miles north, how far are will you be from where you started?

Pythagorean Triples: You can determine whether a triangle is a right triangle by testing the sides using the Pythagorean Theorem.

Examples: Which of the lengths below could be the sides of a right triangle?

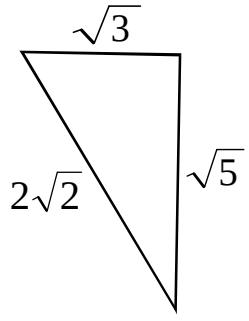
1. 3-4-5 **2.** 5-7-9 **3.** 20-21-29

Practice: Which of the lengths below could be the sides of a right triangle?

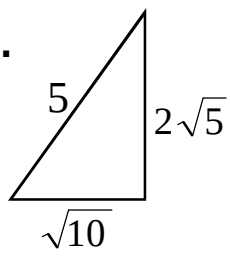
1. 6-7-8 **2.** 6-8-10 **3.** 5-12-13 **4.** 7-23-24

Practice: Which triangle is a right triangle?

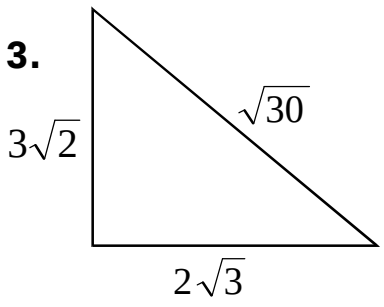
1.



2.



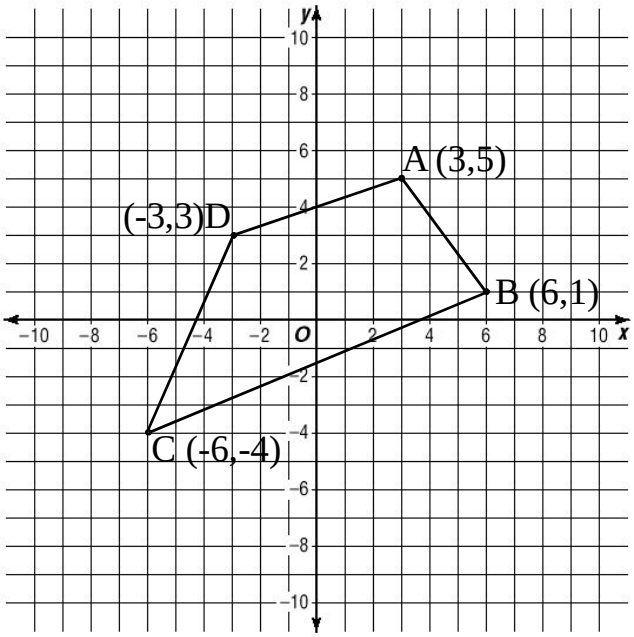
3.



Distance on the Plane

You can use the Pythagorean Theorem to find the distance between two points on the coordinate plane.

Practice:
Find the length of each segment on the coordinate plane below:



AB = _____

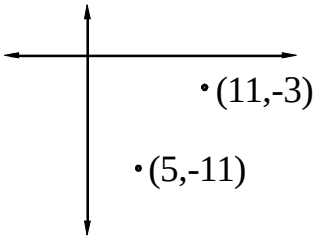
BC = _____

CD = _____

AD = _____

Of course, the distance between two points on the plane can be found without graphing:

Example:
Find the distance between the points (11,-3) and (5,-11) on the plane.



Given any two points: (x_1, y_1) and (x_2, y_2):
The distance between two points on the plane is the hypotenuse of a right triangle with a width of _____ and a height of _____.

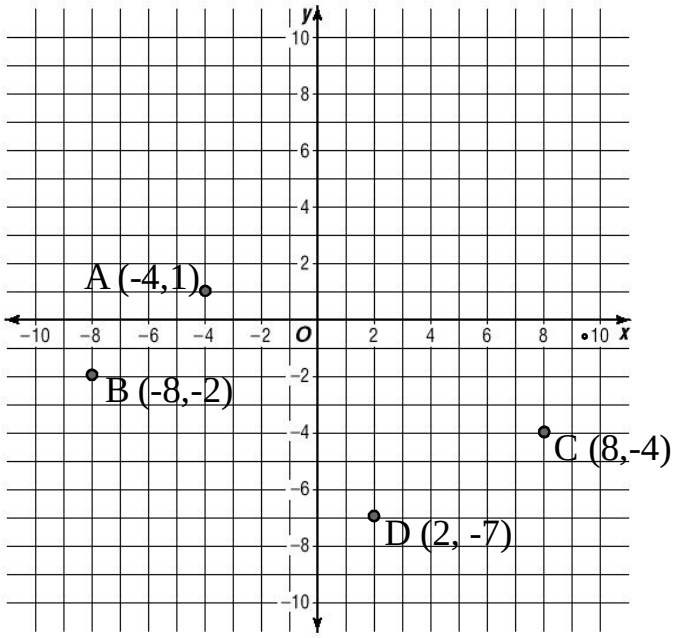
The **distance formula** IS based on the pythagorean theorem:

$$d^2 = (x_2 - x_1)^2 + (y_2 - y_1)^2 \qquad d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

Distance on the Plane

Algebra 11.2

Practice:
Find the distance between each pair of points below:



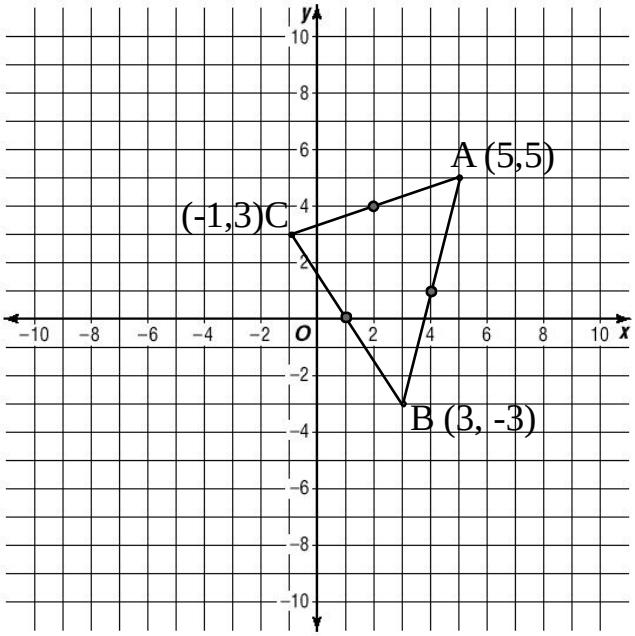
A(-4,1) to B(-8, -2) = _____

A(-4, 1) to C(8, -4) = _____

A(-4, 1) to D(2, -7) = _____

C(8, -4) to D(2, -7) = _____
(leave in radical form)

Midpoint:
Try to find the midpoint of each segment below. Look for a relationship that would help you find the midpoint without graphing.



midpoint of AB = _____

midpoint of BC = _____

midpoint of AC = _____

Try to write the midpoint formula on your own.
Practice: What is the midpoint fr segment MN for M(22, -15) and N(2, -3)

Name_____ Period _____

Pythagorean Problems (Easier)

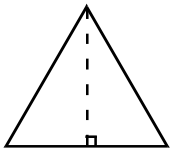
Algebra 11.2

Practice:

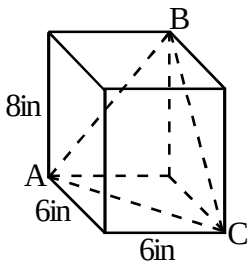
Solve each using the Pythagorean Theorem:

_____ **1.** Chase rides his bicycle 5 miles south, then 7 miles west, then 1 mile north. How far is he from where he started (to the tenth of a mile)?

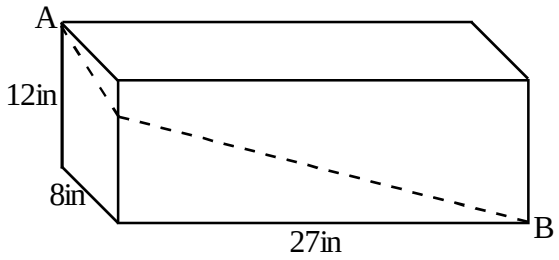
_____ **2.** An equilateral triangle has 4-inch sides. What is its height (in simplest radical form)?



_____ **3.** Triangle ABC is inscribed (drawn within) in the prism on the right. What is the perimeter of triangle ABC (in simplest radical form)?

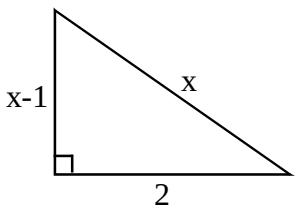


_____ **4.** An ant is crawling along the outside of the box below. How far will he walk from A to B along the path shown (think about unfolding the box to solve this problem).



_____ **5.** A 41-foot ladder rests against a wall so that the top of the ladder is 40 feet from the ground. How far from the wall is the bottom of the ladder?

_____ **6.** Solve for x:



Name_____ Period _____

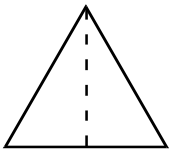
Pythagorean Problems (Harder)

Algebra 11.2

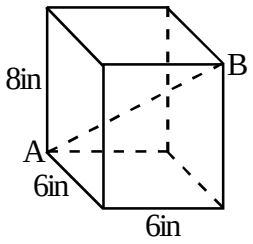
Practice:
Solve each using the Pythagorean Theorem:

_____ **1.** Mary and Benjamin are driving to their friend Paul's house for a birthday party. Mary drives 9 miles north and 6 miles east to get there, while Benjamin drives 3 miles south and 7 miles west. How far does Mary live from Benjamin (round to the tenth of a mile)?

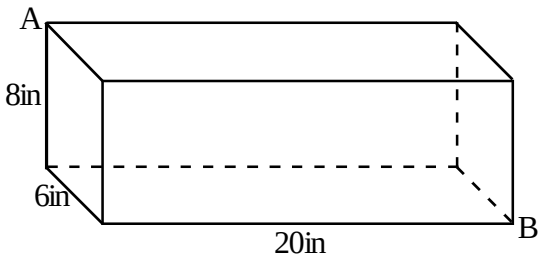
_____ **2.** An equilateral triangle has 10-inch sides. What is its area (in simplest radical form)? hint: area of a triangle = bh/2



_____ **3.** What is the distance from A to B in the following prism (in simplest radical form)?

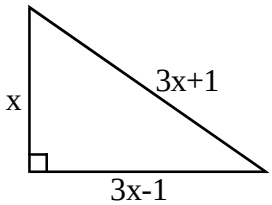


_____ **4.** An ant is crawling inside of a box with the dimensions below. What is the **shortest possible distance** the ant can walk **along the inside surface** of the box to get from corner A to the food at corner B?



_____ **5.** A 50-foot ladder rests against a wall so that the top of the ladder is 48 feet from the ground. As you start to climb the ladder, it slips and the top of the ladder drops 8 feet. How far does the bottom of the ladder slide away from the wall (from its original position)?

_____ **6.** Solve for x:



Name_____ Period _____

Pythagorean Review

Algebra 11.2

Solve:

1. The hypotenuse of a right triangle is 45cm, and one of its legs is 36cm. Find its perimeter.

1. _____

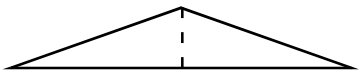
2. A fifteen-foot ladder reaches the top of a 13-foot wall. How far is the base of the ladder from the base of the wall? (leave in radical form)

2. _____

3. If you drive 3 miles west, then 5 miles south, and finally 15 miles east, how far will you end up from where you started?

3. _____

4. An isosceles triangle has two congruent 11-inch sides, and an 18-inch base. What is its area (in simplest radical form)?



4. _____

5. Addison is standing in the middle of a large field throwing baseballs. He throws the first ball 20 yards straight out. He turns 90 degrees to the right an throws a second ball 23 yards straight out. He turns 90 degrees to the right again and throws a third ball 45 yards (straight out again). What is the shortest distance he can walk to retrieve all three balls (he does not need to return to his original spot). Round to the tenth.

5. _____

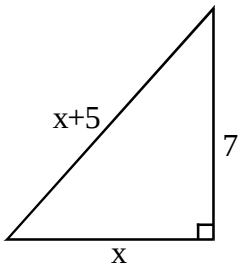
Name_____ Period _____

Pythagorean Review

Algebra 11.2

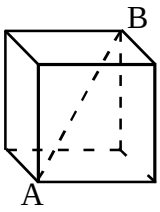
Answer each:

6. Solve for x:



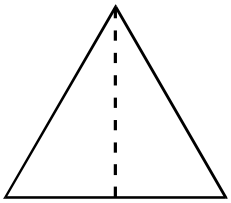
6. _____
(leave as a simplified fraction)

7. A cube has two-inch edges. What is the distance between opposite corners A and B of the cube? (leave in radical form)



7. _____

8. An equilateral triangle has 8-inch sides. What is the height of the triangle? (leave in radical form)



8. _____

9. The short leg of a right triangle is x inches long, and the hypotenuse of the triangle is 2x inches. How long is the longer leg (in terms of x, leave in radical form)?

9. _____

Challenge. A rectangle is nine inches longer than it is wide, and its diagonal is 10 inches longer than its width. What is the width of the quadrilateral? (Round to the hundredth, or, even better ... leave in radical form).

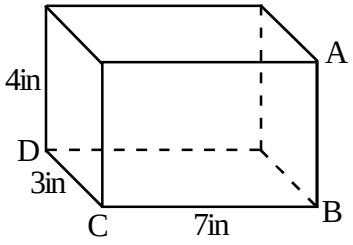
C. _____

Pythagorean Review

Algebra 11.2

Right Triangles are EVERYWHERE!

Prisms:



Name the right triangles you can find in this figure (using only A, B, C and D):

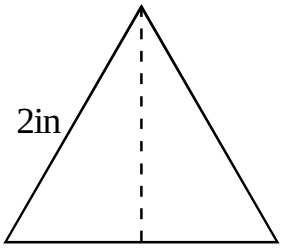
Now find the distance from: A to C, B to D, and A to D.

Non-Right Triangles:

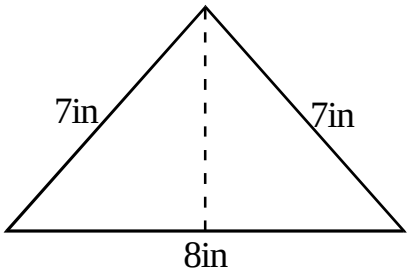
You can use the Pythagorean Theorem to find the altitude (height) of triangles.

Practice: Find each height.

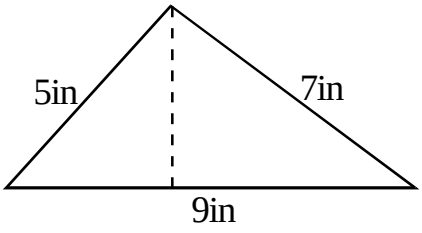
1. (equilateral)



2. (Isosceles)



3. (scalene… much harder!)

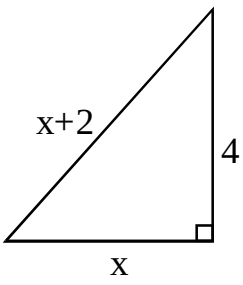


More work with variables:

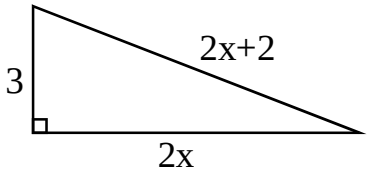
The Pythagorean Theorem works even without numbers.

Practice: Solve for x in each.

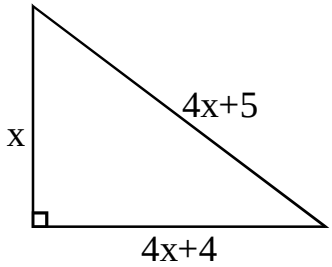
1.



2. (leave as a fraction)



3. (solve as a quadratic)



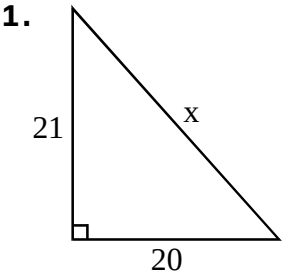
Name_____ Period _____

Pythagorean Practice Test

Algebra 11.4

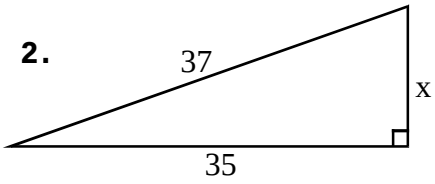
Find the missing length x for each diagram below. Leave all irrational answers in radical form.

1.



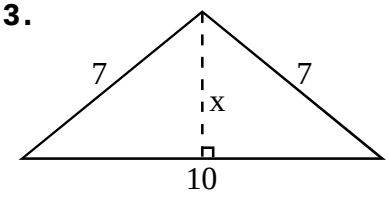
1. x=_____

2.



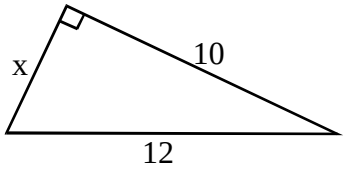
2. x=_____

3.



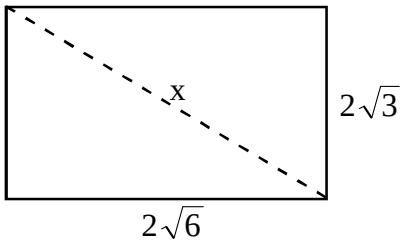
3. x=_____

4.



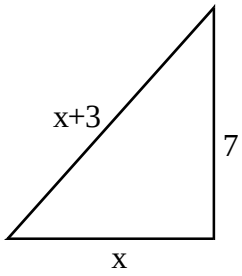
4. x=_____

5. (rectangle)



5. x=_____

6.



6. x=_____
(leave as a simplified fraction)

Name_____ Period _____

Pythagorean Practice Test

Algebra 11.4

Solve each. Leave answers in simplest radical form unless noted otherwise.

7. What is the area of an equilateral triangle with 6-inch sides (leave answer in simplest radical form).

7. _____

8. Alonzo walks 40 meters north, then 18 meters east, then 16 meters south, then directly back to where he started. How far did he walk altogether? (Round to the tenth of a meter.)

8. _____

9. The wires that support a 90-foot antenna are 92 feet long. How far from the base of the tower are the wires attached? (in simplest radical form)

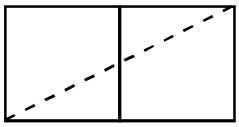
9. _____

10-11. Find the midpoint and distance between the following pair of points (to the nearest tenth): (9, -2) (-1, 5)

Midpoint: 10. _____

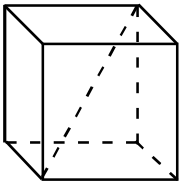
Distance: (in simplest radical form) 11. _____

12. What is the diagonal length of two adjoining squares whose side length is 3cm (in simplest radical form)?



12. _____

13. What is the diagonal length of a cube whose edge length is 3cm (in simplest radical form)?



13. _____

14. The numbers 12 and 37 are part of a Pythagorean Triple. What is the third number in the Pythagorean Triple which includes 12 and 37?

14. _____

Name_____ Period _____

Pythagorean Practice Test (4th)

Algebra 11.4

Solve each. Leave answers in simplest radical form unless noted otherwise.

7. What is the area of an equilateral triangle with 6-inch sides (leave answer in simplest radical form).

7. _____

8. Alonzo walks 40 meters north, then 18 meters east, then 16 meters south, then directly back to where he started. How far did he walk altogether? (Round to the tenth of a meter.)

8. _____

9. The wires that support a 90-foot antenna are 92 feet long. How far from the base of the tower are the wires attached? (in simplest radical form)

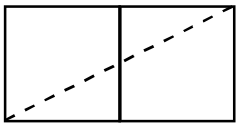
9. _____

10-11. Find the midpoint and distance between the following pair of points (to the nearest tenth): (9, -2) (-1, 5)

Midpoint: 10. _____

Distance: (in simplest radical form) 11. _____

12. What is the diagonal length of two adjoining squares whose side length is 3cm (in simplest radical form)?



12. _____

Simplify each:

13. $\sqrt{25x^2} =$

13. _____

14. $\sqrt{20} + \sqrt{45} =$

14. _____

15. $\sqrt{900a^6} =$

15. _____

16. $\sqrt{\frac{2}{3}} =$

16. _____