Name: _____ Date: _____

Pythagorean Theorem: Proof, Triples, and 3D - Medium

A square with side a + b is split into four right triangles with legs a and b and a tilted square with side c. Find (1) the area of the big square, (2) the total area of the four triangles, (3) the area of the tilted square, and (4) c.

1. a = 40, b = 9

2. a = 7, b = 24

3. a = 15, b = 8

4. a = 12, b = 35

5. a = 24, b = 10

6. a = 10, b = 24

Tell whether each set of numbers is a Pythagorean triple. Show your check.

7. 6, 8, 11

8. 22, 21, 29

9. 12, 35, 37

10. 12, 35, 35

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Pythagorean Theorem: Proof, Triples, and 3D - Medium

Tell whether each set of numbers is a Pythagorean triple. Show your check.

11. 20, 21, 29

12. 10, 40, 41

Use the Pythagorean Theorem in three dimensions.

13. A cone has radius 7 cm and slant height 25 cm. Find its height.

14. A cylinder has diameter 18 cm and height 80 cm. Find the length of the longest straight rod that fits inside.

15. A cylinder has diameter 12 ft and height 35 ft. Find the length of the longest straight rod that fits inside.

16. A cone has radius 9 ft and slant height 41 ft. Find its height.

17. A cone has radius 12 in. and slant height 37 in. Find its height.

18. A box is 8 m long, 12 m wide, and 9 m tall. Find the length of the diagonal from a bottom corner to the opposite top corner.

19. A square pyramid has base edge 24 ft and slant height 37 ft. Find its height.

20. A cylinder has diameter 18 ft and height 80 ft. Find the length of the longest straight rod that fits inside.

Pythagorean Theorem: Proof, Triples, and 3D - Medium - Answer Key

1. a = 40, b = 9

   (1) 2401 (2) 720 (3) 2401 - 720 = 1681 (4) c = 41, since $40^2 + 9^2 = 41^2$

2. a = 7, b = 24

   (1) 961 (2) 336 (3) 961 - 336 = 625 (4) c = 25, since $7^2 + 24^2 = 25^2$

3. a = 15, b = 8

   (1) 529 (2) 240 (3) 529 - 240 = 289 (4) c = 17, since $15^2 + 8^2 = 17^2$

4. a = 12, b = 35

   (1) 2209 (2) 840 (3) 2209 - 840 = 1369 (4) c = 37, since $12^2 + 35^2 = 37^2$

5. a = 24, b = 10

   (1) 1156 (2) 480 (3) 1156 - 480 = 676 (4) c = 26, since $24^2 + 10^2 = 26^2$

6. a = 10, b = 24

   (1) 1156 (2) 480 (3) 1156 - 480 = 676 (4) c = 26, since $10^2 + 24^2 = 26^2$

7. 6, 8, 11

   No: $6^2 + 8^2 = 100$, but $11^2 = 121$

8. 22, 21, 29

   No: $22^2 + 21^2 = 925$, but $29^2 = 841$

9. 12, 35, 37

   Yes: $12^2 + 35^2 = 144 + 1225 = 1369 = 37^2$

10. 12, 35, 35

    No: $12^2 + 35^2 = 1369$, but $35^2 = 1225$

Pythagorean Theorem: Proof, Triples, and 3D – Medium – Answer Key

11. 20, 21, 29

    Yes: $20^2 + 21^2 = 400 + 441 = 841 = 29^2$

12. 10, 40, 41

    No: $10^2 + 40^2 = 1700$, but $41^2 = 1681$

13. A cone has radius 7 cm and slant height 25 cm. Find its height.

    $\sqrt{(25^2 - 7^2)} = 24$ cm

14. A cylinder has diameter 18 cm and height 80 cm. Find the length of the longest straight rod that fits inside.

    $\sqrt{(18^2 + 80^2)} = 82$ cm

15. A cylinder has diameter 12 ft and height 35 ft. Find the length of the longest straight rod that fits inside.

    $\sqrt{(12^2 + 35^2)} = 37$ ft

16. A cone has radius 9 ft and slant height 41 ft. Find its height.

    $\sqrt{(41^2 - 9^2)} = 40$ ft

17. A cone has radius 12 in. and slant height 37 in. Find its height.

    $\sqrt{(37^2 - 12^2)} = 35$ in.

18. A box is 8 m long, 12 m wide, and 9 m tall. Find the length of the diagonal from a bottom corner to the opposite top corner.

    $\sqrt{(8^2 + 12^2 + 9^2)} = \sqrt{289} = 17$ m

19. A square pyramid has base edge 24 ft and slant height 37 ft. Find its height.

    $\sqrt{(37^2 - 12^2)} = 35$ ft

20. A cylinder has diameter 18 ft and height 80 ft. Find the length of the longest straight rod that fits inside.

    $\sqrt{(18^2 + 80^2)} = 82$ ft