Pythagorean triples

Mana Maths

Te reo Māori terms

takitoru
Pythagorean triple
Open in Te Aka

ture a Pythagoras
Pythagoras' theorem
Open in Te Aka

tapatoru
triangle
Open in Te Aka

tau
number
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Pythagorean triples — Foundation

1. Which one is a Pythagorean triple: $(3, 4, 5)$ or $(3, 4, 6)$?

2. Which one is a Pythagorean triple: $(5, 12, 13)$ or $(5, 12, 14)$?

3. Which one is a Pythagorean triple: $(8, 15, 17)$ or $(8, 15, 18)$?

4. A right-angled triangle has short sides 3 cm and 4 cm. Write the full triple.

5. A right-angled triangle has short sides 5 m and 12 m. Write the full triple.

6. A right-angled triangle has short sides 8 mm and 15 mm. Write the full triple.

7. Complete the triple: $(6, 8, \ ?)$.

8. Complete the triple: $(9, 12, \ ?)$.

9. Complete the triple: $(10, 24, \ ?)$.

10. Complete the triple: $(7, 24, \ ?)$.

11. Is $(9, 12, 15)$ a Pythagorean triple? Write yes or no.

12. Is $(12, 16, 20)$ a Pythagorean triple? Write yes or no.

13. Is $(6, 8, 9)$ a Pythagorean triple? Write yes or no.

14. If $(3, 4, 5)$ is a Pythagorean triple, write another triple made by doubling it.

Pythagorean triples — Proficient

1. Show whether $(9, 40, 41)$ is a Pythagorean triple.

2. Show whether $(12, 35, 37)$ is a Pythagorean triple.

3. Show whether $(10, 24, 25)$ is a Pythagorean triple.

4. A right-angled triangle has short sides 12 cm and 16 cm. Write the triple in simplest whole-number form.

5. A right-angled triangle has short sides 15 m and 20 m. Write the triple in simplest whole-number form.

6. The hypotenuse is 25 cm and one short side is 7 cm. Find the missing side and write the triple.

7. The hypotenuse is 17 m and one short side is 8 m. Find the missing side and write the triple.

8. The hypotenuse is 37 mm and one short side is 35 mm. Find the missing side and write the triple.

9. If $(5, 12, 13)$ is a Pythagorean triple, write the triple formed by multiplying by 3.

10. If $(8, 15, 17)$ is a Pythagorean triple, write the triple formed by multiplying by 4.

11. One side length is 18 cm. Complete a Pythagorean triple by scaling $(3, 4, 5)$.

12. Explain briefly why multiplying every side in a Pythagorean triple by the same integer gives another Pythagorean triple.

Pythagorean triples — Excellence

1. Decide whether $(20, 21, 29)$ is a Pythagorean triple.

2. Decide whether $(11, 60, 61)$ is a Pythagorean triple.

3. Decide whether $(13, 84, 85)$ is a Pythagorean triple.

4. Decide whether $(16, 30, 34)$ is a Pythagorean triple in simplest form.

5. A student says $(15, 36, 39)$ is not a Pythagorean triple because all three numbers have a common factor. Is the student correct?

6. Find the missing side: $(20,\ ?, 29)$.

7. Find the missing side: $(\ ?, 36, 39)$.

8. Find the missing side: $(12,\ ?, 37)$.

9. Find the missing side: $(28, 45,\ ?)$.

10. Find a Pythagorean triple with hypotenuse 65.

11. Find a Pythagorean triple with one short side 24 and simplest whole-number form.

12. A right-angled triangle has sides $(6k, 8k, 10k)$. If the hypotenuse is 50, find k and the full triple.

13. A right-angled triangle has sides $(5k, 12k, 13k)$. If one short side is 60, find the other two sides.

14. Two side lengths of a right-angled triangle are 27 and 36. Show that the third side is a whole number.

15. Write a non-example: three whole numbers close to a Pythagorean triple that do not satisfy the theorem.

16. Explain the difference between a primitive Pythagorean triple and a scaled Pythagorean triple, using one example of each.