LESSON MAKER PRO

Fixed or Flexible?

Test claims about right triangles.

HIGH SCHOOL · GDA.GM.G

GDA.GM.G "Using technology to construct and explore figures with constraints provides an opportunity to explore the independence and dependence of assumptions and conjectures."

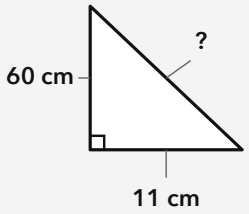
NAME _____ DATE _____

TEST THE CONSTRAINT

For a right triangle, $leg_1^2 + leg_2^2 = hypotenuse^2$. An added claim is forced if every triangle meeting the given constraints satisfies it, possible but not forced if some do, and impossible if none do.

WORKED EXAMPLE

The two legs are marked. Is a 61 cm hypotenuse forced?



1. $11^2 + 60^2 = 121 + 3600$
2. $121 + 3600 = 3721$
3. The hypotenuse is the square root of 3721, or 61 cm.

Answer: Forced.

PRACTICE 4 problems

1 A right triangle has legs of 6 cm and 8 cm. Is a perimeter of 24 cm forced, possible but not forced, or impossible?

ANSWER _____

2 A right triangle has a 41 cm hypotenuse and a 9 cm leg. Is a 40 cm second leg forced, possible but not forced, or impossible?

ANSWER _____

3 A right triangle has legs of 7 cm and 24 cm. Is a 26 cm hypotenuse forced, possible but not forced, or impossible?

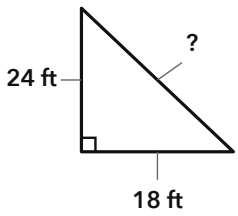
ANSWER _____

4 A right triangle has a 25 cm hypotenuse. Is an area of 150 cm^2 forced, possible but not forced, or impossible?

ANSWER _____

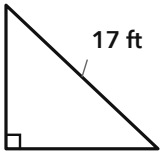
APPLY IT Show your work

1 A video crew marks a right-angle path with the sides shown. Is a 30 ft cable exactly long enough to span the diagonal?



ANSWER _____

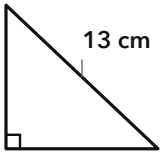
2 A skate-park ramp has the sloped length shown. A builder claims its rise must be 8 ft. Is that forced, possible but not forced, or impossible?



ANSWER _____

CHALLENGE One step up

A right triangle has a 13 cm hypotenuse and a 30 cm perimeter. Must its legs be 5 cm and 12 cm, in either order? Explain.



WORK SPACE AND ANSWER

Fixed or Flexible?

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	A right triangle has legs of 6 cm and 8 cm. Is a perimeter of 24 cm forced, possible but not forced, or impossible?	**Forced.**
2	A right triangle has a 41 cm hypotenuse and a 9 cm leg. Is a 40 cm second leg forced, possible but not forced, or impossible?	**Forced.**
3	A right triangle has legs of 7 cm and 24 cm. Is a 26 cm hypotenuse forced, possible but not forced, or impossible?	**Impossible.**
4	A right triangle has a 25 cm hypotenuse. Is an area of 150 cm^2 forced, possible but not forced, or impossible?	**Possible but not forced.**

PART 2 · APPLY IT

1. **Yes. The diagonal is 30 ft.** $18^2 + 24^2 = 900$, and the square root of 900 is 30.
2. **Possible but not forced.** A rise of 8 ft works with a 15 ft horizontal side. A rise of 15 ft with an 8 ft horizontal side also works.

CHALLENGE

Yes. The legs sum to 17 cm. If one is x, then $x^2 + (17 - x)^2 = 169$, which simplifies to $(x - 5)(x - 12) = 0$. The legs are 5 cm and 12 cm.

For problem 4, legs of 15 cm and 20 cm give an area of 150 cm^2, while legs of 7 cm and 24 cm give an area of 84 cm^2. Accept either leg order in the challenge.