

Mathematics

Pythagoras's Theorem

Generalising

Lesson 5 of 8

Downloadable Resource

Dr Rim Saada



Try this

How many numbers 1-100 can be expressed as the sum of 2 square numbers

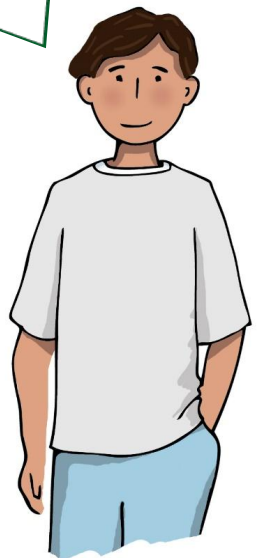
(you can use the same number twice!)



$2^2 + 4^2 = 20$

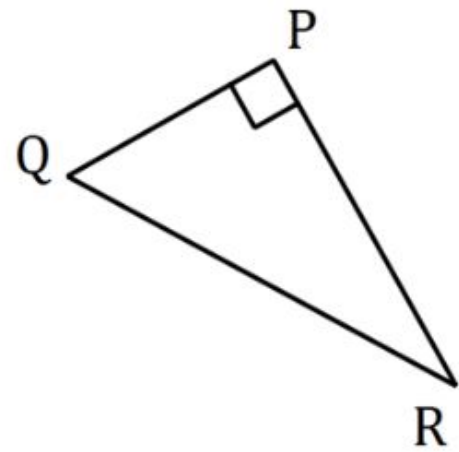
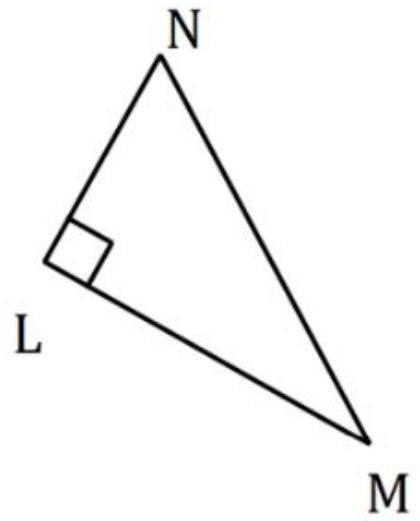
1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

$3^2 + 1^2 = 10$

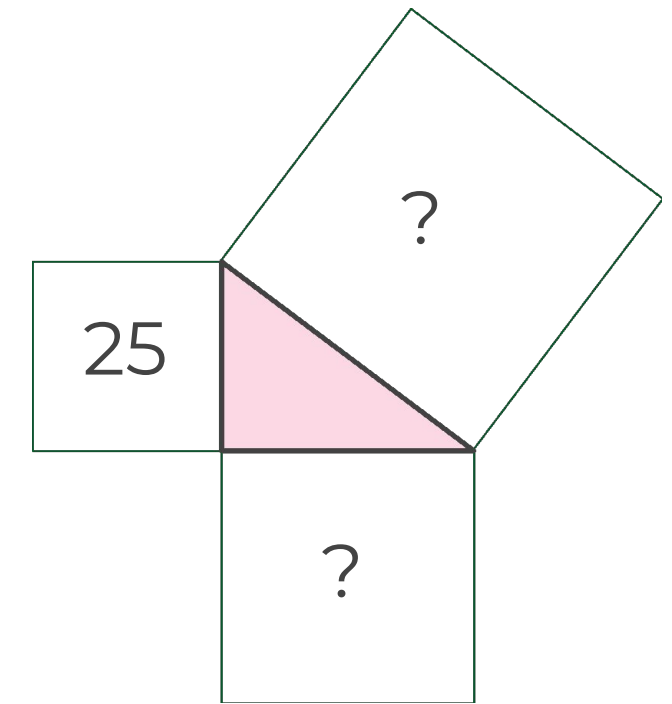
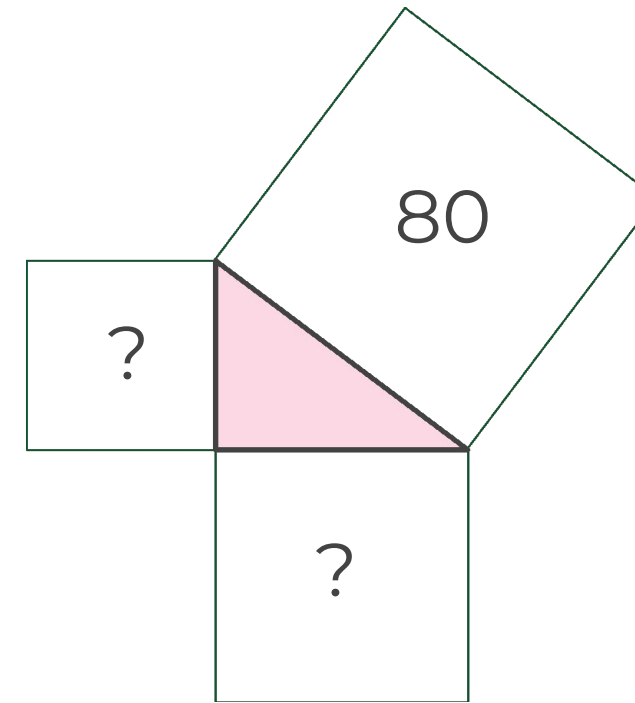


Independent task

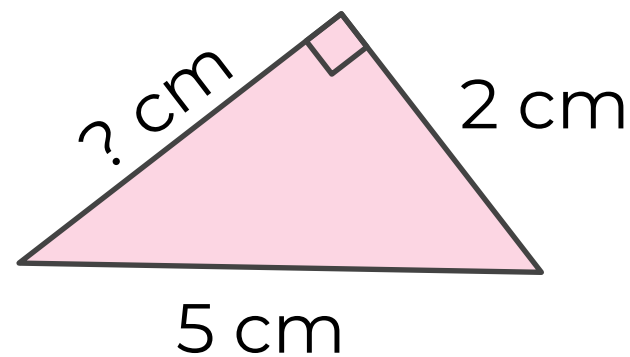
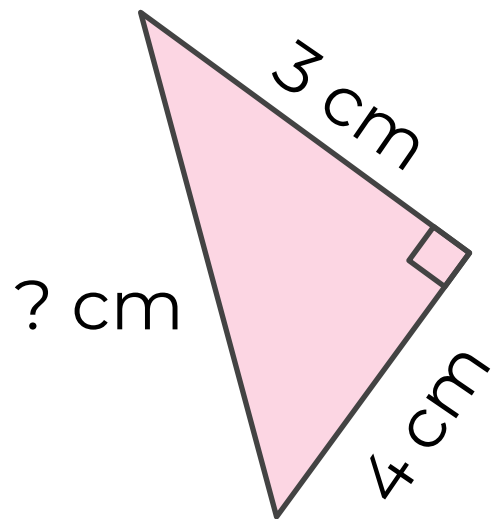
1) Mark the hypotenuse on each of the following right angled triangles:



2) Fill in the gaps on the diagrams below:



3) Find the length of the missing side in each triangle:



Solutions



Try this - Answers

How many numbers 1-100 can be expressed as the sum of 2 square numbers

(you can use the same number twice!)



$2^2 + 4^2 = 20$

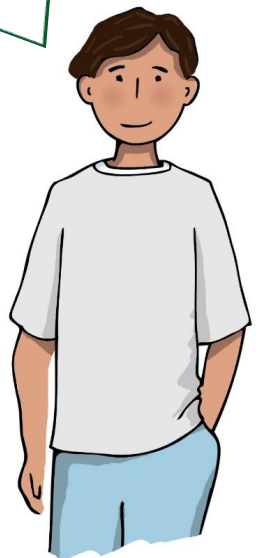
$3^2 + 2^2 = 13$

$7^2 + 6^2 = 85$

$5^2 + 2^2 = 29$

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

$3^2 + 1^2 = 10$



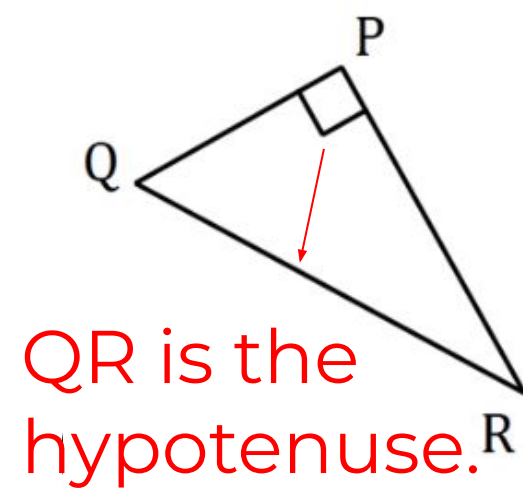
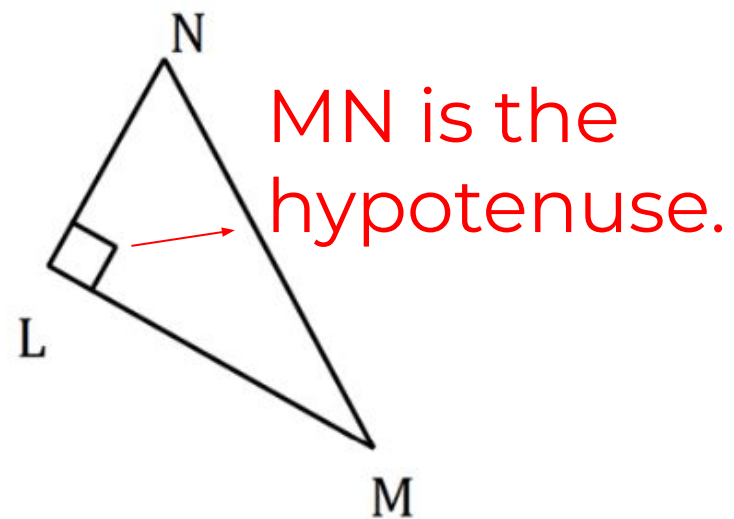
$5^2 + 9^2 = 106$

Lots of possible answers.

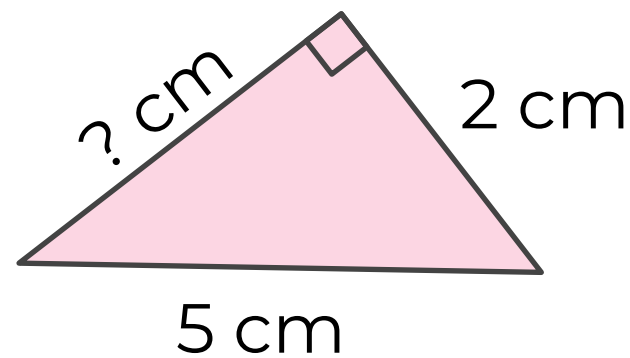
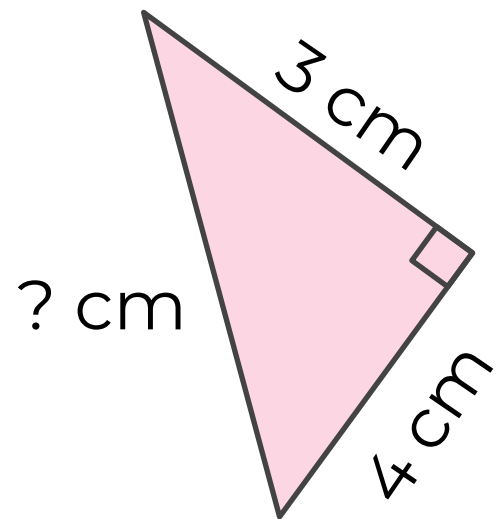


Independent task - Answers

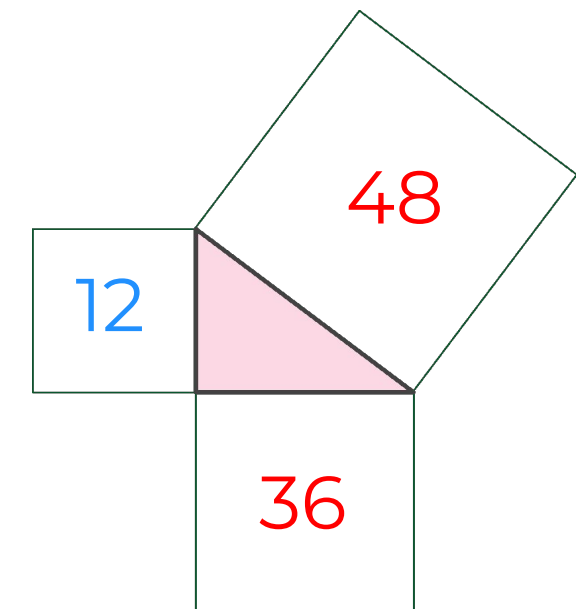
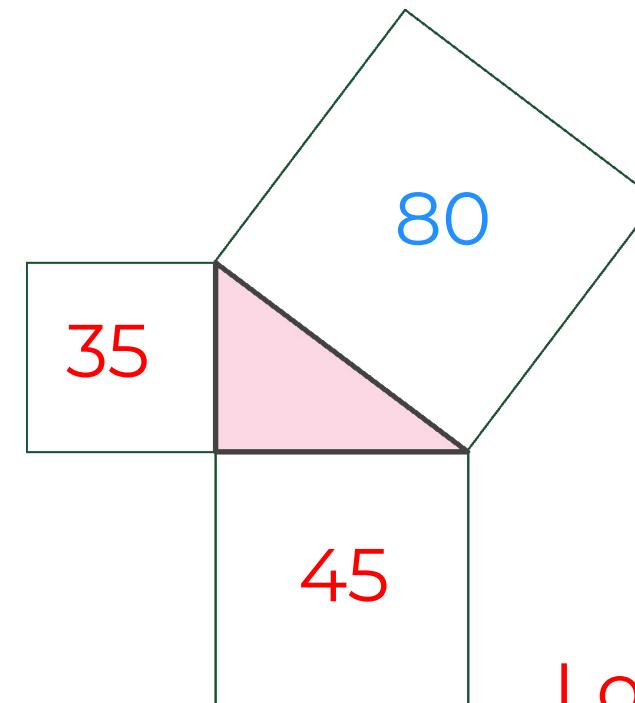
1) Mark the hypotenuse on each of the following right angled triangles:



3) Find the length of the missing side in each triangle:



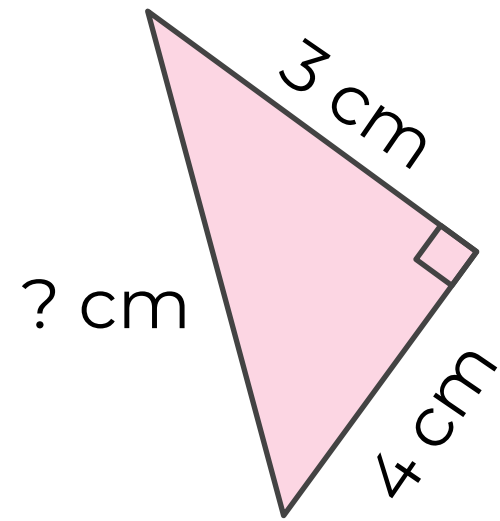
2) Fill in the gaps on the diagrams below:



Lots of possible answers for Q2.



Independent task - Answers



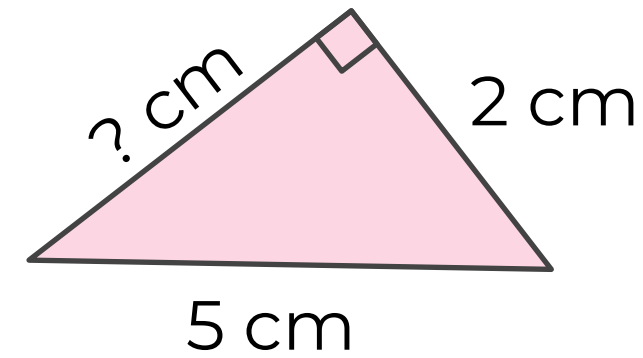
$$a^2 + b^2 = c^2$$

$$3^2 + 4^2 = c^2$$

$$9 + 16 = c^2$$

$$25 = c^2$$

$$5 \text{ cm} = c$$



$$a^2 + b^2 = c^2$$

$$a^2 + 2^2 = 5^2$$

$$a^2 = 5^2 - 2^2$$

$$a^2 = 25 - 4$$

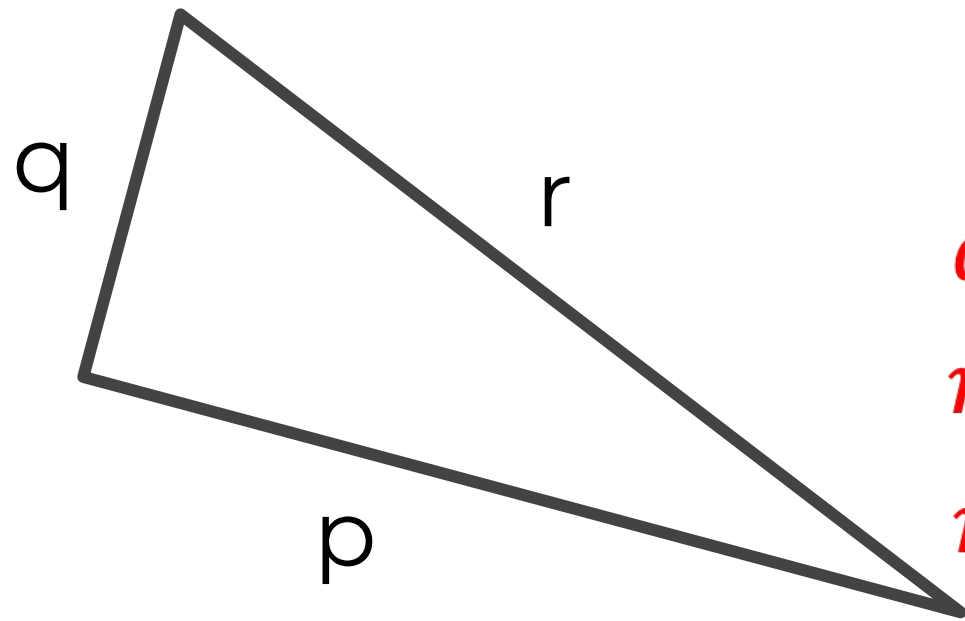
$$a^2 = 21$$

$$a = \sqrt{21} \text{ cm}$$



Explore - Answers

For each right-angled triangle, write some equations relating side lengths

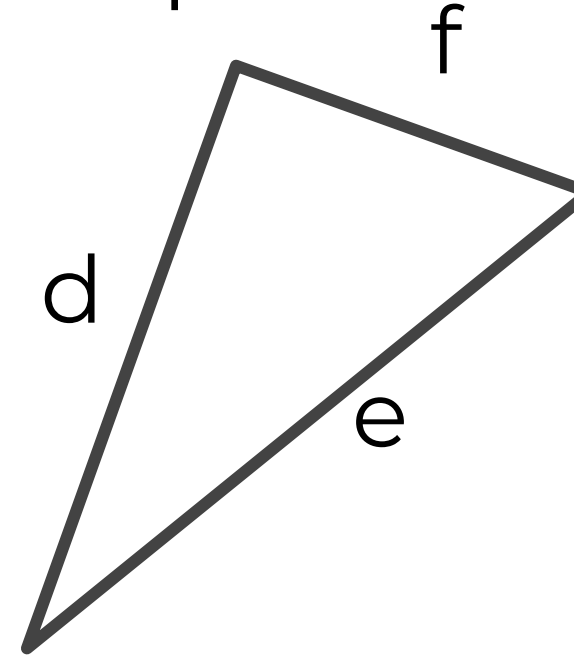


$$p^2 + q^2 = r^2$$

$$q^2 + p^2 = r^2$$

$$r^2 = p^2 + q^2$$

$$r^2 - p^2 = q^2$$

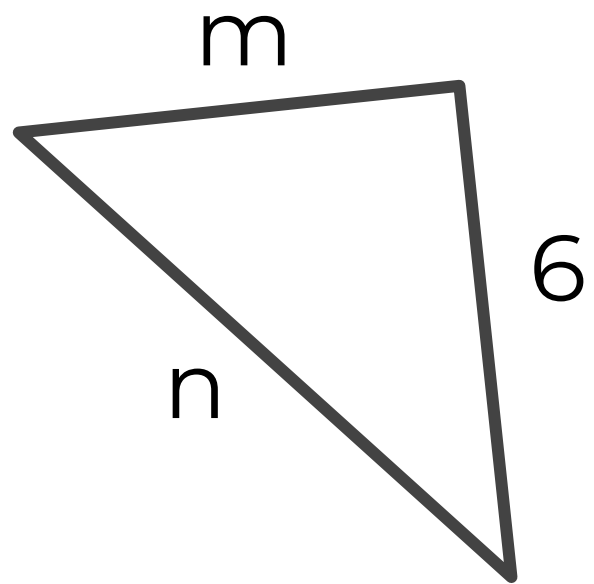


$$d^2 + f^2 = e^2$$

$$d^2 = e^2 - f^2$$

$$e^2 - d^2 = f^2$$

$$e^2 - f^2 = d^2$$



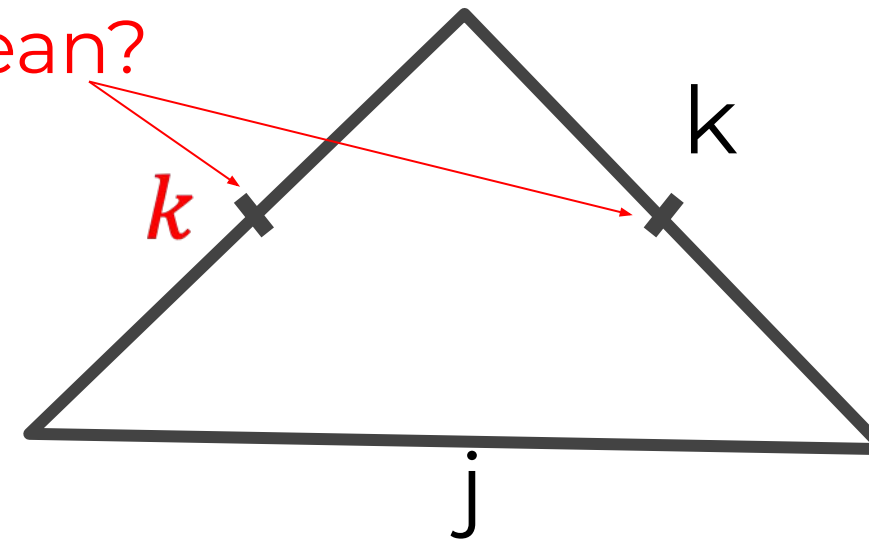
$$m^2 + 6^2 = n^2$$

$$6^2 = n^2 - m^2$$

$$6^2 + m^2 = n^2$$

$$m^2 = n^2 - 6^2$$

What do these dashes mean?



$$k^2 + k^2 = j^2$$

$$k^2 = j^2 - k^2$$

$$j^2 - k^2 = k^2$$



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