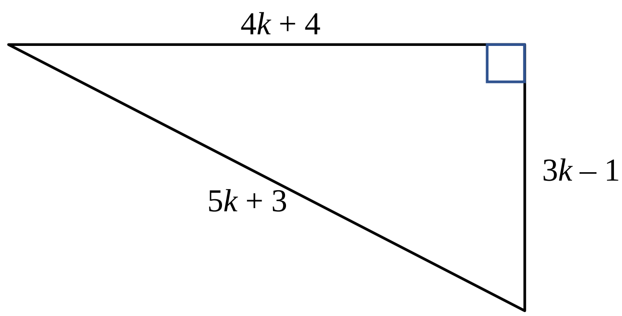
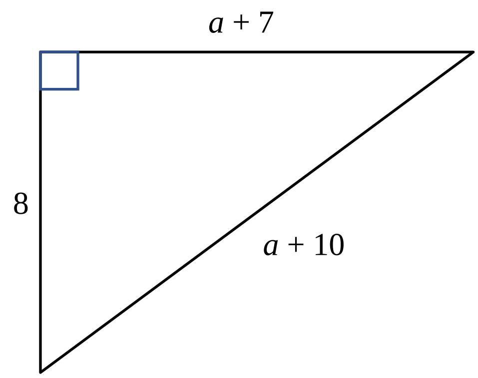
PYTHAGOREAN THEOREM
CHALLENGE PROBLEMS

Solve each of the following triangles. One of them cannot exist. Figure out which one.

1)



2)



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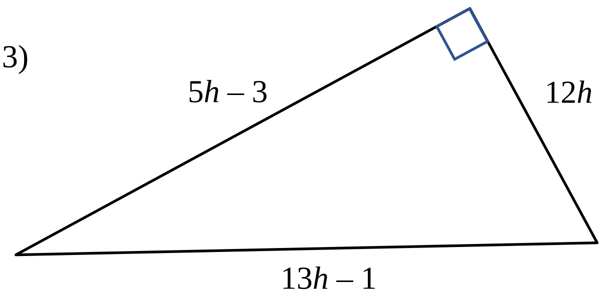

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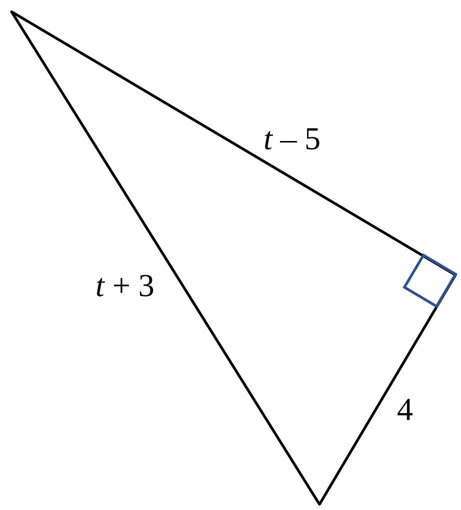
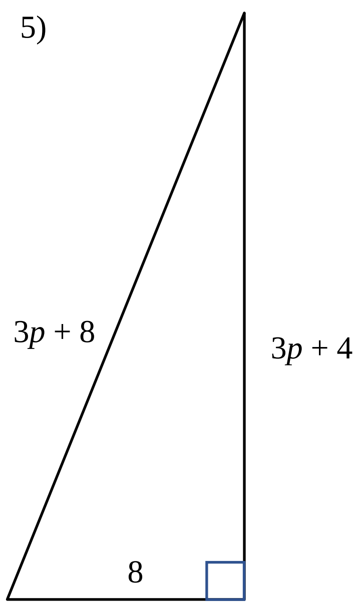
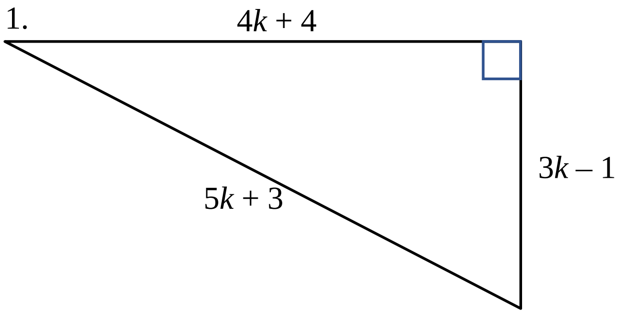


5)



ANSWERS

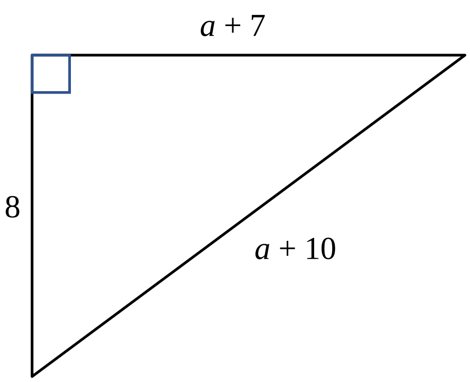
1.



$$(4k+4)^2+(3k-1)^2=(5k+3)^2$$
$$\cancel{16k^2}+32k+16+\cancel{9k^2}-6k+1=\cancel{25k^2}+30k+9$$
$$26k+17=30k+9$$
$$8=4k$$
$$2=k$$
$$k=2$$

The legs equal 12 and 5; the hypotenuse equals 13.

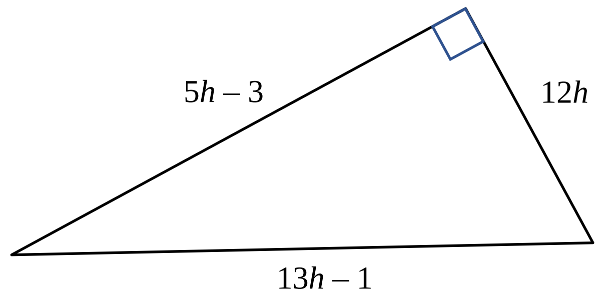
2.



$$(a+7)^2+8^2=(a+10)^2$$
$$\cancel{a^2}+14a+49+64=\cancel{a^2}+20a+100$$
$$14a+113=20a+100$$
$$-6a=-13$$
$$a=\frac{13}{6}$$
$$a=2\tfrac{1}{6}$$

The legs equal 8 and $9\frac{1}{6}$ and the hypotenuse equals $12\frac{1}{6}$.

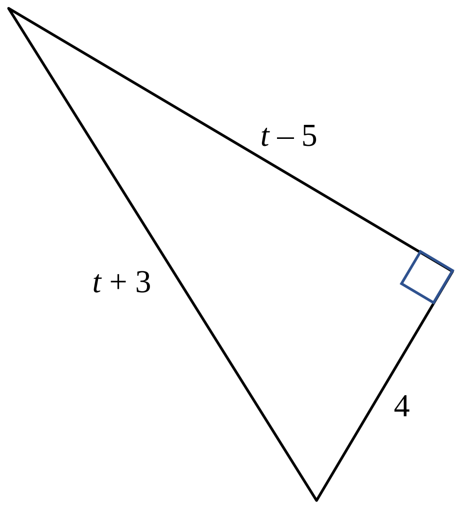
3.



$$(5h-3)^2+(12h)^2=(13h-1)^2$$
$$\cancel{25h^2}-30h+9+\cancel{144h^2}=\cancel{169h^2}-26h+1$$
$$-30h+9=-26h+1$$
$$8=4h$$
$$4h=8$$
$$h=2$$

The legs are 7 and 24. The hypotenuse is 25.

4.



$$(t-5)^2+4^2=(t+3)^2$$

$$\cancel{t^2}-10t+25+16=\cancel{t^2}+6t+9$$

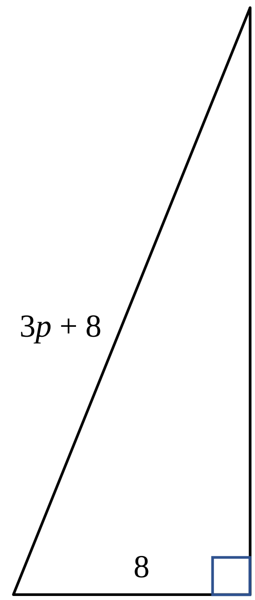
$$32=16t$$

$$16t=32$$

$$t=2$$

One of the legs will be equal to –3. This is impossible. So this triangle cannot exist.

5.



$$8^2+(3p+4)^2=(3p+8)^2$$

$$\cancel{64}+\cancel{9p^2}+24p+16=\cancel{9p^2}+48p+\cancel{64}$$

$$16=24p$$

$$24p=16$$

$$p=\tfrac{2}{3}$$

The legs are 8 and 6. The hypotenuse is 10.