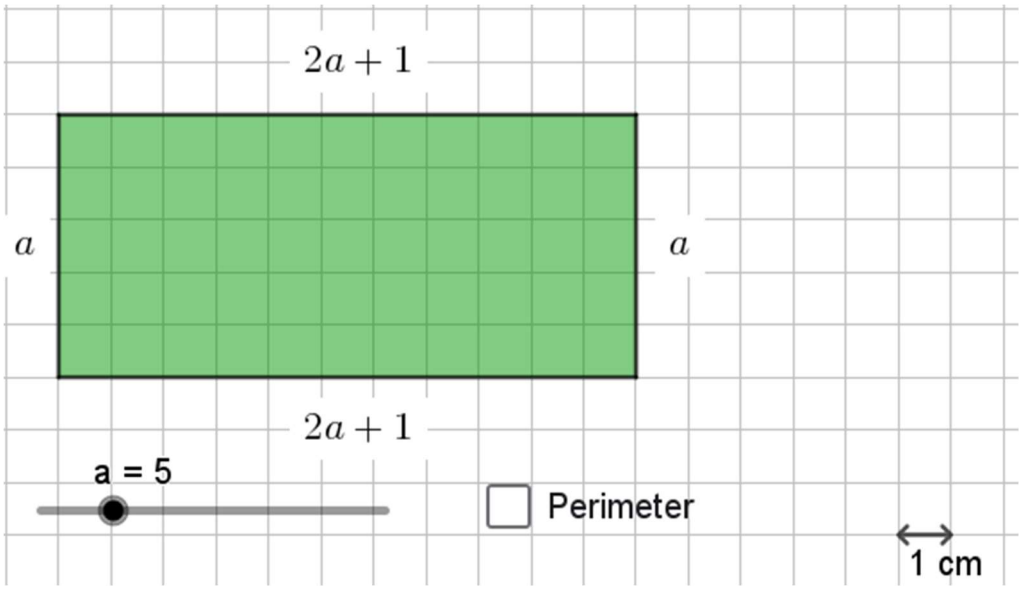
G9 Core Unit 4 Algebra Lesson 4 Polynomials and Perimeters

INTRO: Enter these two words to the vocabulary list: Variable; Constant

Use the GeoGebra activity to help answer the questions in this lesson.

Shape Study 1: Rectangle

This shape varies with the number a. In this diagram, the value of a is 5.



(a) When $a = 5$, length = , width = , Perimeter =

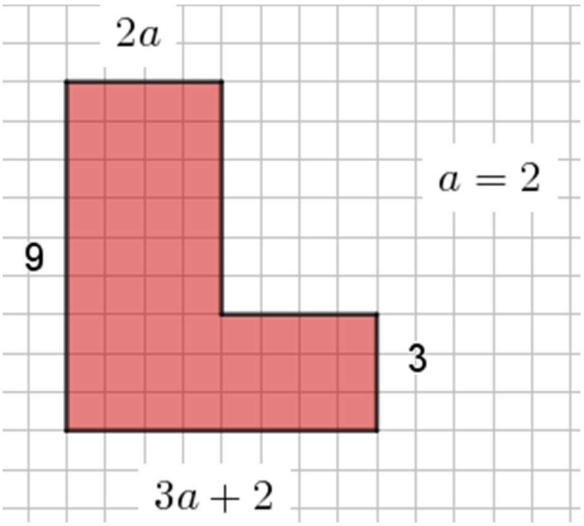
(b) When $a = 12$, length = , width = , Perimeter =

(c) Write and simplify an expression for the perimeter of the rectangle in terms of a.

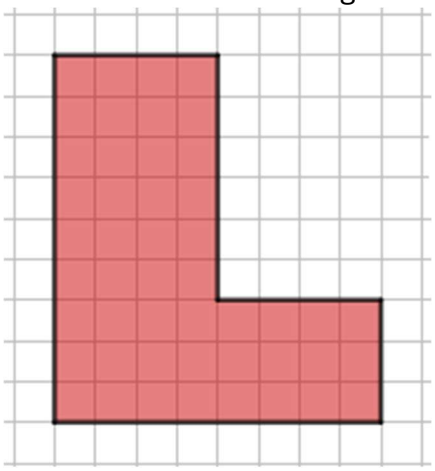
(d) Substitute these values into your expression. Use the applet to determine if your expression is correct.

a	Substitution Perimeter	Applet value
$a = 2$		
$a = 10$		
$a = 7$		

Shape Study 2: ‘L’ shape (hexagon)



Write the dimensions on each edge when $a = 2$

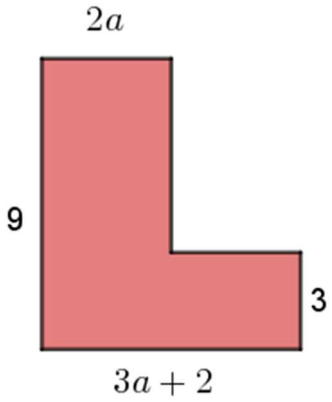


Constant or Variable?

Use the applet to vary the value of a.

Colour the edges of the ‘L’ shape that have a constant length green.

Colour the edges of the ‘L’ shape that change when a changes red.



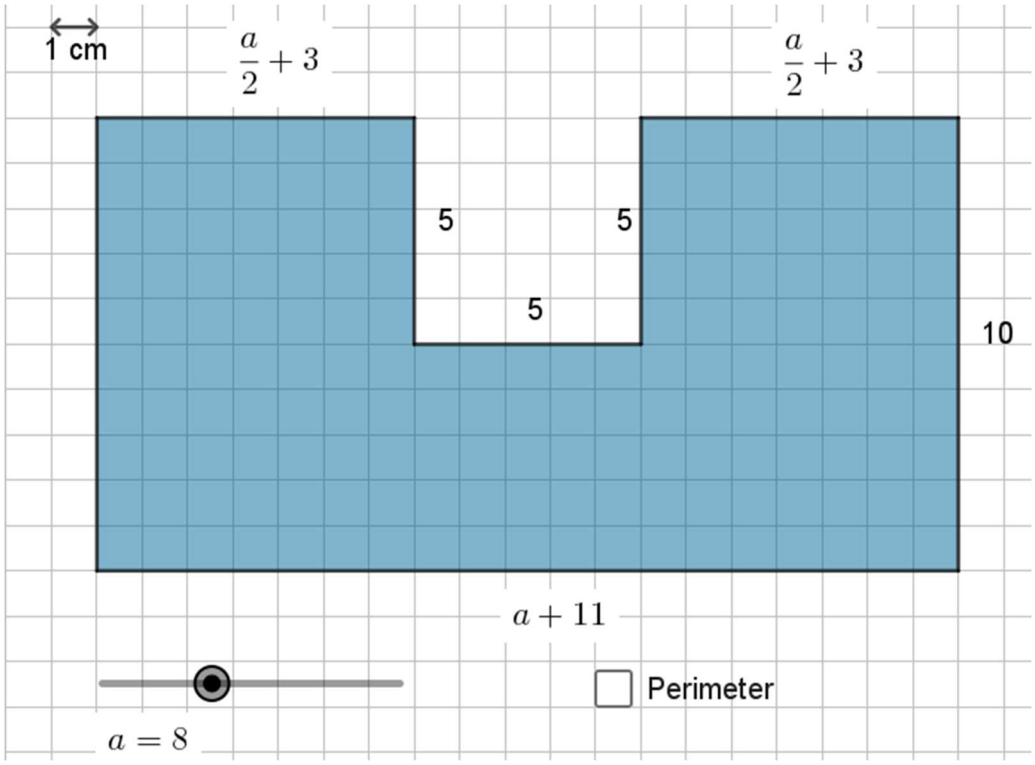
(c) Write and simplify an expression for the perimeter of the ‘L’ shape in terms of a.

(d) Substitute these values into your expression. Use the applet to determine if your expression is correct.

a	Substitution Perimeter	Applet value
$a = 2$		
$a = 10$		
$a = 7$		

Shape Study 3: ‘U’ Shape

This shape varies with the number a. In this diagram, the value of a is 8.



(a) Use the applet to vary a. Colour the sides that have a constant length green. Colour the sides that have varying length red.

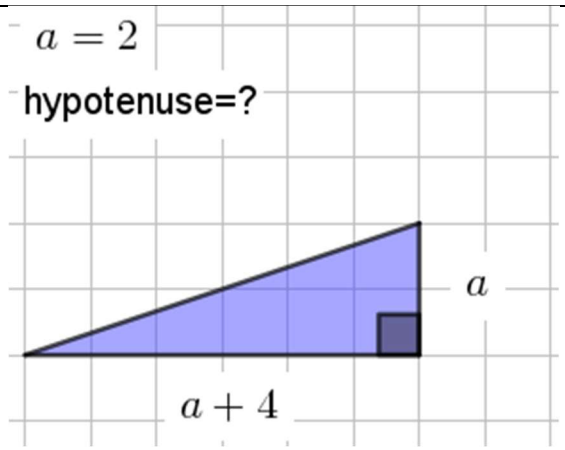
(b) Calculate the perimeter of the shape when $a = 8$

(c) Write and simplify an expression for the perimeter of the ‘U’ shape in terms of a.

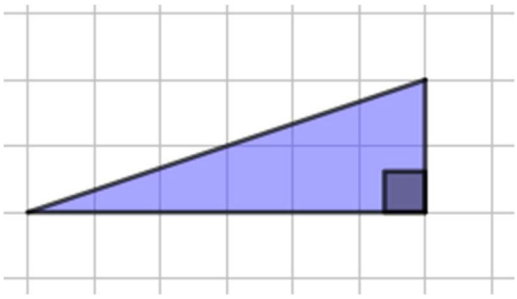
(d) Substitute these values into your expression. Use the applet to determine if your expression is correct.

a	Substitution Perimeter	Applet value
$a = 2$		
$a = 10$		
$a = 7$		

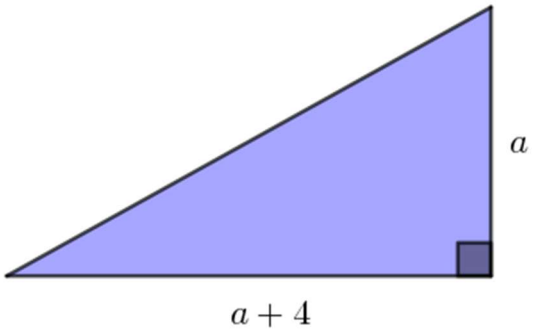
Shape Study 4: Using the Pythagorean Theorem



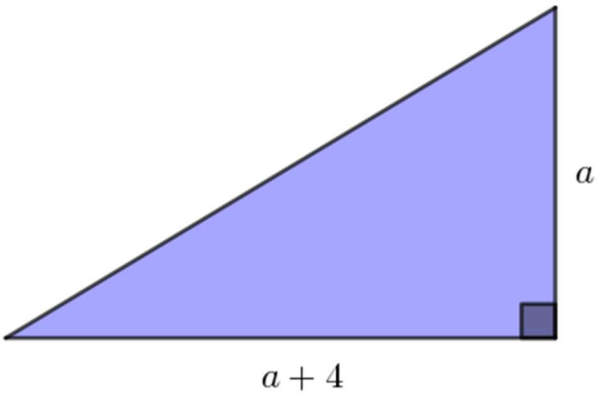
Write the dimensions on each edge when $a = 2$
Use the Pythagorean theorem to calculate the hypotenuse.



Write the dimensions on each edge when $a = 5$
Use the Pythagorean theorem to calculate the hypotenuse.



Write the dimensions on each edge when $a = 6$
Use the Pythagorean theorem to calculate the hypotenuse.



Explain why the expression for the length of the hypotenuse is:

$$h = \sqrt{(a+4)^2 + a^2}$$

(d) Substitute these values into your expression. Use the applet to determine if your expression is correct.

a	Substitution to $\sqrt{(a+4)^2 + a^2}$ Hypotenuse	Applet value
$a = 7$		
$a = 10$		