

Churchlands Mathematics Department 2020
Year 9 AEP
Test 1: Geometry and Algebraic Techniques

INSTRUCTIONS:

No calculators allowed. Drawings are not to scale.

Full working must be shown for all questions (or parts) worth more than 1 mark.

Marks will be deducted for rounding and unit errors

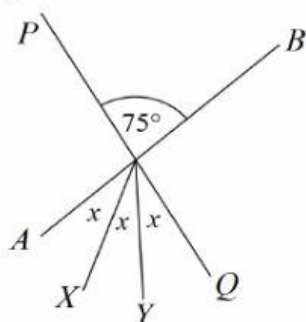
Name: _____

Time: 50 minutes

Total _____ / 55

QUESTION 1 State the value of the pronumerals in each of the following figures. Give reasons for all your answers. (2, 4 marks)

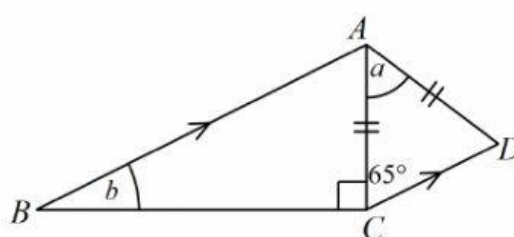
a.



$x =$ _____

reason = _____

b.



$a =$ _____

reason = _____

$b =$ _____

reason = _____

QUESTION 2 Fully factorise.

(2, 2, 3, 2 marks)

a. $-45g^2 + 18g$

()

b. $5(a - 2b) + x(a - 2b)$

()()

c. $3x^2 - 27$

()()

d. $4mn - 20mp + 12m^2$

()

QUESTION 3 Expand and simplify.

(2, 2, 2 marks)

a. $(6p - 1)(3p + 4)$

b. $(7a + 2b)^2$

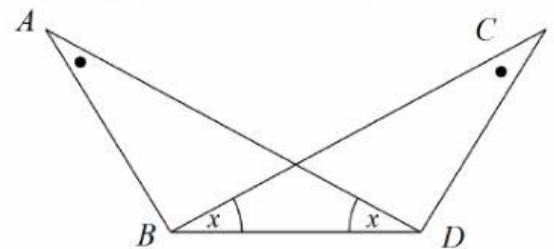
c. $(2 - 5z)(2 + 5z)$

QUESTION 4 Using the information on the diagram below and the reasons

(3, 2 marks)

a. Prove that $\triangle ABD \equiv \triangle CDB$

_____ (given)
 _____ (given)
 _____ (common)
 $\triangle \quad \equiv \quad \triangle$



$AB = 7 \text{ cm}$
 $AD = 11 \text{ cm}$

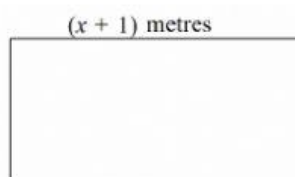
b. Find the length of BC and CD, giving reasons.

$BC =$
 $CD =$
 reason =

QUESTION 5 Refer to the rectangles below to answer the following:

(2, 2 marks)

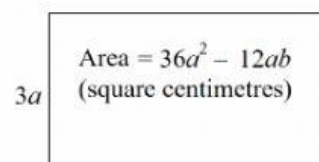
a.



Give a simplified expression for the area of the figure if its width is 5 metres less than the length as shown?

() m^2

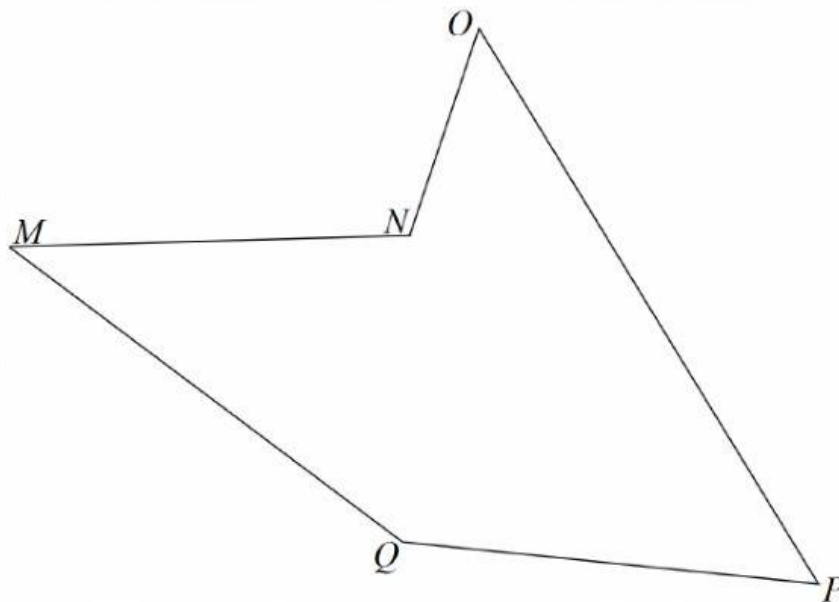
b.



Find an expression for the missing side length given the information on the figure.

() cm

QUESTION 6 Using a ruler, draw and label the image of pentagon $MNOPQ$ using a scale factor of $\frac{2}{3}$. Use vertex O as the centre of enlargement. (3 marks)



QUESTION 7 Using the diagram below (measurements in cm,) answer the following questions: (1, 1, 3 marks)

- a. Explain how it is known that $\triangle EHI \sim \triangle EFG$.

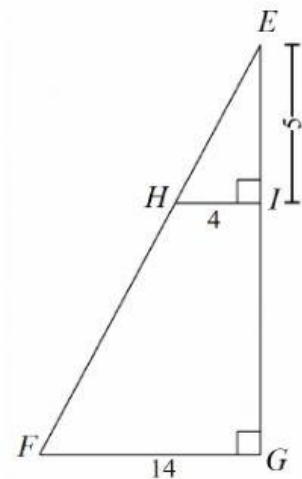
$\angle$ is —, $\angle$ = $\angle$

$\therefore$ triangles are similar ()

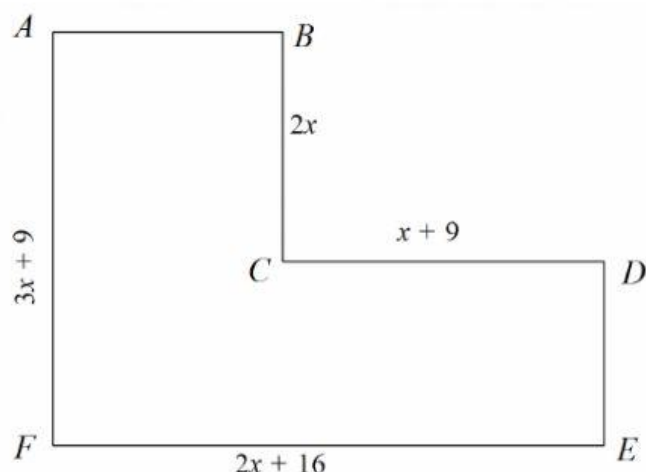
- b. What scale factor would be applied to $\triangle EHI$ to get $\triangle EFG$?

- c. Determine the area of $\triangle EFG$. (Recall $\Delta \text{Area} = \frac{1}{2}bh$)

$A = \text{ ——— } \text{cm}^2$



QUESTION 8 The diagram below is the design for an L-shaped swimming pool with dimensions in metres as shown. The pool is enlarged or reduced depending on the value of x . (2, 1, 1, 3, 2 marks)



- a. Find, in terms of x , the length of:
i. AB ii. DE

- b. Show that the perimeter of the pool is equal to $(10x + 50)$ metres.

- c. What is the perimeter if $x = 2$?

- d. Find the area of the swimming pool in terms of x . Expand and simplify your answer.

- e. It is decided that a square swimming pool would be a better use of space. By factorising your answer to part d, find the dimensions, in terms of x , of a square swimming pool with the same area as the L-shaped pool.

$$(\quad)m \times (\quad)m$$

QUESTION 9 Using the information in the figure below:

(3, 1, 1 marks)

a. Prove that $\triangle ABM$ is similar to $\triangle CDM$

$\angle = \angle$ (given)

$_ = _$ (given)

$\triangle \parallel \triangle$ ()

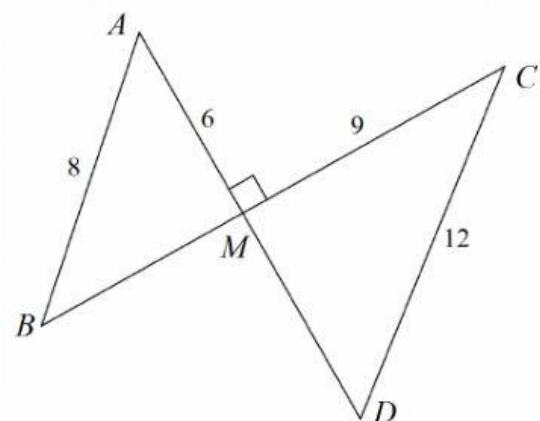
b. Hence prove that $\angle B = \angle D$.

c. Is it true that $AB \parallel CD$?

You must state your answer and give a reason why/why not.

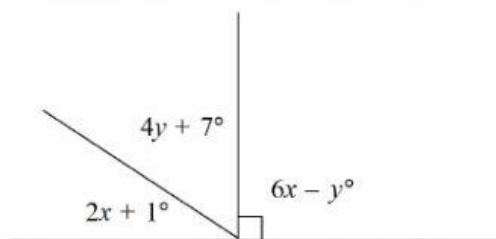
answer =

reason =



QUESTION 10 Find the value of the pronumerals in the figure below:

(3 marks)



$x =$

$y =$