

Exam Questions

Algebraic Reasoning

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Easy (5 questions)	/7
Medium (5 questions)	/10
Hard (5 questions)	/17
Total Marks	/34

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Easy Questions

1 Select the formula.

A. $7x - 2x = 5x$

B. $C = 2\pi r$

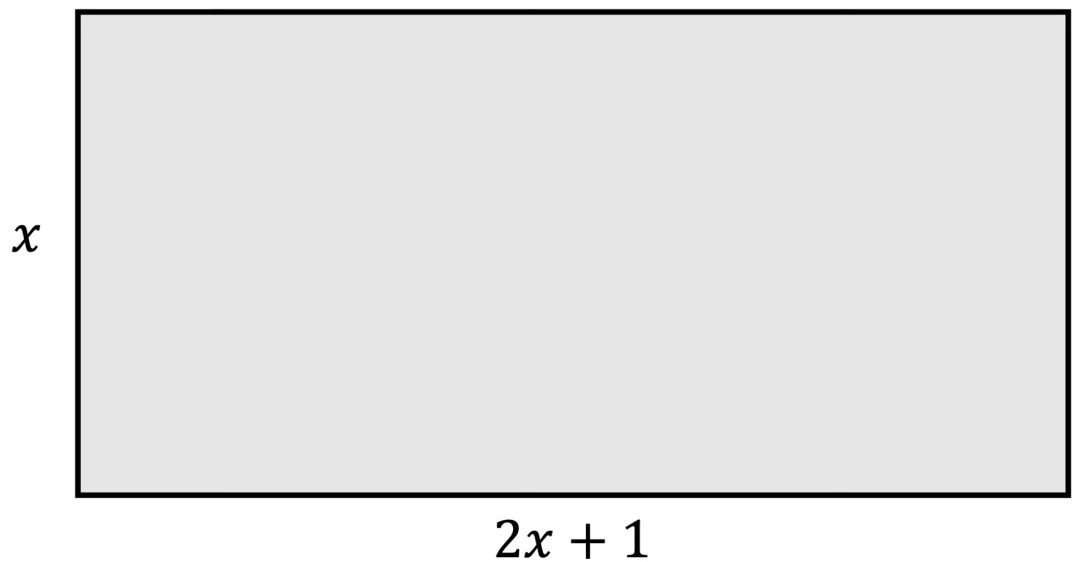
C. $2y + 8 > 3$

D. $3t + 4 = 19$

E. $6k + 5$

(1 mark)

2 Here is a rectangle.



All measurements are in centimetres.

Show that when $x = 4$, the perimeter of the rectangle is 26 cm.

(3 marks)

- 3** Write down an example to show that the following statement is **not** correct.

The sum of an even number and an odd number will be even.

(1 mark)

- 4** An unknown integer can be expressed as n .

Write down an algebraic expression for the next integer value.

(1 mark)

- 5** An integer value can be expressed as n .

Write down an algebraic expression for an even number.

(1 mark)

Medium Questions

- 1 (a) Write down an example to show that each of the following two statements is **not** correct.

The multiples of an odd number are always odd.

(1 mark)

- (b) All the digits in even numbers are even.

(1 mark)

- 2 The n th even number is $2n$.

Write down an expression for the next even number.

(1 mark)

- 3 a and b are two consecutive odd numbers.

Give an example to show that the value of $3(a + b)$ is a multiple of 12

(2 marks)

- 4 p is a positive number.

n is a negative number.

For each statement, tick the correct box.

	Always true	Sometimes true	Never true
$p + n$ is positive	☐	☐	☐
$p - n$ is positive	☐	☐	☐
$p^2 + n^2$ is positive	☐	☐	☐
$p^3 \div n^3$ is positive	☐	☐	☐

(4 marks)

5 Which of these is a correct identity?

A. $x + 4x \equiv 5x$

B. $6x \equiv 18$

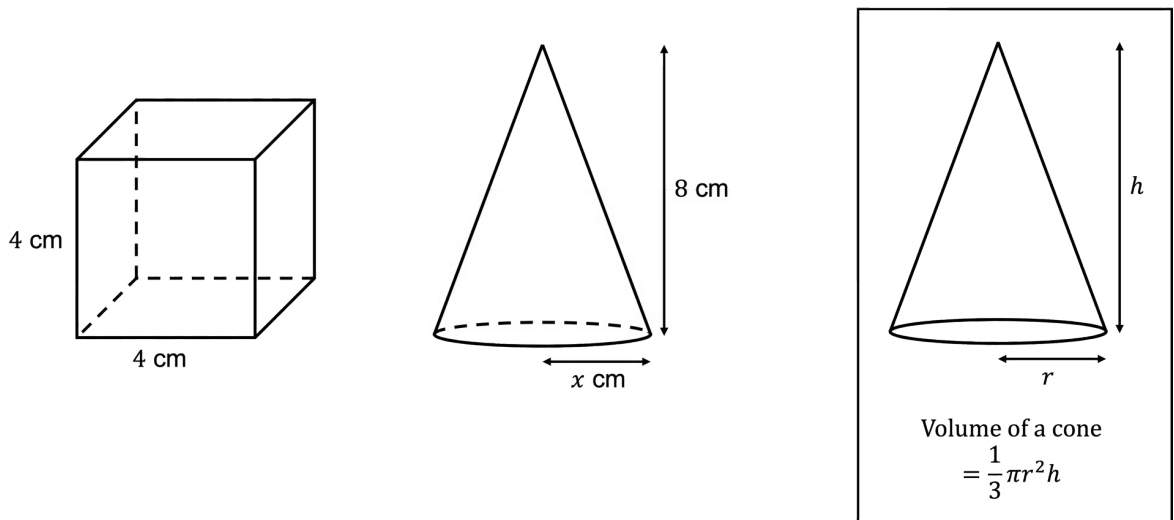
C. $2x + 1 \equiv 7$

D. $7x + 9 \equiv x$

(1 mark)

Hard Questions

- 1 The diagram shows a cube with edges of length 4 cm and cone of radius x cm and height 8 cm.



The volume of the cube is equal to the volume of the cone.

Show that $x = \sqrt{\frac{k}{\pi}}$, where k is an integer.

(4 marks)

- 2 (a) The n^{th} odd number is $2n + 1$.

The next odd number after is $2n + 3$.

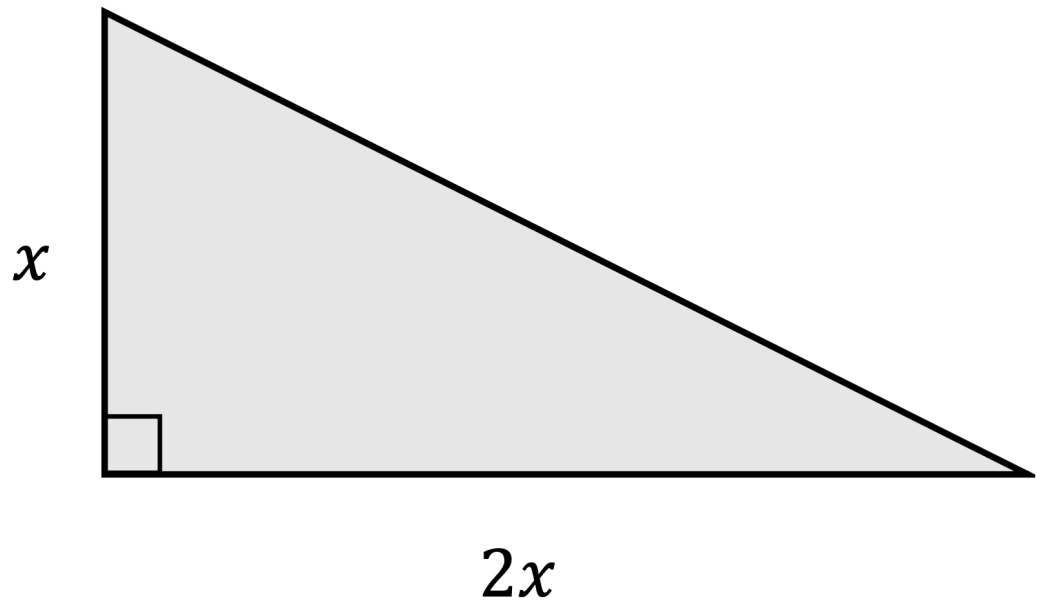
Explain why.

(1 mark)

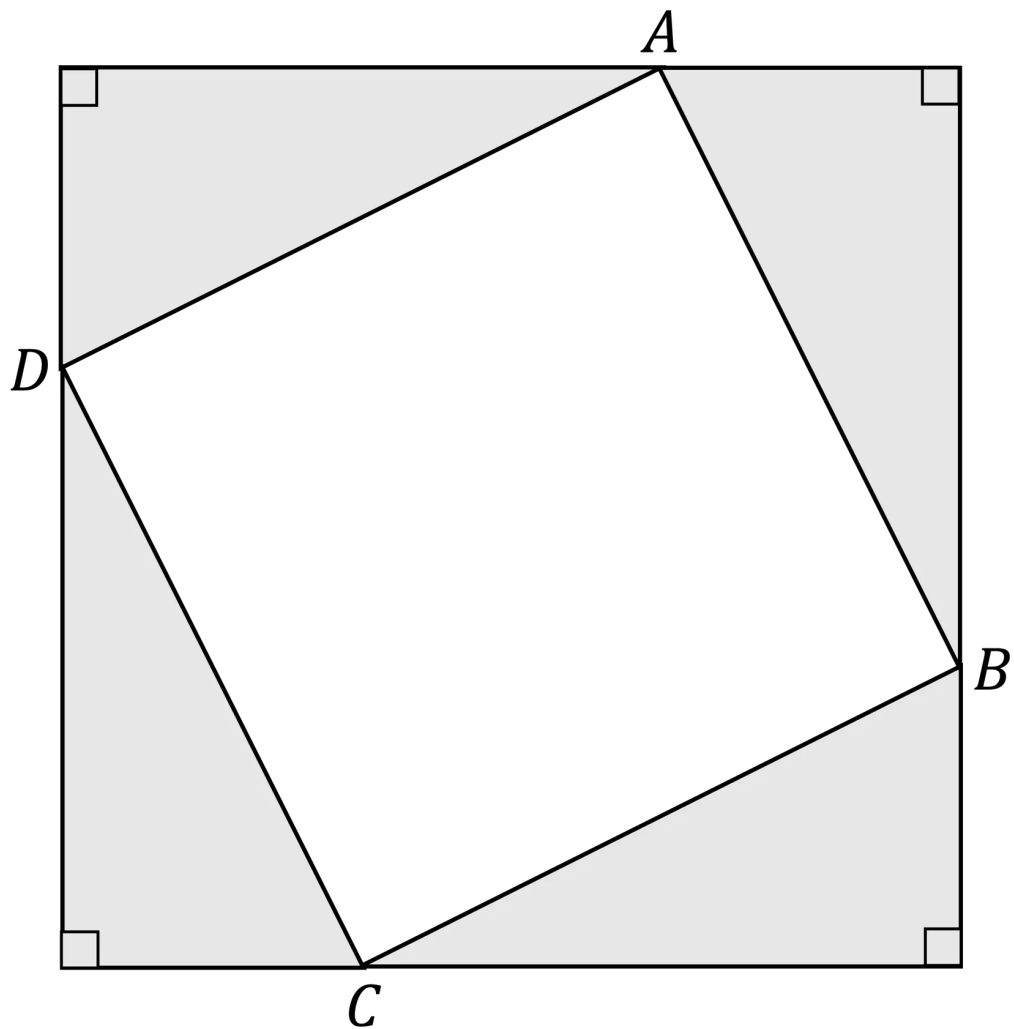
(b) Write down an expression, in terms of n , for the next odd number.

(1 mark)

3 Here is a right-angled triangle.



Four of these triangles are joined to enclose the square $ABCD$ as shown below.



Show that the area of square $ABCD$ is $5x^2$.

(3 marks)

4 (a) a and b are two even numbers.

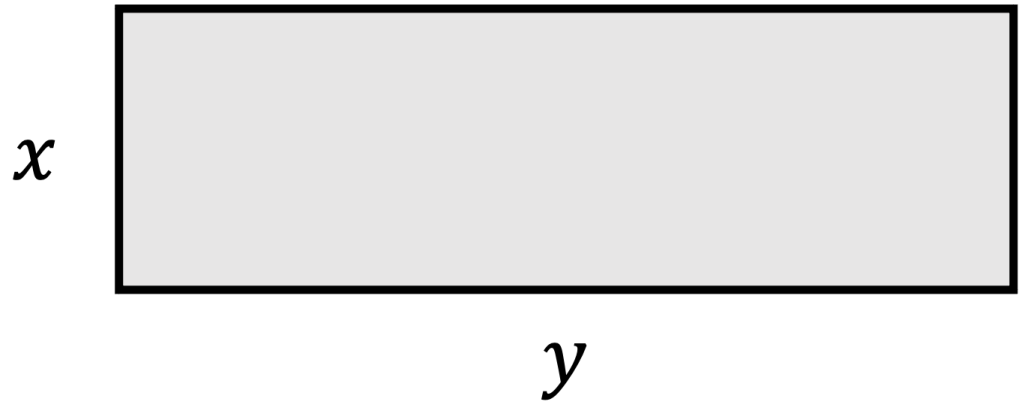
Give an example to show that the value of $3(a + b)$ is a multiple of 6

(2 marks)

- (b) Explain why when a and b are both even numbers, the value of $3(a + b)$ will always be a multiple of 6

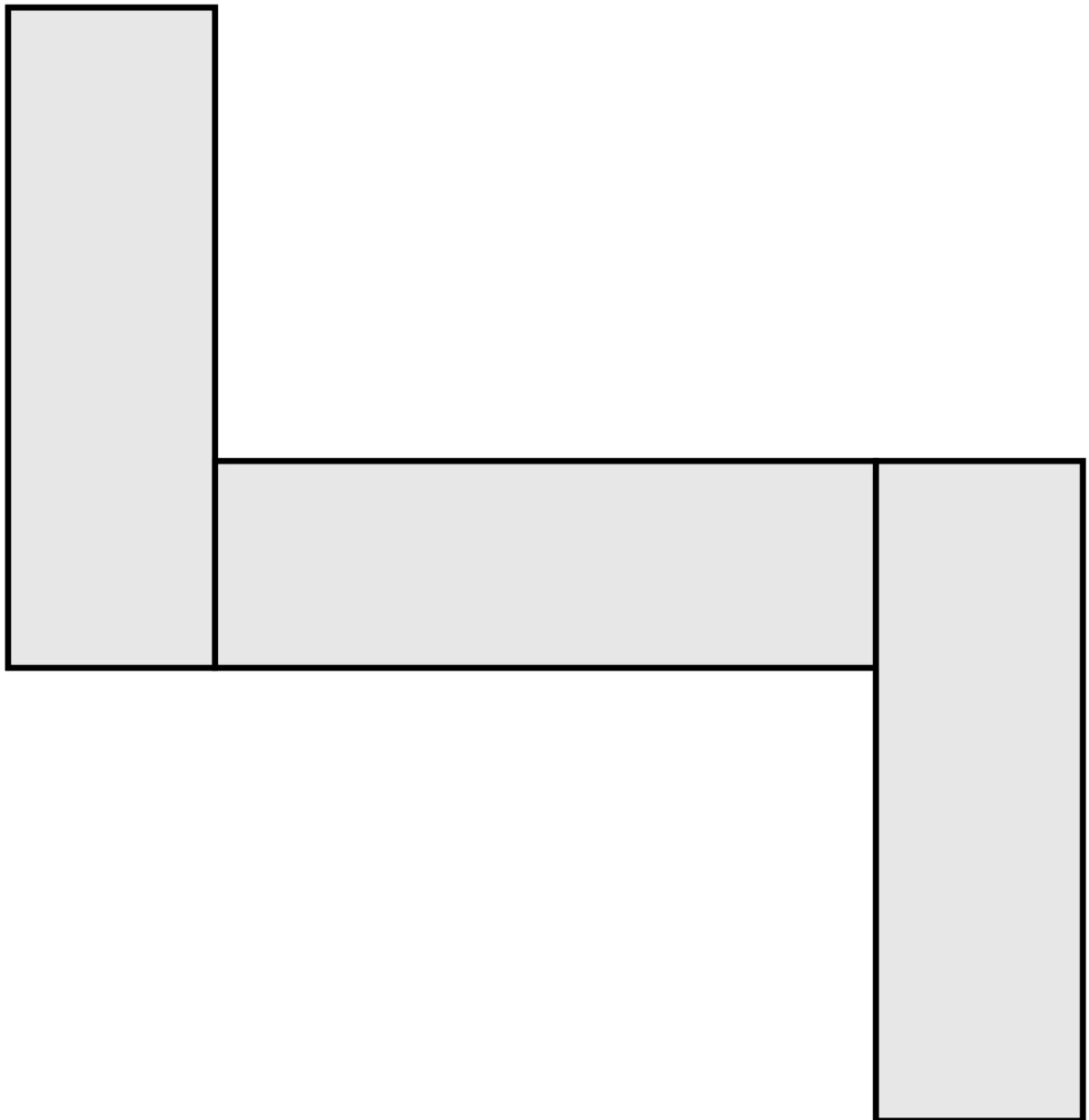
(2 marks)

5 (a) Here is a rectangular wooden block.



The measurements of the diagram are in centimetres.

Three of these wooden box are put together to construct a shelf.



The perimeter of the shelf is P cm.

Show that $P = 2x + 6y$

(2 marks)

(b) Consider the statement,

'When x and y are whole numbers, P is always a multiple of 2.'

Is this statement correct?
You must give a reason for your answer.

(2 marks)