

**Mixed Exercise 5**

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1.

Find the value of  $n$  such that  $4^n \times 8^{n+1} = 16$   
Show clear algebraic working.

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2.

Simplify  $\left(5h^{\frac{4}{3}}g^2\right)^3$

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3.

Use algebra to show that the recurring decimal  $0.0\dot{2}\dot{4} = \frac{4}{165}$

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4.

$$M = \frac{b - c}{a}$$

$a = 5.3$  correct to 1 decimal place.

$b = 346.6$  correct to 1 decimal place.

$c = 80.0$  correct to 1 decimal place.

Calculate the upper bound for the value of  $M$ .

Show your working clearly.

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5.

$(2x + 23)$ ,  $(8x + 2)$  and  $(20x - 52)$  are three consecutive terms of an arithmetic sequence.

Prove that the common difference of the sequence is 12

6.

Point  $A$  has coordinates  $(4, 1)$

Point  $B$  has coordinates  $(8, -2)$

$A$  and  $B$  lie on the straight line  $L$ .

(a) Work out the gradient of  $L$ .

(2)

(b) Find an equation for  $L$ .

Give your answer in the form  $ax + by = c$  where  $a$ ,  $b$  and  $c$  are integers.

(3)

The straight line  $M$  is parallel to  $L$  and passes through the point  $(0, 7)$

(c) Write down an equation for  $M$ .

(1)

7.

Line **L** has equation  $4y - 6x = 33$

Line **M** goes through the point  $A (5, 6)$  and the point  $B (-4, k)$

**L** is perpendicular to **M**.

Work out the value of  $k$ .

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8.

Here is triangle  $ABC$ .

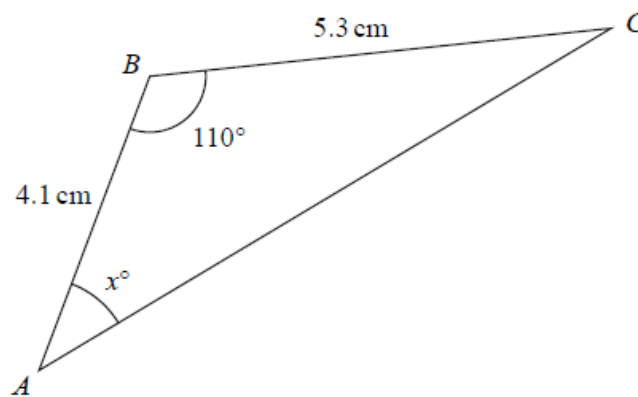


Diagram **NOT**  
accurately drawn

Calculate the value of  $x$ .

Give your answer correct to 3 significant figures.

9.

The diagram shows a parallelogram  $LMNP$ .

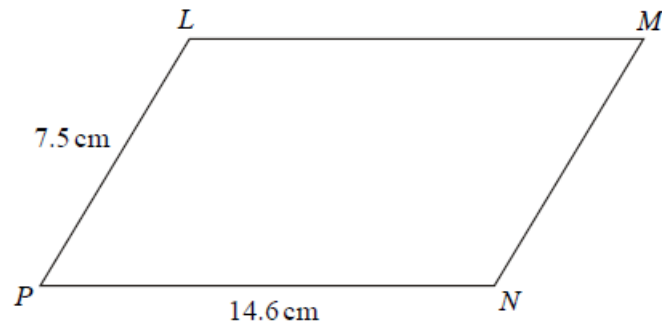


Diagram **NOT** accurately drawn

$$LN = 13.3 \text{ cm}$$

Calculate the area of the parallelogram.  
Give your answer correct to 3 significant figures.

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10.

The diagram shows a sector  $OAC$  of a circle, centre  $O$  and radius 15 cm.

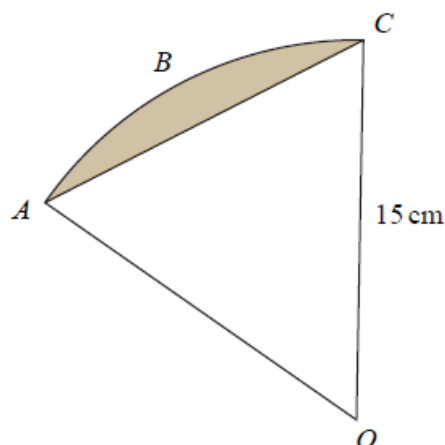


Diagram **NOT** accurately drawn

The length of arc  $ABC = 3\pi$  cm.

Work out the area of the shaded segment.  
Give your answer correct to 1 decimal place.

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11.

The diagram shows a rectangular based pyramid.

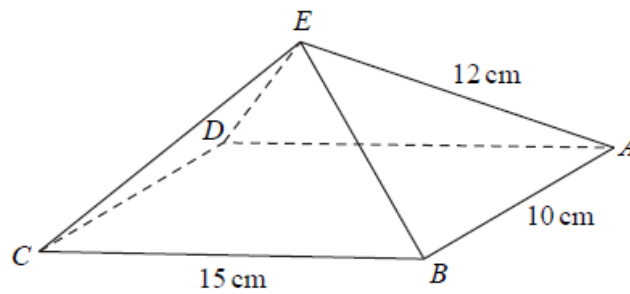


Diagram NOT  
accurately drawn

$$AE = BE = CE = DE = 12\text{ cm}$$
$$AB = 10\text{ cm and } CB = 15\text{ cm}$$

Calculate the size of angle  $CEA$ .  
Give your answer correct to 1 decimal place.

12.

(a) Rationalise the denominator of  $\frac{a + \sqrt{4b}}{a - \sqrt{4b}}$  where  $a$  is an integer and  $b$  is a prime number.

Simplify your answer.

(b) Given that  $\left(\sqrt{\frac{y}{x}}\right)^{-5} = \frac{x^m}{y^m}$  where  $x \neq y$

(3)

find the value of  $m$ .

13.

$T$  is directly proportional to the cube of  $r$

$T = 21.76$  when  $r = 4$

(a) Find a formula for  $T$  in terms of  $r$

(3)

(b) Work out the value of  $T$  when  $r = 6$

(1)

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14.

$p$  is directly proportional to the cube of  $w$

$p = 37.5$  when  $w = 5$

(a) Find a formula for  $p$  in terms of  $w$

(3)

(b) Calculate the value of  $p$  when  $w = 4$

(1)

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