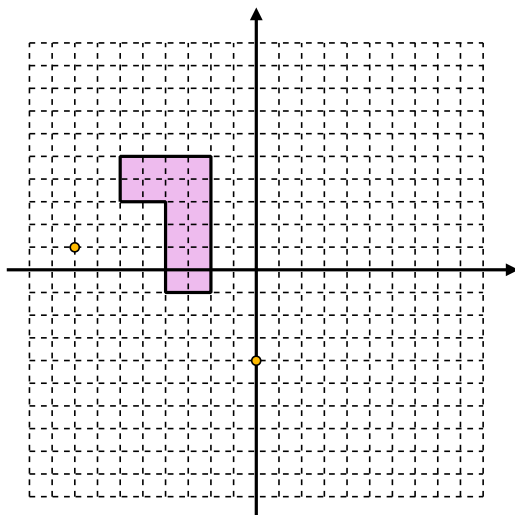


# Grade Grabber 8

40 Mark Paper

## Question 1

The shape with vertices  $(-2, -1)$ ,  $(-2, 5)$ ,  $(-6, 5)$ ,  $(-4, 3)$  and  $(-4, -1)$  has been plotted on the grid below.



On the grid mark where the shape would be if it were;

- (i) Rotated  $90^\circ$  about the point  $(0, -4)$

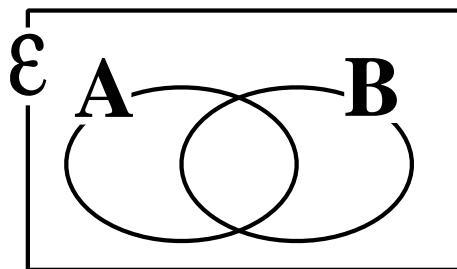
[ 2 marks ]

- (ii) Enlarged with scale factor 2, centre  $(-8, 1)$

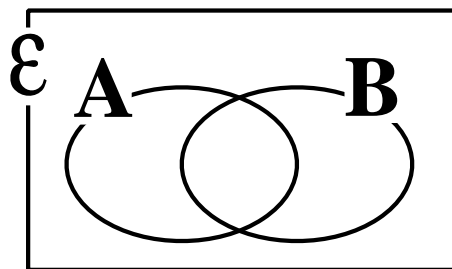
[ 2 marks ]

## Question 2

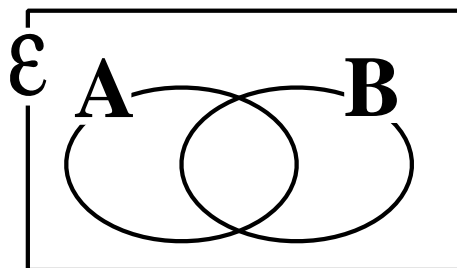
On each diagram, shade in the region specified,



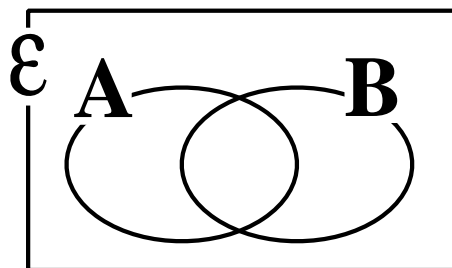
- (i)  $A \cap B$



- (ii)  $(A \cup B)'$



- (iii)  $A \cap B'$



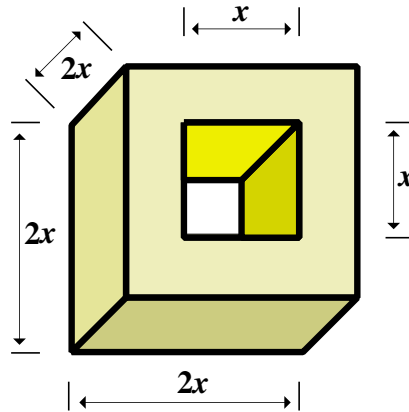
- (iv)  $A' \cup B'$

[ 4 marks ]

### Question 3

A *holed cube* is illustrated below.

It can be thought of as being a cube of side length  $2x$  with an “ $x$  by  $x$  by  $2x$ ” hole passing through.



If  $x = 3.5$  cm, calculate;

- (i) The volume of the *holed cube*,

[ 3 marks ]

- (ii) The surface area of the *holed cube*.

[ 3 marks ]

### Question 4

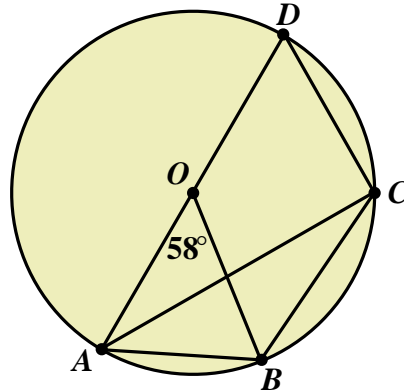
Write each of the following in the form,  $k\sqrt{2}$ , where  $k$  is an integer.

- (i)  $\sqrt{50}$                       (ii)  $\sqrt{6} \times \sqrt{48}$                       (iii)  $\frac{14}{\sqrt{2}}$

[ 1, 1, 1 marks ]

**Question 5**

In the diagram below,  $O$  is the centre of a circle, with diameter  $AOD$ ,  
 $A, B, C$  and  $D$  are points on the circumference of the circle and  $\angle AOB = 58^\circ$



( a ) ( i ) Write down the value of  $\angle ACB$ .

[ 1 mark ]

( ii ) Give a reason for your answer.

( b ) ( i ) Write down the value of  $\angle BCD$ .

[ 1 mark ]

[ 1 mark ]

( ii ) Give a reason for your answer.

[ 1 mark ]

**Question 6**

Draco bought a wand from Ollivander's wand shop for a price of 3451 Knuts.

At the end of each year, the value of the wand has depreciated by 12%.

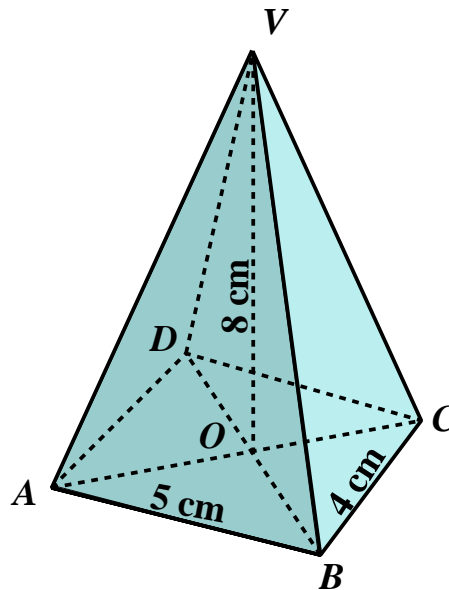
Work out the value of Draco's wand at the end of three years.

Give your answer to the nearest Knut.

[ 3 marks ]

**Question 7**

A pyramid  $ABCDV$  has a rectangular, horizontal, base  $ABCD$  of sides 5 cm and 4 cm. The vertex  $V$ , is vertically above the centre of the base  $O$ . The pyramid has height 8 cm.



Find the angle  $VAC$ .

[ 4 marks ]

**Question 8**

Given that  $x = 4 \times 5^{28}$  and  $y = 8 \times 5^{25}$

- ( i ) Find the highest common factor (HCF) of  $x$  and  $y$   
Give your answer in index form

[ 2 marks ]

- ( ii ) Find the lowest common multiple (LCM) of  $x$  and  $y$   
Give your answer in index form

[ 2 marks ]

**Question 9**

There are 15 beads in a box and  $n$  of the beads are red.

Jonty takes one bead at random from the box and does not replace it.

He takes a second bead at random from the box.

The probability that he takes 2 red beads is  $\frac{1}{7}$

( i ) Show that  $n^2 - n - 30 = 0$

[ 4 marks ]

( ii ) Solve this equation.

[ 2 marks ]

( iii ) Explain why only one of the two answers is appropriate.

[ 1 mark ]

( iv ) How many of the original 15 beads were red ?

[ 1 mark ]

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In October 2020, Shrewsbury School was voted "**Independent School of the Year 2020**"

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Teachers may obtain detailed worked solutions to the exercises by email from [mhh@shrewsbury.org.uk](mailto:mhh@shrewsbury.org.uk)