

九升十数学入学测试卷

(英文卷)

Total mark: 100

Total time: 80 mins

Name: \_\_\_\_\_

Mark: \_\_\_\_\_

- 1 (a) Abdullah and Jasmine bought a car for \$9000.  
Abdullah paid 45% of the \$9000 and Jasmine paid the rest.

(i) How much did Jasmine pay towards the cost of the car?

Answer(a)(i) \$ ..... [2]

(ii) Write down the ratio of the payments Abdullah : Jasmine in its simplest form.

Answer(a)(ii) ..... : ..... [1]

- (b) Last year it cost \$2256 to run the car.  
Abdullah, Jasmine and their son Henri share this cost in the ratio 8 : 3 : 1.  
Calculate the amount each paid to run the car.

Answer(b) Abdullah \$ .....

Jasmine \$ .....

Henri \$ ..... [3]

- (c) (i) A new truck costs \$15 000 and loses 23% of its value each year.  
Calculate the value of the truck after three years.

Answer(c)(i) \$ ..... [3]

(ii) Calculate the overall percentage loss of the truck's value after three years.

Answer(c)(ii) ..... % [3]

2

<p>NORTH EASTERN BANK</p> <p>SAVINGS ACCOUNT</p> <p><b>5%</b></p> <p>Per Year</p> <p>Simple Interest</p>	<p>SOUTH WESTERN BANK</p> <p>SAVINGS ACCOUNT</p> <p><b>4.9%</b></p> <p>Per Year</p> <p>Compound Interest</p>
--	--

Kalid and his brother have \$2000 each to invest for 3 years.

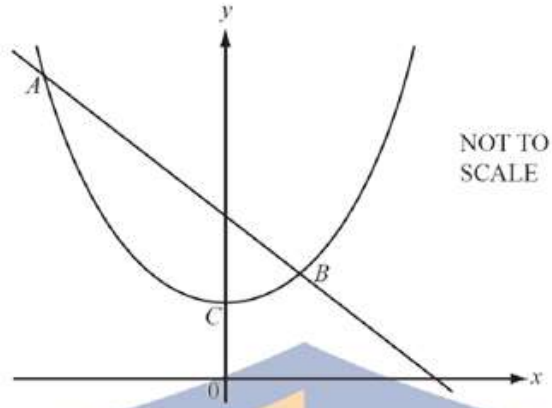
- (a) North Eastern Bank advertises savings with **simple** interest at 5% per year. Kalid invests his money in this bank. How much money will he have at the end of 3 years?

Answer(a)\$ ..... [2]

- (b) South Western Bank advertises savings with **compound** interest at 4.9% per year. Kalid's brother invests his money in this bank. At the end of 3 years, how much **more** money will he have than Kalid?

Answer(b)\$ ..... [3]

3



The diagram shows a sketch of  $y = x^2 + 1$  and  $y = 4 - x$ .

(a) Write down the co-ordinates of

(i) the point C,

[1]

(ii) the points of intersection of  $y = 4 - x$  with each axis.

[2]

(b) Write down the gradient of the line  $y = 4 - x$ .

[1]

- (c) Write down the range of values of  $x$  for which the gradient of the graph of  $y = x^2 + 1$  is negative. [1]

- (d) The two graphs intersect at  $A$  and  $B$ .

Show that the  $x$  co-ordinates of  $A$  and  $B$  satisfy the equation  $x^2 + x - 3 = 0$ .

[1]

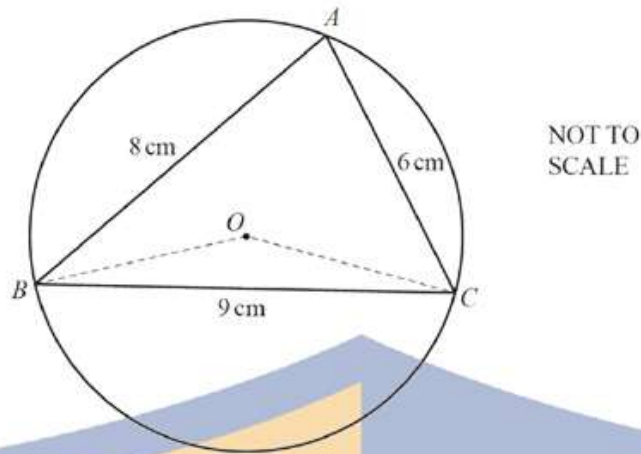
- (e) Solve the equation  $x^2 + x - 3 = 0$ , giving your answers correct to 2 decimal places.

[4]

- (f) Find the co-ordinates of the mid-point of the straight line  $AB$ .

[2]

4



The circle, centre  $O$ , passes through the points  $A$ ,  $B$  and  $C$ .

In the triangle  $ABC$ ,  $AB = 8$  cm,  $BC = 9$  cm and  $CA = 6$  cm.

- (a) Calculate angle  $BAC$  and show that it rounds to  $78.6^\circ$ , correct to 1 decimal place.

*Answer(a)*

**NC**

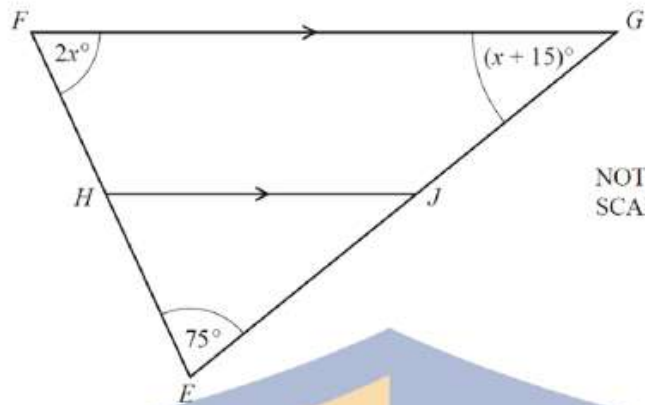
[4]

- (b)  $M$  is the midpoint of  $BC$ .

- (i) Find angle  $BOM$ .

*Answer(b)(i)* Angle  $BOM = \dots\dots\dots$  [1]

(b)



NOT TO SCALE

$EFG$  is a triangle.  
 $HJ$  is parallel to  $FG$ .  
 Angle  $FEG = 75^\circ$ .  
 Angle  $EFG = 2x^\circ$  and angle  $FGE = (x + 15)^\circ$ .

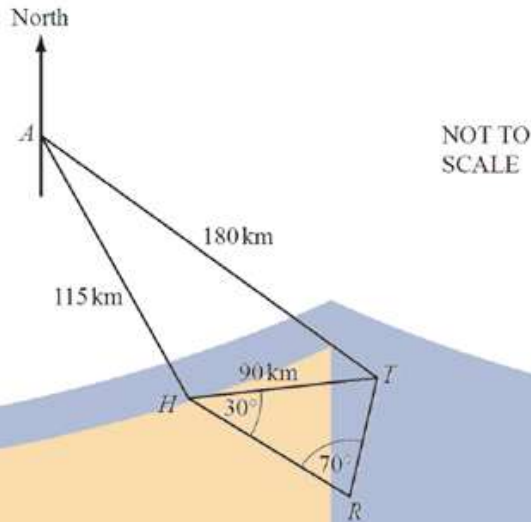
(i) Find the value of  $x$ .

Answer(b)(i)  $x = \dots\dots\dots$  [2]

(ii) Find angle  $HJG$ .

Answer(b)(ii) Angle  $HJG = \dots\dots\dots$  [1]

5



The diagram shows some straight line distances between Auckland ( $A$ ), Hamilton ( $H$ ), Tauranga ( $T$ ) and Rotorua ( $R$ ).  
 $AT = 180$  km,  $AH = 115$  km and  $HT = 90$  km.

- (a) Calculate angle  $HAT$ .  
 Show that this rounds to  $25.0^\circ$ , correct to 3 significant figures.

Answer(a)

[4]

- (b) The bearing of  $H$  from  $A$  is  $150^\circ$ .  
 Find the bearing of

(i)  $T$  from  $A$ ,

Answer(b)(i) ..... [1]

(ii)  $A$  from  $T$ .

Answer(b)(ii) ..... [1]

- (c) Calculate how far  $T$  is east of  $A$ .

Answer(c) ..... km [3]

- (d) Angle  $THR = 30^\circ$  and angle  $HRT = 70^\circ$ .

Calculate the distance  $TR$ .

Answer(d) ..... km [3]

- (e) On a map the distance representing  $HT$  is 4.5cm.

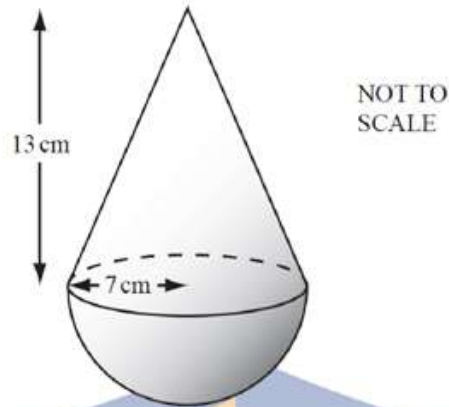
The scale of the map is  $1 : n$ .

Calculate the value of  $n$ .

Answer(e)  $n =$  ..... [2]



6



The diagram shows a solid made up of a hemisphere and a cone.  
The base radius of the cone and the radius of the hemisphere are each 7 cm.  
The height of the cone is 13 cm.

- (a) (i) Calculate the total volume of the solid.

[The volume of a hemisphere of radius  $r$  is given by  $V = \frac{2}{3}\pi r^3$ .]

[The volume of a cone of radius  $r$  and height  $h$  is given by  $V = \frac{1}{3}\pi r^2 h$ .]

[2]

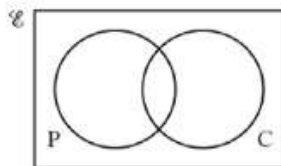
- (ii) The solid is made of wood and  $1\text{ cm}^3$  of this wood has a mass of 0.94 g.  
Calculate the mass of the solid, in kilograms, correct to 1 decimal place.

[3]

- (b) Calculate the curved surface area of the cone.  
[The curved surface area of a cone of radius  $r$  and sloping edge  $l$  is given by  $A = \pi rl$ .] [3]

- (c) The cost of covering all the solid with gold plate is \$411.58.  
Calculate the cost of this gold plate per square centimetre.  
[The curved surface area of a **hemisphere** is given by  $A = 2\pi r^2$ .] [5]

- 7 (a) There are 30 students in a class.  
20 study Physics, 15 study Chemistry and 3 study neither Physics nor Chemistry.

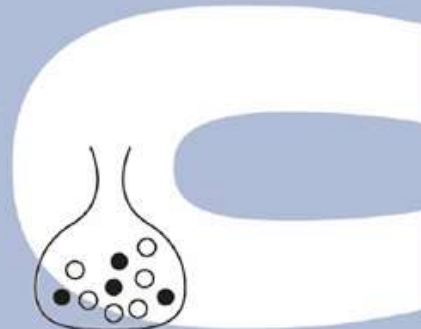


- (i) **Copy and complete** the Venn diagram to show this information. [2]
- (ii) Find the number of students who study both Physics **and** Chemistry. [1]
- (iii) A student is chosen at random. Find the probability that the student studies Physics but not Chemistry. [2]
- (iv) A student who studies Physics is chosen at random. Find the probability that this student does not study Chemistry. [2]

(b)



A

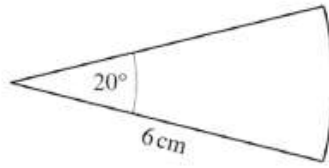


B

Bag A contains 6 white beads and 3 black beads.  
Bag B contains 6 white beads and 4 black beads.  
One bead is chosen at random from each bag.  
Find the probability that

- (i) both beads are black. [2]
- (ii) at least one of the two beads is white. [2]
- The beads are not replaced.  
A second bead is chosen at random from each bag.  
Find the probability that
- (iii) all four beads are white. [3]
- (iv) the beads are not all the same colour. [3]

- 8 (a) A sector of a circle, radius 6 cm, has an angle of  $20^\circ$ .



NOT TO SCALE

Calculate

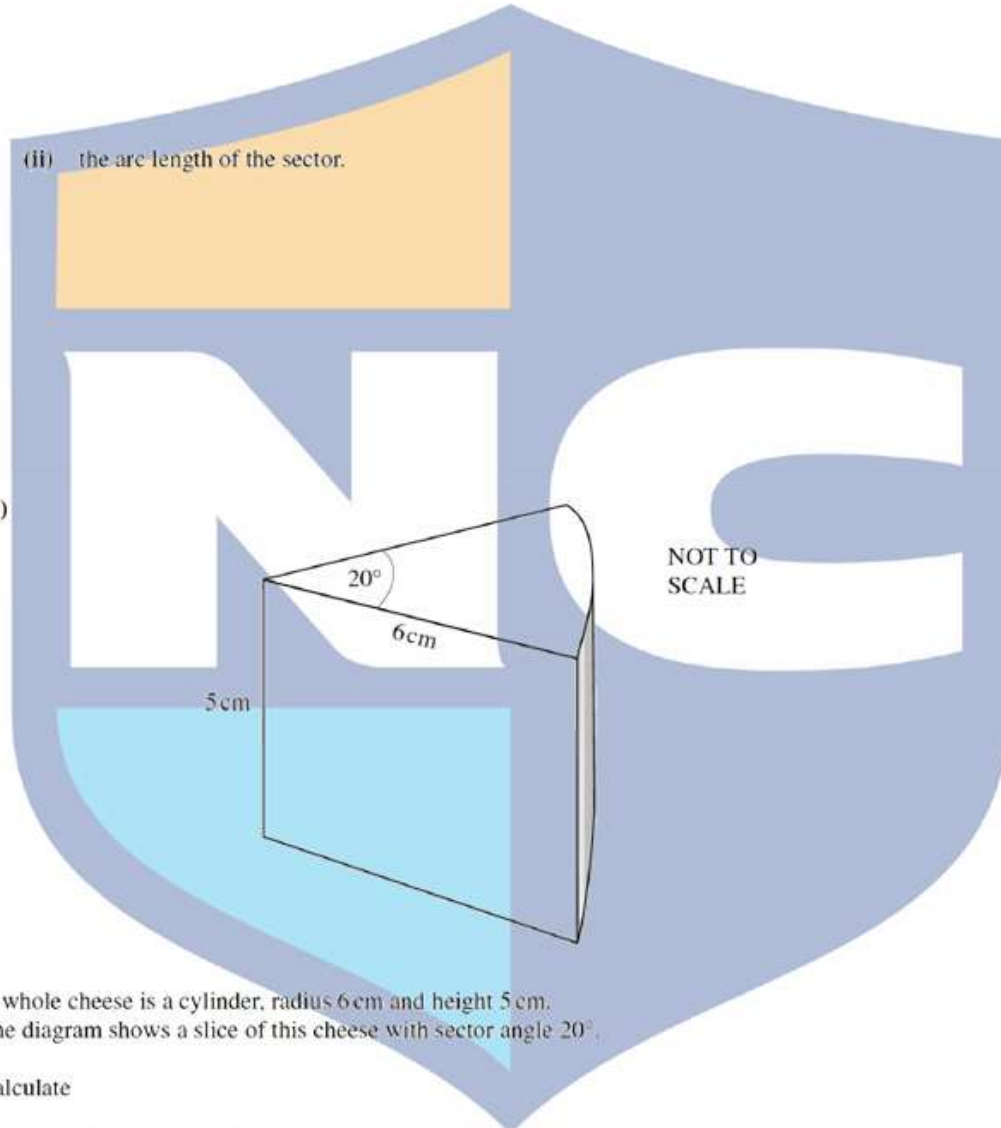
- (i) the area of the sector,

[2]

- (ii) the arc length of the sector.

[2]

(b)



NOT TO SCALE

A whole cheese is a cylinder, radius 6 cm and height 5 cm.  
The diagram shows a slice of this cheese with sector angle  $20^\circ$ .

Calculate

- (i) the volume of the slice of cheese,

[2]

(ii) the total surface area of the slice of cheese.

[4]

(c) The radius,  $r$ , and height,  $h$ , of cylindrical cheeses vary but the volume remains constant.

(i) Which one of the following statements  $A$ ,  $B$ ,  $C$  or  $D$  is true?

$A$ :  $h$  is proportional to  $r$ .

$B$ :  $h$  is proportional to  $r^2$ .

$C$ :  $h$  is inversely proportional to  $r$ .

$D$ :  $h$  is inversely proportional to  $r^2$ .

[2]

(ii) What happens to the height  $h$  of the cylindrical cheese when the volume remains constant but the radius is doubled? [2]

9. Given that a parabola passing through A(-1,0), B(4,0) and C(0,-4). A point P is moving along the arcBC.

(a) Find the equation of the quadratic function.

[2]

(b) Find the maximum area of  $\triangle PBC$ .

[3]

