



Year 9 Common - Yearly 2017

TIME : 65 minutes

Name:

Teacher:

Directions

- Full working should be shown in every question.
- Marks may be deducted for careless or badly arranged work.
- Use black or blue pen only (not pencils) to write your solutions.
- No liquid paper/correction tape is to be used.
If a correction is to be made, one line is to be ruled through the incorrect answer.
- The diagrams are not to scale.
- Approved calculators are allowed

(For Teacher use only)

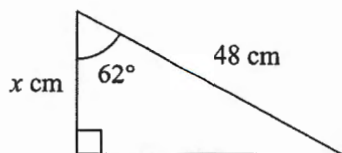
Marking Grid

	Algebra, Surds & Indices	Measurement and Trigonometry	Coordinate and Quadratics	Statistics and Probability and Financial Maths	Parabola, function and graphs	Total
Section 1	Q1 – Q4, Q6 /10		Q7-8 /4	Q5 /2		/16
Section 2		Q9 /2	Q10 /5	Q11-12 /8		/15
Section 3					Q13-14 /12	/12
Section 4		Q16-17 /7			Q15 /3	/10
Section 5	Q18 /2	Q20 /5			Q19 /2	/9
MC		Q2,3 /2	Q5 /1		Q1,4 /2	/5
Total	/12	/16	/10	/10	/19	/67

Part A		
1	Simplify: $\sqrt{98} - \sqrt{8}$	1
2	Rationalise the denominator and give the answer in simplest form. $\frac{\sqrt{2} + 3}{\sqrt{3}}$	2
3	Simplify : $\frac{9x^2 - 3x}{3x - 1}$	1
4	Simplify and write your answer with positive indices: $\frac{(a^{-4})^3 b^4}{a^9 (b^{-1})^4}$	2
5	The price of a table tennis table has increased by 6.5% to \$189. Find the price of the table before the increase.	2

6	Solve for x (i) $x^2 - 5x + 6 = 0$ (ii) $4^{2x+3} = 8^{x-5}$	2 2
7	Use the quadratic formula to solve $x^2 - 4x - 6 = 0$ and give answers in exact simplest form.	2
8	Given $x^2 + 2x - 3 = (x + a)^2 + b$ Where a and b are real numbers, find the values of a and b .	2

9 Find to 1 decimal place the value of x in the following diagram. 2



10 (a) Find the gradient of the line 1

$$3x - 2y + 5 = 0$$

(b) Find the equation of the line perpendicular to $x + 2y = 4$ which passes through $(0,7)$. 2

(c) If $(2, 3)$, $(-1, 6)$ and $(4, k)$ are collinear, find the value of k . 2

11 A car priced at \$22 600 is sold on the following terms.

30% deposit and weekly repayments of \$160 for 3 years.
(1 year = 52 weeks)

Find:

(i) The total amount paid. 1

(ii) The interest paid. 1

(iii) The annual interest rate paid for purchasing the car on terms. 2

12 The stem and leaf plot below shows the weight of 25 Year 9 students in class

Student weight in kg	
Stem	Leaf
5	1 1 2 2 3 3 3 7
6	0 1 1 3 4 5 8 9 9
7	2 2 6 8 9
8	1 3 □

(i) One entry represented by \square is missing, what is the missing entry if the range is 37 kg? 1

(ii) What is the median weight of the students? 1

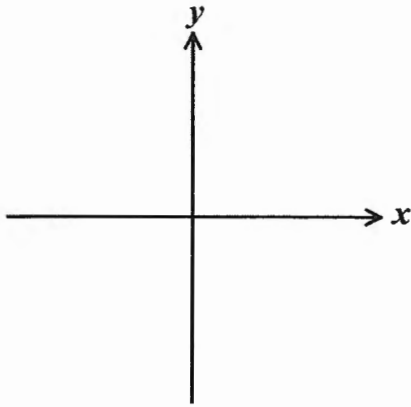
(iii) What is the modal weight of the students? 1

(iv) A student is chosen at random. What is the probability that the weight of these students will be below 60 kg? 1

13 Draw neat sketch of the following. Showing x and y intercepts, and asymptotes if applicable.

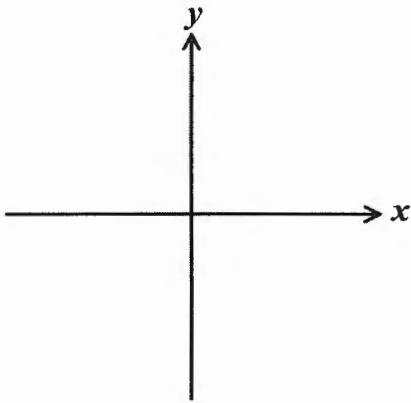
(i) $y = 2 - |x|$

2



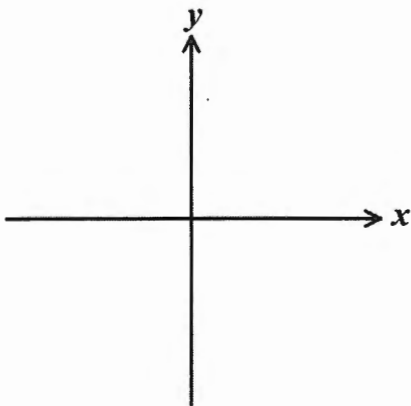
(ii) $y = \frac{2}{x-1}$

2



(iii) $y = -(x - 2)^3$

2



14 For the parabola

$$y = x^2 - 5x + 4$$

(i) What are the coordinates of the y -intercept?

1

(ii) Where does the parabola cut the x -axis?

1

(iii) What is the equation of the axis of symmetry?

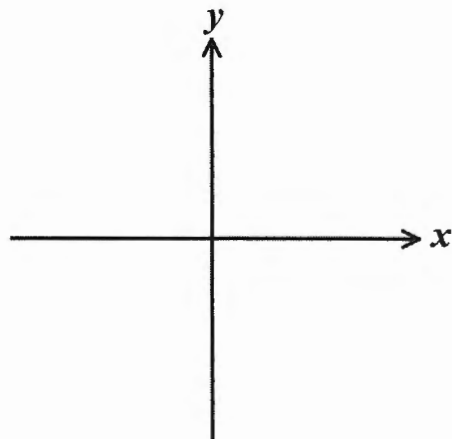
1

(iv) What are the coordinates of the vertex?

1

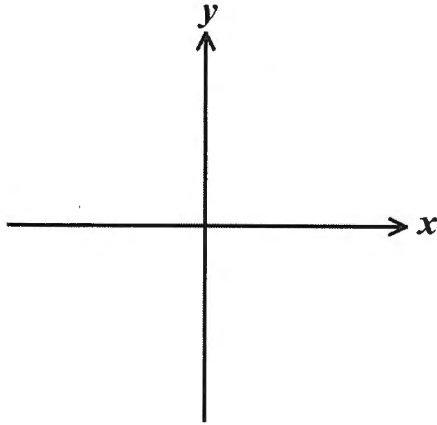
(v) Draw a neat sketch of the parabola. Showing all the above features.

2

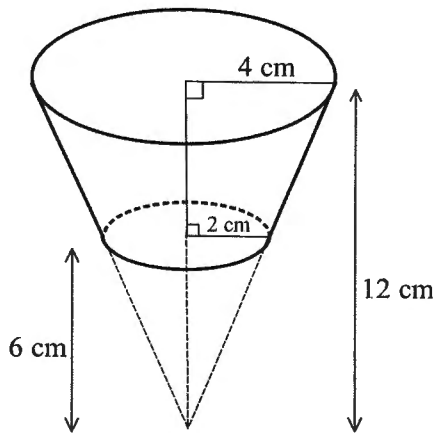


15 On a number plane shade in the region 3
given by the two conditions.

$$y \geq 2x - 1 \text{ and } x + y < 2$$



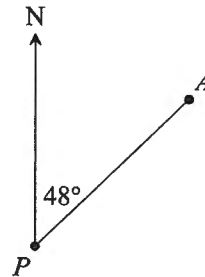
16 A solid object is in the shape of a truncated (cut off) cone. The dimensions of the truncated cone are shown below.



Find the volume of the object, correct to 2
one decimal place. 2

17 A boat leaves a port P and sails on a bearing $048^\circ T$ to A for 33 km. It then changes direction and sails for 56 km on a bearing of $138^\circ T$ and reaches S.

(i) Draw a neat diagram to show the above information. 1



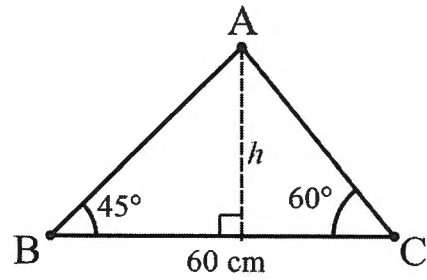
(ii) How far will the boat then be from P? 2

(iii) What is the bearing of P from S? 2

18 If $ab = 24$, $bc = 40$, $ac = 60$ and a is positive, find the value of abc . 2

19 If $f(x + 1) = 7 + 3f(x)$ and $f(1) = 4$, find $f(3)$. 2

20 Given the following diagram:



(i) Find the exact value of h . 3

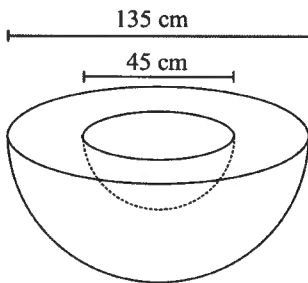
(ii) Hence find the area of the triangle ABC with rational denominator. 2

Part B Multiple Choice
Circle the correct answer

- 1** Given $f(x) = |x| - x$, then the coordinates of the midpoint of the line joining the points $(f(2), f(-2))$ and $(f(4), f(-4))$ is
- (A) (0,0)
 (B) (0,6)
 (C) (3,6)
 (D) (0,4)

- 2** A mould is made from a solid hemisphere of 135 cm diameter, with another hemisphere of 45 cm diameter removed.

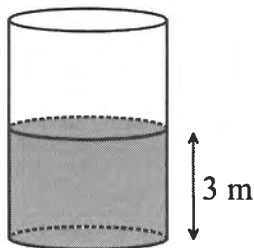
The total surface area of the mould, correct to the nearest square centimetre.



- (A) 44 533 cm^2
 (B) 44 532 cm^2
 (C) 41 351 cm^2
 (D) 12 723 cm^2

- 3** A cylindrical tank contains oil to a depth of 3m. The volume of oil in the tank is 16 000L

The radius of the tank in metres, correct to 2 decimal places is :



- (A) 41.20 m
 (B) 41.21 m
 (C) 1.70 m
 (D) 1.30 m

- 4** The centre and radius of the circle with equation $x^2 + 4x + y^2 - 10y + 18 = 0$

- (A) (2, -5), $r = \sqrt{11}$
 (B) (2, -5), $r = 11$
 (C) (-2, 5), $r = \sqrt{11}$
 (D) (-2, 5), $r = 11$

- 5** What is the value of k if the equation below has an equal roots?

$$x^2 - 6x + k = 0$$

- (A) 3
 (B) 6
 (C) 9
 (D) 12

Spare working space

End of Exam