Year 9 Common - Term 4 2020

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)

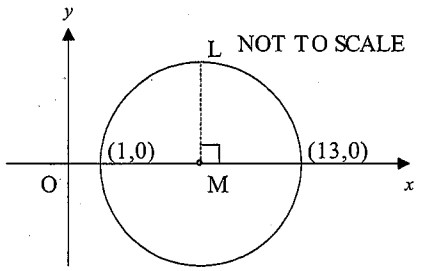
Marking Grid

	Algebra, Surds & Indices	Measurement and Trigonometry	Coordinate geometry and Quadratics	Statistics and Probability and Financial	**Total**
Part A (Page2)	*1* /2	*4,5* /5	*2* /1	*3,6* /3	/11
Page 3	*8* /2	*7* /2	*9,10* /11		/15
Page 4		*11* /4		*12* /4	/8
Page 5			*13,14* /9		/9
Page 6	*15* /2	*17* /6	*16* /4		/12
Page 7	*20* /2	*19* /6	*18* /2		/10
Page 8	*21* /3				/3
Multiple Choice	*1,3,4* /3		*2* /1		/4
Total	/14	/23	/28	/7	/72

Part A

1 Simplify $3\sqrt{32} + \sqrt{8}$ **2**

2 **1**

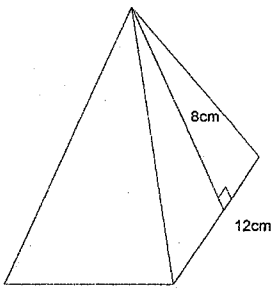


M is the centre of the circle.
What are the co-ordinates of L?

3 The simple interest earned over 3 years for an investment of \$5000 is \$1060. What is the interest rate (2 dp)? **1**

4 A cube has a surface area of 150 cm^2. What is the side length of the cube? **1**

5 A squared-based pyramid is given below:



(a) Find the surface area of the pyramid. **2**

(b) Find the volume of the pyramid to 1dp. **2**

6 This back-to back stem-and-leaf plot displays the test results for a class of 27 students

Boys		Girls
1	2	1 2 4
3	3	0 2 3 5
9 7 4	4	4 4 5 9 9 9
6 4 2 2	5	3
3 0	6	1 9

(a) What is the difference between the medians for boys and girls? **1**

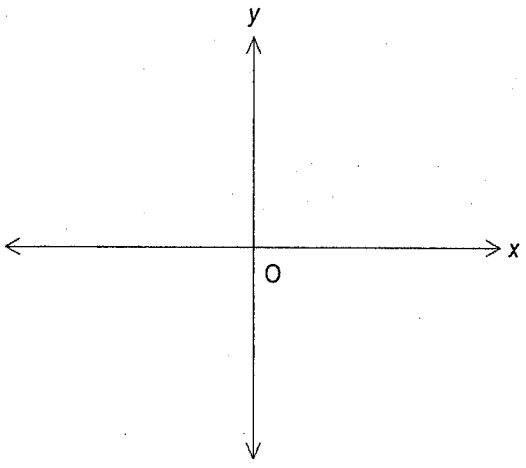
(b) What is the mode of the test results for girls? **1**

7 If $\sin\theta = \frac{4}{7}$ and θ is acute, find the exact value of $\tan\theta$. **2**

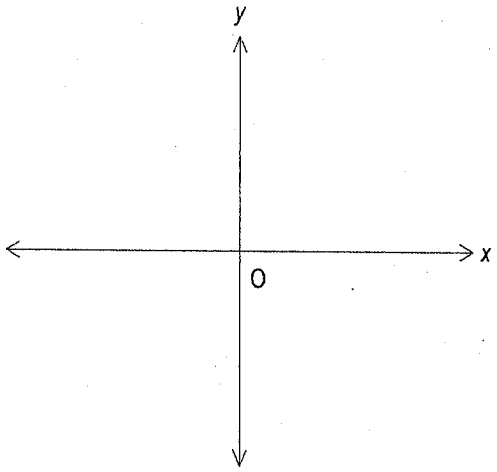
8 Simplify $\frac{4-2\sqrt{2}}{4+2\sqrt{2}}$ **2**

9 Draw neat sketches of the following equations labelling the x and y intercepts and asymptotes where applicable.

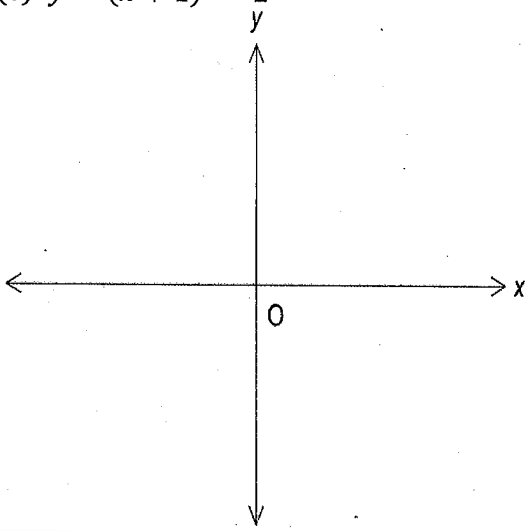
(a) $y = |x+1|$ **3**



(b) $y = \frac{1}{x-3} - 1$ **3**

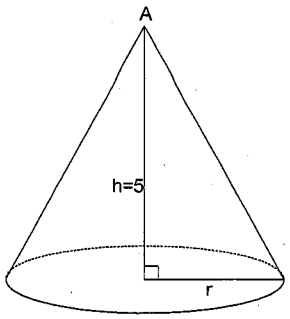


(c) $y = (x+1)^2 - 2$ **3**



10 If $x^2 + 7x - 4 = 0$, find the values of x. Give exact answer(s). **2**

11



A solid cone has a radius r = 2.4 cm and perpendicular height of 5 cm.
Calculate to 2 decimal places:

(a) the slant height. **2**

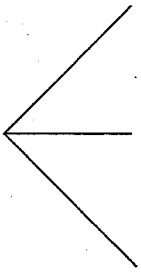
(b) the surface area of the cone. **1**

(c) What fraction of the volume of a cylinder (same radius 2.4 cm and height 5 cm) is the volume of this cone? **1**

12

A box contains 3 cards with a digit 2, 3 and 6 written on it.
Two cards are selected at random **without** replacement one after the other.

(a) Draw a tree diagram to show the possible 2-digit numbers formed. **1**



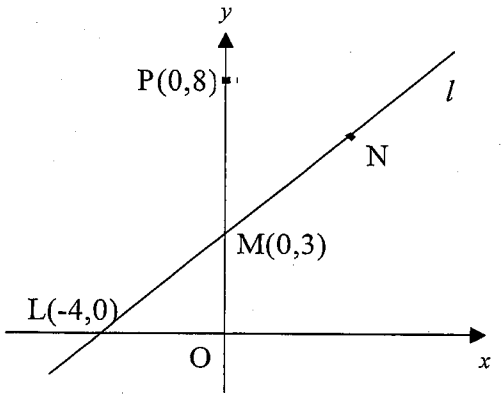
(b) What is the probability that the 2-digit number formed is

(i) even **1**

(ii) greater than 30 **1**

(iii) multiple of 3 **1**

13 The line l has intercepts at L (-4,0) and M (0,3). N is a point on l and P has coordinates (0,8).



NOT TO SCALE

(a) Find the gradient of the line l. **1**

(b) Find the equation of l. **1**

(c) Show that ΔLMP is isosceles. **1**

(d) If M is the midpoint of LN, find the coordinates of N. **1**

14 For the parabola

$$y = x^2 - 5x + 6$$

(a) Find the x-intercepts. **2**

(b) Find the y-intercept. **1**

(c) Find the equation of the axis of symmetry. **1**

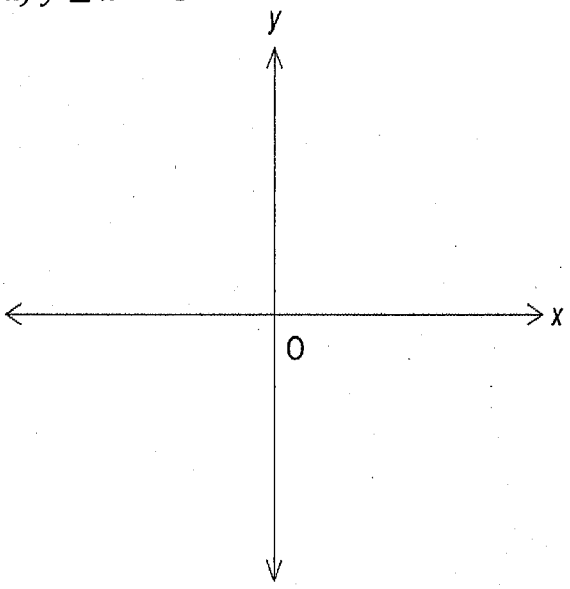
(d) Find the coordinates of the vertex. **1**

15 Solve the following equation

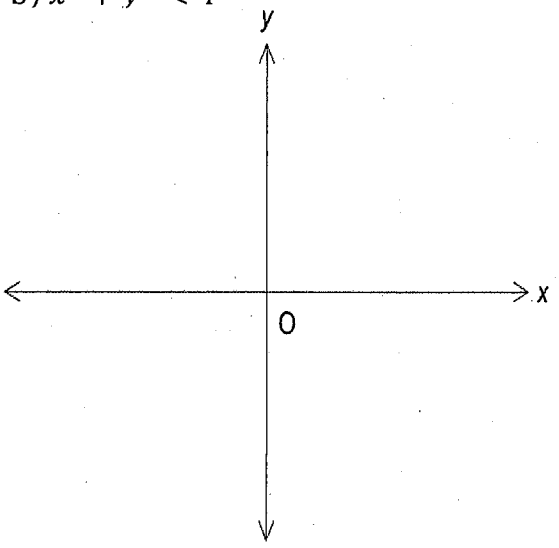
$2^{2x}=32^{x+1}$ **2**

16 Sketch the regions of the following:

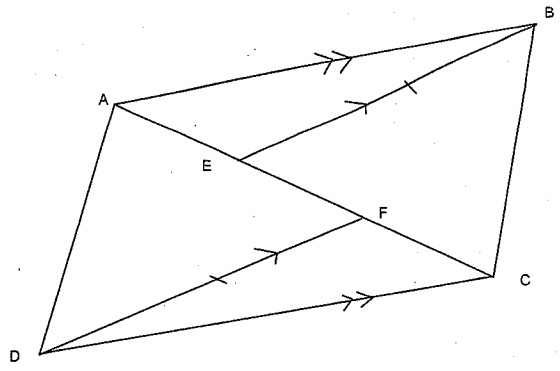
a) $y \geq x^2 - 3$ **2**



b) $x^2 + y^2 < 4$ **2**



17



In the figure, AB//DC, EB//DF and EB=DF.

(a) Prove that $\angle AEB = \angle DFC$ **2**

(b) Prove that $\Delta AEB \equiv \Delta CFD$ **3**

(c) Explain why AB=CD **1**

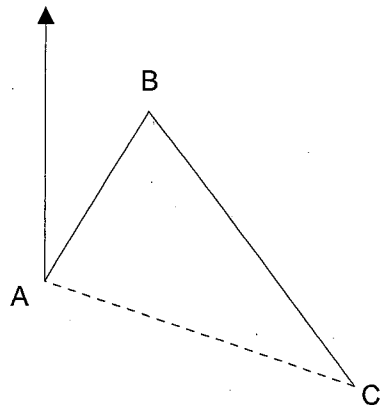
18 Solve by completing the square:
(Give exact answers)

$$x^2 - 10x = 4$$

2

19 A yacht sails on a course of $030°T$ from A to B for 50 nautical miles (nm) and then on a course of $120°T$ from B to C for $70nm$.

(a) Put this information on the diagram below **1**



2

(b) Show that $\angle ABC = 90°$

(c) How far is the yacht from the starting point A? **2**

(d) Find $\angle BCA$ (to the nearest degree) **1**

20 Factorise completely **2**

$256 - k^4$

21 If $\frac{3a+4b}{2a-2b}=5$

(i) Make a the subject **2**

(ii) Hence or otherwise find the value of $\frac{a^2+2b^2}{ab}$ **1**

Part B: Multiple Choice

1 The expression $\left(\frac{3}{x}\right)^{-3}$ is equivalent to

A. $27x^3$

B. $\frac{x^3}{27}$

C. $\frac{27}{x^3}$

D. $\frac{1}{27x^3}$

2 The line parallel to $3x-5y+2=0$ has equation

A. $5x-3y+4=0$

B. $3x+5y-1=0$

C. $5x+3y-4=0$

D. $3x-5y-3=0$?

3 Simplify $3^n+3^n+3^n$

A. 3^{n+1}

B. 3^{3n}

C. 9^n

D. 9^{3n}

4 If $\left(a+\sqrt{2}\right)^2=m+6\sqrt{2}$, where m and a are integers, then which of the following is true?

A. $a=3, m=9$

B. $a=3, m=11$

C. $a=6, m=36$

D. $a=6, m=38$

Spare working space

End of Exam