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| Class: | Candidate Name: | Candidate Index Number: |
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SHUQUN SECONDARY SCHOOL

2011 End-of-Year Examination Secondary 1 Express

MATHEMATICS

Paper 2

11 October 2011

Additional Material: Answer Paper
Graph Paper

1 Hour 30 Minutes

INSTRUCTIONS TO CANDIDATES

Write your name, class and class index number in the spaces at the top of this page and all the work you hand in.

Write in blue or black pen.

You may use a pencil for any diagrams or graphs.

Do not use staples, paper clips highlighters, glue or correction fluid.

Answer **all** questions.

If working is needed for any question, it must be shown with the answer.

Omission of essential working will result in loss of marks.

You are expected to use a scientific calculator to evaluate explicit numerical expressions.

If the degree of accuracy is not specified in the question, and if the answer is not exact, give the answer to three significant figures. Give answers in degrees to one decimal place.

For π , use either your calculator value or 3.142, unless the question requires the answer in terms of π .

At the end of the examination, fasten all your work securely together.

The number of marks is given in brackets [] at the end of each question or part question.

The total of marks for this paper is **50**.

This question paper consists of **5** printed pages.

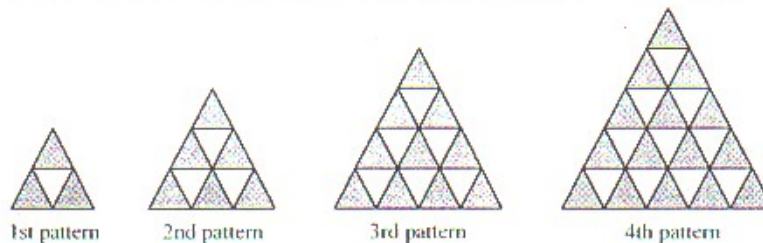
[Turn over

Answer all questions.

1. a) Express, correct to two significant figures,
- i) 208.897 [1]
- ii) 0.020859 [1]
- b) Hence estimate, correct to one significant figure, the value of $\frac{(208.897)^2}{0.020859}$. [1]
-

2. a) Express 180 and 792 as a product of prime factors. Leave your answers in index notation. [2]
- b) Hence, find
- i) the LCM of 180 and 792, [1]
- ii) the least value of n such that $792n$ is a perfect cube. [1]
-

3. Study the sequence of shaded and unshaded triangles in the diagram below.



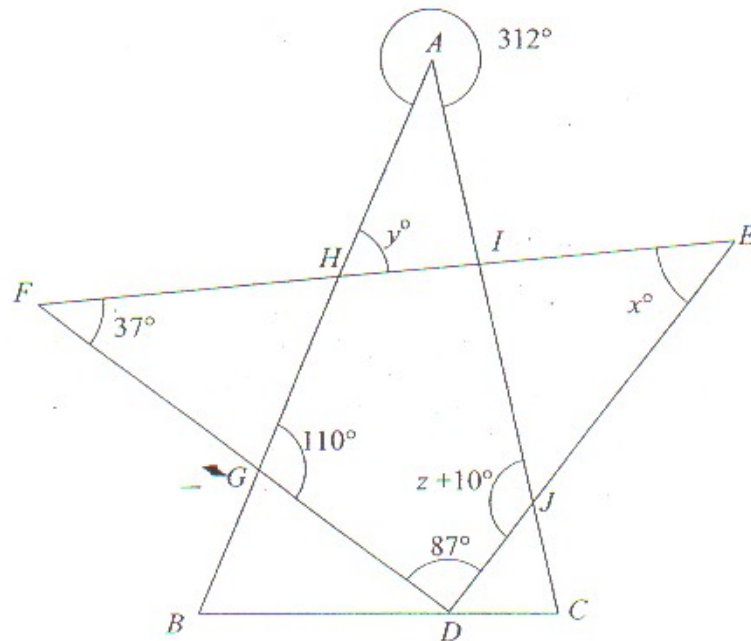
- a) The information from the pattern sequence is tabulated below.
Find the values of x and y . [2]

| Pattern (n) | 1 | 2 | 3 | 4 | 5 | 6 |
|-----------------------------------|---|---|----|----|-----|-----|
| Total number of triangles (T) | 4 | 9 | 16 | 25 | x | y |

- b) Write down an expression in terms of n , for the total number of triangles in the n th pattern. [1]
- c) Hence, find the number of triangles when $n = 25$. [1]
- d) Find the value of n when the pattern is made up of 400 triangles. [1]
-

4. In the diagram, BDC , $AHGB$, $AJJC$, $FHIE$, EJD and FGD are straight lines. Calculate the value of

- a) x ,
b) y ,
c) z .

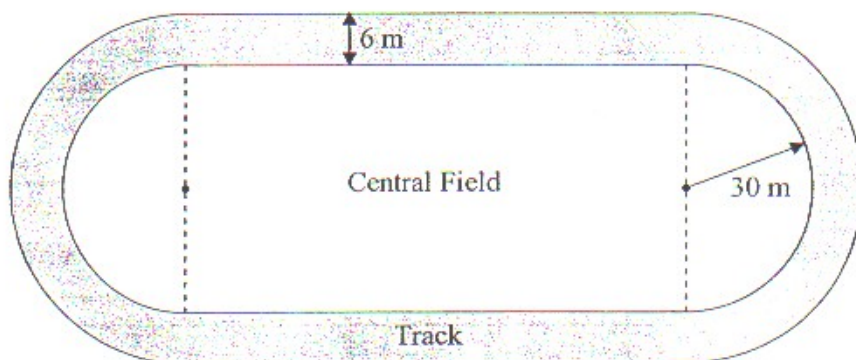


[1]

[2]

[2]

5. A track and field stadium consists of a central field surrounded by a 6 m wide running track (shaded region). The central field has two semicircular ends, each with radius 30 m and two straight sides. The perimeter of the central field is 350 m.



Find

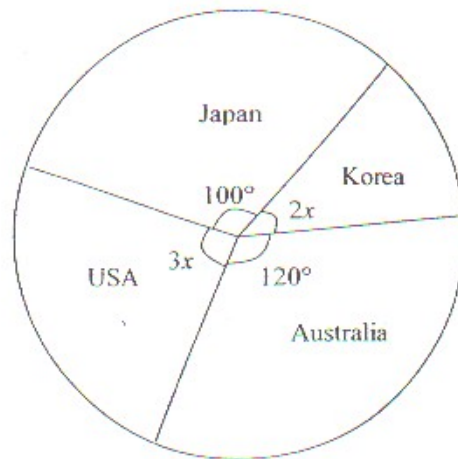
- a) the length of each straight side of the central field, [2]
b) the area of the central field, [2]
c) the area of the running track. [2]

3/3

6. a) Express $\frac{3}{x+2} - \frac{4}{x-1}$ as a single fraction in its lowest term. [3]

b) Solve $\frac{2}{x-1} = \frac{3}{2x+1}$. [3]

7. A group of students were surveyed to determine which countries they would like to visit the most. Their choices were represented on a pie chart as given below. →



- a) Find the value of x . [2]
- b) Hence, calculate the percentage of the group who would like to visit Korea the most. [2]
- c) If 400 students would like to visit Australia the most, find the total number of students surveyed. [2]
-

8. a) An aircraft flew a distance of 8756 km from London to Los Angeles at an average speed of v km/h. Write down the expression for the time in hours that it took for the journey. [1]
- b) The aircraft returned non-stop by the same route at an average speed of $3v$ km/h. Write down the expression for the time in hours that it took for the return journey. [1]
- c) Given that the difference between these two times was 15 hours, form an equation in v . Show that the equation will reduce to $17512 = 45v$. [2]
- d) Hence, solve this equation. [1]
- e) Thus, find the time in hours the aircraft took on the return journey. [1]
-

9. Answer the whole of this question on a sheet of graph paper.

The table of values for the linear function $y = -3x + 2$ is given below.

| | | | | | |
|---------------|----|-----|---|----|-----|
| x | -4 | -2 | 0 | 2 | 4 |
| $y = -3x + 2$ | 14 | a | 2 | -4 | -10 |

- a) Find the value of a . [1]
- b) Using a scale of 2 cm to represent 1 unit on the x -axis and 1 cm to represent 1 unit on the y -axis, draw the graph of $y = -3x + 2$ for the values of x from -4 to 4. [3]
- c) From the graph, find the value of x when $y = 3$. [1]
- d) Draw the line $y = 8$ and state the gradient. [2]
- e) Find the coordinates of the point when the two graphs intersect. [1]
- f) Find the gradient of the line AB where A is $(1, 6)$ and B is $(-2, -4)$. [1]
-

End of Paper

375

Answers

| | |
|-----|---|
| 1a. | 210 |
| ii. | 0.021 |
| b. | 2000 000 |
| 2a. | $2^2 \times 3^2 \times 5, 2^3 \times 3^2 \times 11$ |
| bi. | 3960 |
| ii. | 363 |
| 3a. | 36, 49 |
| b. | $(n + 1)^2$ |
| c. | 676 |
| d. | 19 |
| 4a. | 56 |
| b. | 73 |
| c. | 105 |
| 5a. | 80.74 |
| b. | 7672.2 |
| c. | 2213.112 |
| 6a. | $(-11 - x)/[(x + 2)(x - 1)]$ |
| b. | $X = -5$ |
| 7a. | 28 |
| b. | 15.6% |
| c. | 1200 |
| 8a. | $8756/v$ |
| b. | $8756/3v$ |
| c. | $8756/v - 8756/3v = 15$ |
| d. | 389 |
| e. | 7.50h |
| 9a. | $a = 8$ |
| b. | graph |
| c. | -0.3 |
| d. | 0 |
| e. | $(-2, 8)$ |
| f. | 3.33 |