Candidate's Name _____ Class _____ Index No____ ___

BUKIT PANJANG GOVERNMENT HIGH SCHOOL
END OF YEAR EXAMINATION, 2007
SECONDARY TWO SPECIAL/EXPRESS/N(A)

Mathematics
Paper 1

Date: 06/10/2006 **Duration: 1 hr 15 mins**

INSTRUCTIONS TO CANDIDATES:

Write your name, class and registration number in the spaces at the top of this page.
Answer **ALL** questions in the space provided.
If working is needed for any question, it must be shown below that question.
Omission of essential working will result in the loss of marks.
Electronic calculators and mathematical tables are **NOT** allowed in this paper.

If the answer is not exact and the degree of accuracy is not specified in the question, give your answer correct to 3 significant figures. Give answers in degrees to one decimal place.

INFORMATION FOR CANDIDATES

The number of marks is given in brackets [ ] at the end of each question or part question. The total marks for this paper is **50**.
You should not spend too much time on any one question.

For examiner's use
/ 50

This paper consists of 9 pages

All essential working and steps must be clearly shown.

1. Simplify the following.

a) $\dfrac{6}{3x-5}-\dfrac{4}{3x^2-8x+5}$

b) $\dfrac{6a^3b}{5(a+3)}\div\dfrac{ab^3}{(a+3)^2}$

Answers: a) _____ [2]

b) _____ [2]

2. Given that $A:B=\dfrac{1}{2}:\dfrac{1}{3}$ and $3B=4C$, find the ratio of A to C in the form $x:y$ where x and y are integers.

Answer: _____ [2]

3. Factorise the following expressions

a) $18x^4 - 8y^2$

b) $pq - 3q - 6 + 2p$

c) $x^4 - 4x^3 + 4x^2 - (x-2)^2$

Answer: a) _____ [2]

b) _____ [2]

c) _____ [3]

4. a) How many square pieces of paper of side 3 cm by 3 cm can be cut from a larger piece of paper measuring 11 cm by 23 cm.?

b) A cone P has a volume of 216 cm^3. Calculate the volume of a second cone, Q, which has a radius double that of cone P and height one-third that of cone P.

Answer: a) _____ [2]

b) _____ [2]

5. A shopkeeper reduced the price of some goods from \$50 to \$42. Due to poor sales, he further reduced the selling price by the same percentage as before. What would be the new selling price?

Answer: _____ [2]

6. Solve the following equations.

a) $\frac{x^2}{3} + 2x = -3$

b) $(x^3 - 4x\ )^2 = 0$

Answer: a) _____ [2]

b) _____ [2]

7. a) Given that $p = 2a\sqrt{q-4}$, find an expression for q in terms of p and a.

b) Using as much of the information below as necessary, write down the value of $\sqrt{0.014}$.

($\sqrt{14} = 3.74$, $\sqrt{1.4} = 1.18$)

Answer: a) _____ [2]

b) _____ [2]

8. If y varies as x^n, the relationship between x and y can be expressed by the equation $y = kx^n$ where k and n are constants.

Write down the value of n if

a) y varies directly as the cube of x,

b) y varies inversely as the square root of x,

c) y varies directly as the fifth root of x.

Answer: a) _____ [1]

b) _____ [1]

c) _____ [1]

9. There are a total of 40 students in a class. There are 25 boys and 15 of them are bespectacled. 20% of the girls either do not wear spectacles or they wear contact lenses to school. All the student are Chinese. On a particular day, Mr Tan picked a student to be the leader, Calculate:

a) the probability that the student picked is boy wearing spectacles.

b) the probability that the student picked is non Chinese.

c) the probability that the students picked is a girl without spectacles.

Answer: a) _____ [1]

b) _____ [1]

c) _____ [2]

10. a) Find the difference between the sum of the first 20 positive even integers and the sum of the first 20 positive odd integers. That is, find the value of

$(2 + 4 + 6 + \ldots + 40) - (1 + 3 + 5 + \ldots + 39)$

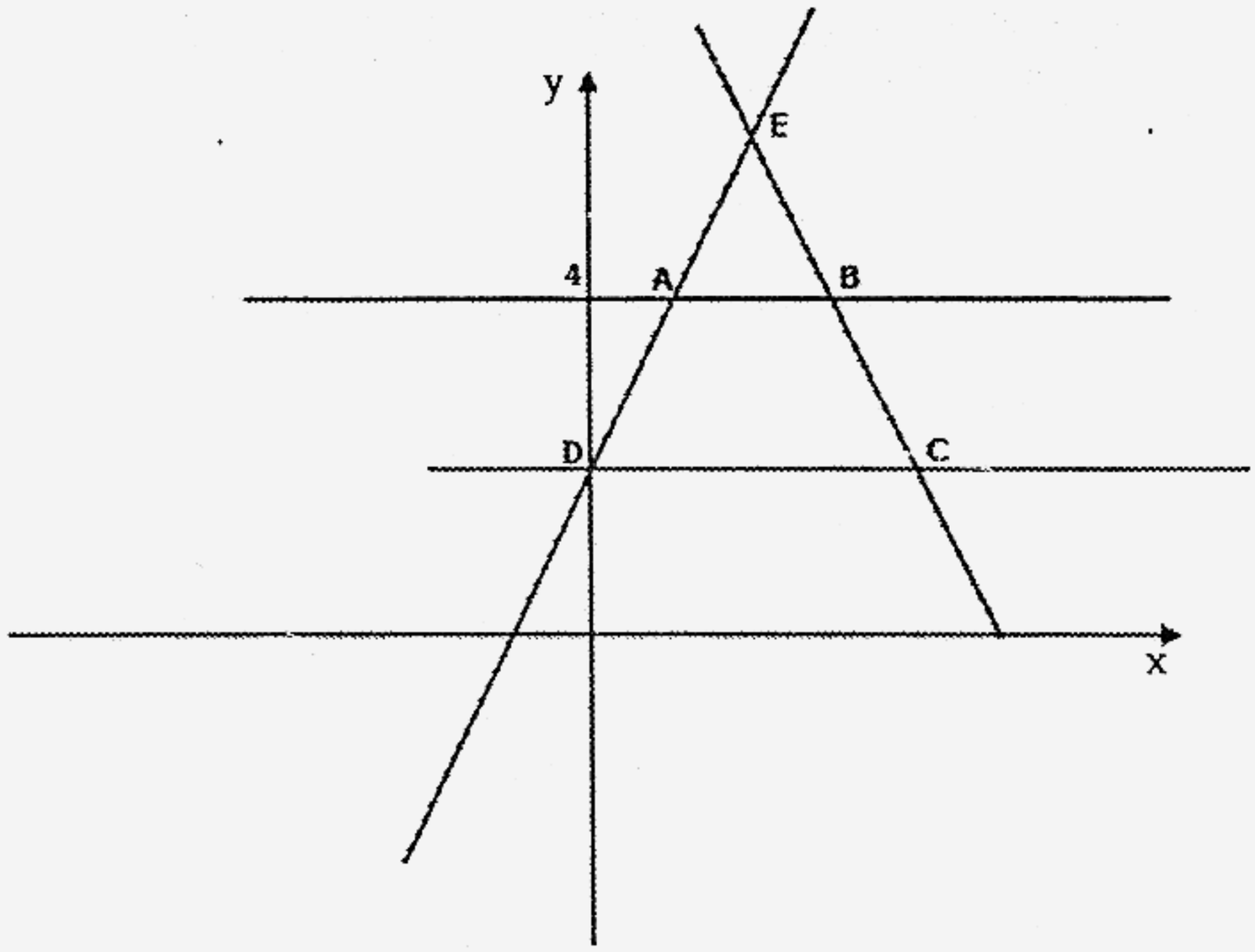
b) The plan of a theme park is drawn using a scale of 1: 250.

The area of a circular pond in the park is $176\frac{11}{14} m^2$. Find in centimetres, the radius of the pond in the plan. (Take $\pi = \frac{22}{7}$).

Answer: a) _____ [2]

b) _____ [2]

11.



The diagram above shows four lines. The equation of the line BC is $y + 2x = 10$ and the equation of the line CD is $y = 2$

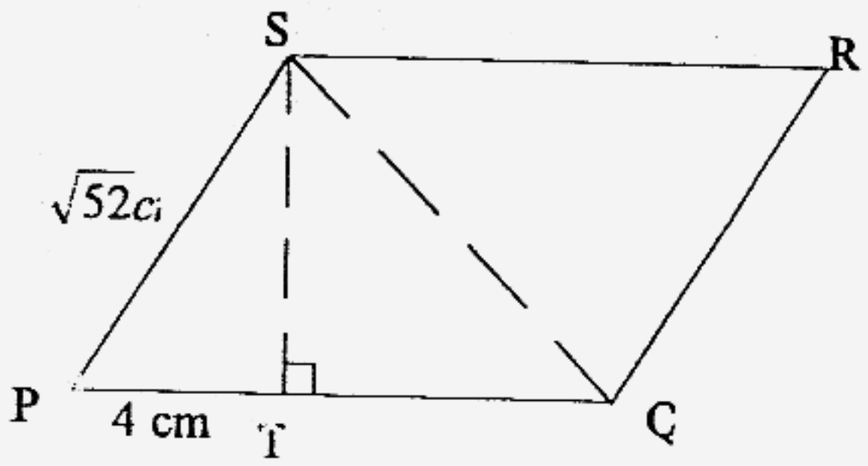
a) Write down the equation of the line AB.
b) Write down the equation of the line AD given that the gradient is 2
c) What is the area of the triangle EDC?

Answer: a) _____ [1]

b) _____ [2]

c) _____ [3]

12.



$PQRS$ is a parallelogram. SQ = 10 cm , $SP = \sqrt{52}cm$ and, PT = 4cm. ST is perpendicular to PQ.

Calculate

a) the length of ST.

b) the area of the parallelogram $PQRS$.

Answer a) _____ [2]

b) _____ [2]

13. In a regular polygon, each interior angle is 160° greater than each exterior angle. Calculate the number of sides of the polygon.

Answer: _____ [2]

End of paper

Candidate's Name _____ Class _____ Index No____

BUKIT PANJANG GOVERNMENT HIGH SCHOOL

END-OF-YEAR EXAMINATION 2006

SECONDARY TWO EXPRESS

MATHEMATICS
PAPER 2

Date: 10 October 2006 **Duration: 1 hour 15 minutes**

Time: 1020 - 1135

INSTRUCTIONS TO CANDIDATES:

Write your name and register number in the spaces at the top of this page.

Answer ALL questions in the space provided.

If working is needed for any question, it must be shown below that question.
Omission of essential working will result in loss of marks.

Calculators are **allowed** in this paper.

INFORMATION FOR CANDIDATES:

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

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.

The total marks for this paper is 50.

For examiner's use
/ 50

This paper consists of 7 pages.

[TURN OVER]

Answer <u>ALL</u> the questions in the spaces provided. [50m]

1 a) The sum of the interior angles of a polygon is 5 times the sum of its exterior angles. Find the number of sides of this polygon. [2]

b) Given that the interior angles of a pentagon are $(2x - 15)^\circ$, $(180 - x)^\circ$, $(x + 98)^\circ$, $(1.5x)^\circ$ and $(3x - 74)^\circ$,

(i) find the value of x [2]

(ii) find the largest exterior angle [2]

2 y varies inversely as the cube root of x. The difference in the value of y when $x = 166\frac{3}{8}$ and $x = 343$ is 2.5. Find the value of y when $x = 4096$.

[4]

3 (a) Given that $\mathcal{E} = 1, 2, 3, ..., 25$, draw labelled Venn diagrams to illustrate the following sets, placing the elements in the appropriate regions and answer the question that follows:

(i) A = multiples of 3 , B = multiples of 9 . Find $A \cap B$. [2]

(ii) C = multiples of 2 , D = prime numbers . Find $A \cup B$. [2]

(b) The empty set is the only set without a subset. Is this statement true or false? [1]

4 The table shows the number of siblings that 40 students have.

No. of siblings	0	1	2	3	4	5	6
No. of students	1	4	8	**e**	9	**f**	2

(a) If the mean number of siblings per student is 3.2, find the values of e and f. [3]

(b) Calculate the median of this distribution. [2]

(c) Find the mode of this distribution. [1]

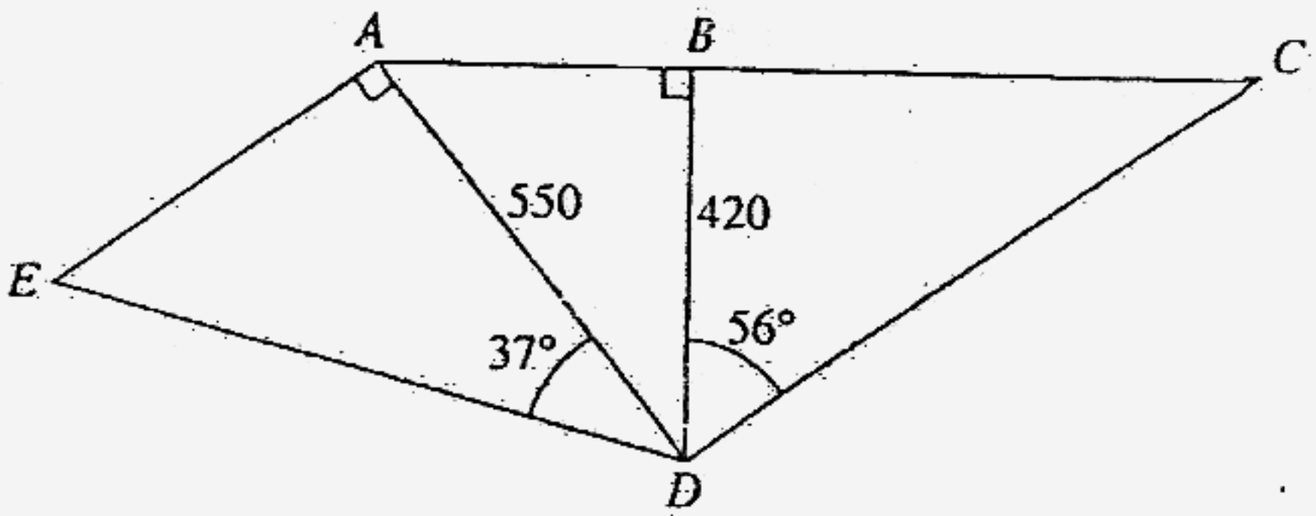
5 Part of a pattern of numbers is shown in the table below.

1	**2**	**3**	**4**	**5**	**...**	**...**	**n**
5	8	11	14	p			x
4	9	16	25	q			y
1	8	27	64	r			z
10	25	54	103	s			t

(a) Study the pattern and write down the value of p, q, r and s. [4]

(b) Find expressions, in terms of n, for each of x, y, z and t. [4]

6 The diagram shows the paths in a park.



ABC is a straight line. Angle EAD = angle ABD = 90°, angle ADE = 37° and angle BDC = 56°. BD = 420m and AD = 550m. Calculate the length of

(a) AB [2]

(b) BC [2]

(c) DE [2]

7 In 2000, a salesman was paid a basic annual salary of $44 000. At the end of the year, he was also paid a bonus of 1.25% of the value of sales made during the year.

(a) If the value of his sales was $269 000, calculate the total income that he received in 2000. [2]

(b) In 2001, his basic annual salary was unchanged at $44 000, but the percentage used to calculate his bonus was changed. The value of his sales was $198 000 and his total income was $48 620. Calculate the percentage used to find his bonus in 2001. [2]

(c) In 2000, he deposited 20% of his total income in a fixed deposit account which earned him 3.5% simple interest per annum. Find the total amount of money that he would have in his account by the end of three years. [3]

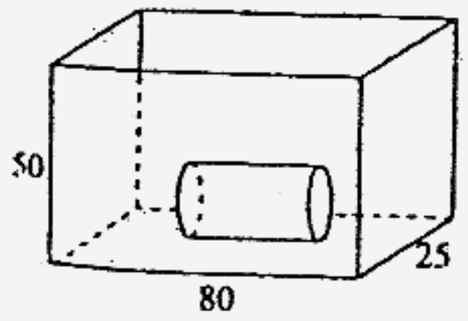


Figure I

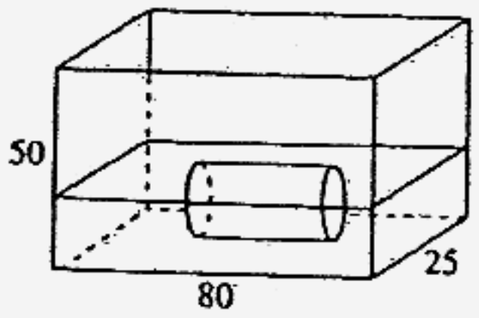


Figure II

An open rectangular tank of depth 50 cm has a horizontal base of length 80 cm and breadth 25 cm. A solid metal cylinder, of volume 21 000 cm , rests with its curved surface on the base of the tank as shown in Figure I.
39 000 cm of water is poured into the tank at a rate of 65 cm /s.

(a) Calculate how many minutes it takes for all the water to be poured in. [1]

(b) Given that the water just covers the cylinder as shown in Figure II, calculate
(i) the depth of water [2]
(ii) the radius of the cylinder [1]
(iii) the length of the cylinder [2]
[Take π to be 3.142]

(c) The cylinder is now removed from the tank. Calculate by how much the water level falls. [2]

End of Paper

Answers

1. (a) 12
   (bi) 54
   (bii) 99°

2. 2.40625

3. (ai) 9, 18
   (aii) 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 2, 3, 5, 7, 11, 13, 17, 19, 23
   (b) False

4. (a) e = 10, f = 6
   (b) 3
   (c) 3

5. (a) p = 17, q = 36, r = 125, s =178
   (b) x = 3n+2
   y = (n+1)
   z = n
   t = n + n + 5n + 3

6. (a) 355m
   (b) 623m
   (c) 689m

7. (a) $47 362.50
   (b) 2.33%
   (c) $10 467.11

8. (a) 10 min
   (bi) 60 000 cm
   (bii) 15 cm
   (biii) 29.7 cm
   (c) 10.5cm

Answers:

1 a) $\frac{2}{x-1}$ b) $\frac{6a^2(a+3)}{5b^2}$

2 a:c = 2:1

3 a) $2(3x^2-2y)(3x^2+2y)$ b) $(q+2)(p-3)$
c) $(x-2)^2(x-1)(x+1)$

4 a) 21 b) $288cm^3$

5 \$35.28 or $35\frac{7}{25}$

6 a) x = -3 b) x = 0 or -2 or 2

7 a) $\frac{p^2}{4a^2}+4$ b) 0.118

8 a) n=3 b) $n=-\frac{1}{2}$ c) $n=\frac{1}{5}$

9 a) $\frac{3}{8}$ b) 0 c) $\frac{3}{40}$

10) a) 20 b) 3cm

11 a) y = 4 b) y = 2x+2 c) 8

12 a) 6 b) 72

13 n = 36