The International Curriculum Program

Entry Exam (Mathematics, Grade 10) 2011

Candidate Name 姓名: Candidate Number 考号:

PAPER CODE 07/2011

READ THESE INSTRUCTIONS FIRST

1. There are **35 questions**. Each question is followed by 5 options marked A, B, C, D, E. Only one of these is correct. Enter the letter A-E corresponding to the correct answer in the corresponding box on the Answer Sheet.

2. Time allowed: **60 minutes**

3. Calculators are forbidden.

4. Scoring rules: 0 marks awarded for each question left unanswered; 2 marks are awarded for each correct answer; **0.5 marks is deducted** for each incorrect answer.

说明:

1. 本试卷共50道题, 均为单选题

2. 考试时间80分钟，不能使用计算器;

3. 每题选一个最佳答案；答对得2分，答错扣0.5分，不答得0分;

4. 答案写在答案卷（最后一页）上，考试结束后所有试卷交回监考老师;

5. 在英文试题中，你可能会用到以下数学专业词汇.

midpoint	中点	line segment	线段	gradient	斜率
evaluate	计算	positive	正的	constant	常数
value	值	equal root	相等的根	expand	展开
inequality	不等式	percent	百分比	graph	图像
side	(多边形)的边	set	集合	number	数
minimum	最小的	function	函数	interval	区间
point	点	vertex	顶点	sum	和
angle	角	right angle	直角	distinct	不同的
quadrilateral	四边形	integer	整数	area	面积
length	长度	intersect	相交	equation	方程
triangle	三角形	plane	平面	real number	实数
slope	斜率，与gradient相同			altitude	(三角形)高
line	直线	join	连接	vertices (pl.)	顶点
prime number	素数（质数）	maximum	最大的	perfect square	完全平方
square	正方形	cube	立方体	remainder	余数
trapezium	梯形	diagonal	对角线	inscribe	内接
circle	圆	prism	棱柱	plane	平面
surface area	表面积	rhombus	菱形	shaded	阴影的
hexagon	六边形	median	中位数	regular hexagon	正六边形
positive	正的	semicircle	半圆	centre	中心、圆心
two-digit number	两位数	probability	概率	mean	平均数
random	随机的	diameter	直径	perimeter	周长
parallel	平行的	perpendicular	垂直的		

There are 11 printed pages
共11 页

1. The line $2x + 3y = 1$ is parallel to the line $2y + mx = 2$, then $m =$

   A $m = \frac{4}{3}$ B $m = \frac{3}{4}$ C $m = -\frac{3}{4}$ D $m = -\frac{4}{3}$ E. $m = 1$

2. If a ball is randomly chosen from a box which contains 4 red balls, 5 black balls and 7 yellow balls, then what is the probability that the randomly chosen ball is red?

   A $\frac{1}{7}$ B $\frac{1}{3}$ C $\frac{1}{4}$ D $\frac{5}{16}$. E. $\frac{7}{16}$

3. The vertex of the parabola $y = (x - b)^2 + b + h$ has coordinates $(2, 5)$, what is the value of h?

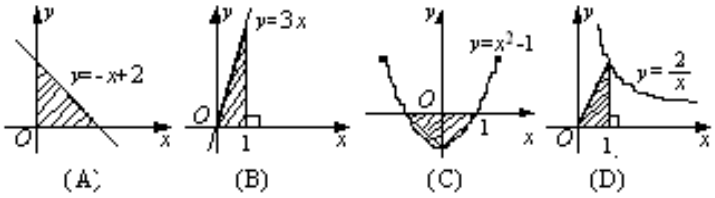
   A. 0 B. 1 C. 2 D. 3 E. 4

4. The entries to the A-Level program grew from 3500 in 2010 to 4905 in 2011.

   Approximately what percentage increase does this represent?

   A. 30% B. 40% C. 50% D. 60%. E. 80%

5. Which of the following two shaded regions have the same area?



   A. (A) and (B) B. (A) and (C) C. (B) and (C) D (C) and (D). E. none of these.

6. The midpoint of the line segment joining $(-4, -7)$ to $(2, -5)$ is

   A $(2, 4)$

   B $(-1, -4)$

   C $(2, -5)$

   D $(1, 5)$

   E none of the above

7. The gradient of the line joining (1, -4) and (-2, 8) is

   A 4 B -4 C $\frac{1}{4}$ D $\frac{-1}{4}$ E 1

8. The two lines $x + 2y = 0$ and $2x - y + 5 = 0$ intersect at the point

   A $\left(1, \frac{-1}{2}\right)$ B $(-1, 1)$ C $(3, 4)$ D $(-2, 1)$ E $(-1, -2)$

9. Evaluate $\frac{1}{2} \times \sin\frac{\pi}{3} \times \frac{\sqrt{2}}{2} \times \cos 90°$

   A $\frac{\sqrt{3}}{2}$ B $\frac{\sqrt{2}}{3}$ C $\frac{\sqrt{3}}{4}$ D $\frac{\sqrt{3}}{8}$ E None of these

10. If a is a positive constant, then $\sqrt{a^4} \times (a^3)^4 \div a^5$ is

    A a B a^3 C a^5 D a^7 E a^9

11. The length of the line segment joining $(2, -4)$ to $(-7, 2)$ is

    A 3 B $3\sqrt{13}$ C $13\sqrt{3}$ D $\sqrt{5}$ E $5\sqrt{3}$

12. The values of x for which $(x - 1)(x - 3) > 0$ are

    A $x > 1$

    B $x < 1$

    C $x > 3$ or $x < 1$

    D $1 < x < 3$

    E $x > 3$

13. If $x^2 + px + 6 = 0$ has equal roots and $p > 0$, p is

    A.$\sqrt{48}$ B.$\sqrt{6}$ C.$\sqrt{24}$ D.3 E 2

14. Solving the equation $\frac{1}{x-2} = \frac{1-x}{2-x} - 3$ gives

    A $x = 0$ B $x = 1$ C $x = 2$ D no solution

    E none of the above

15. Solving the inequalities $\begin{cases} 2x + 2 > 3x + 3 \\ \frac{x-1}{3} - \frac{x-4}{2} < 2 \end{cases}$, gives

    A. $-2 < x < -1$

    B. $1 < x < 2$

    C $x < -2$

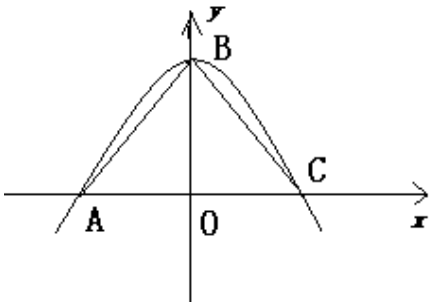
    D $x < -1$

    E $x > -2$

16. In a magazine, 50 pages of the 80 pages are devoted to sports. What percent of the magazine is NOT devoted to sports?

    A.27% B.37.5% C..47.5% D.62.5% E. 87.5%

17. The figure below shows the graph of $y = k - x^2$, where k is a constant. If the area of ΔABC is 8, what is the value of k?



    A 8 B 6 C 4 D 2 E 1

18. Which set of numbers can NOT represent the sides of a triangle?

    A.{3, 4, 5} B.{3, 5, 7} C.{4, 3, 7} D.{10, 12, 14} E. {5, 12 13}

19. The minimum value of the function $y = x^2 + 2x + 3$ over the interval $[-2, 1]$ is

    A -2 B -3 C 0 D 2 E 3

20. How many prime numbers p are there such that $199p + 1$ is a perfect square?

    A. 0 B. 1 C. 2 D. 4. E. 8

21. What is the smallest possible value of $20p + 10q + r$ when p, q, and r are different positive integers?

    A. 31

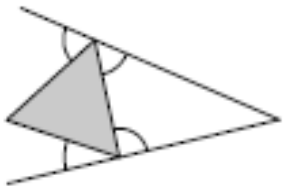
    B. 43

    C. 53.

    D. 63.

    E. 2010

22. The diagram shows an equilateral triangle touching two straight lines.



What is the sum of the four marked angles?

A. 120°. B. 180°. C. 240°. D. 300°. E. 360°

23. Dean runs up a mountain road at 8km per hour. It takes him one hour to get to the top. He runs down the same road at 12 km per hour. How many minutes does it take him to run down the mountain?

A. 30 B. 40 C. 45 D. 50 E. 90

24. Which of the following is equivalent to $(x+y+z)(x-y-z)$?

A. $x^2-y^2-z^2$. B. $x^2-y^2+z^2$. C. $x^2-xy-xz-z^2$.

D. $x^2-(y+z)^2$. E. $x^2-(y-z)^2$.

25. The symbol ∇ is defined by $x\nabla y = x^y - y^x$. What is the value of $(2\nabla 3)\nabla 4$?

A. -3 B. $\frac{-3}{4}$ C. $\frac{1}{4}$ D. $\frac{3}{4}$. E. 3.

26. Expanding $\left(3+\sqrt{2}\right)^3$ gives

A $15+26\sqrt{3}$

B $29\sqrt{2}+45$

C $45\sqrt{2}+29$

D $26+15\sqrt{3}$

E none of the above

27. If $a>b$ and $a(b-a)=0$, which of the following must be true?

I. $a=0$. II. $b<0$. III. $a-b>0$.

A I only B II only C III only D I and II only E I, II and III

28. In the xy-plane, point R$(2, 3)$ and point S$(5, 6)$ are two vertices of triangle RST. If the sum of the slopes of the sides of the triangle is 1, which of the following angles could be a right angle?

    I $\angle R$

    II $\angle S$

    III $\angle T$

    A None

    B I only

    C III only

    D II and III only

    E I, II and III

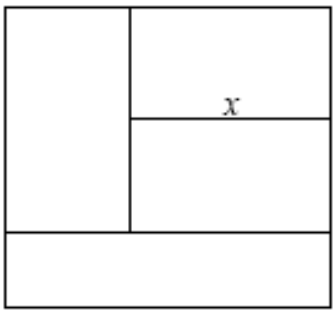
29. A square is cut into 37 squares of which 36 have area 1 cm^2. What is the length of the side of the original square?

    A. 7 cm B. 8 cm C. 9 cm. D. 10 cm. E. 11cm.

30. What is the median of the following numbers?

    A. $9\sqrt{2}$ B. $3\sqrt{19}$ C. $4\sqrt{11}$ D. $5\sqrt{7}$ *E*. $6\sqrt{5}$

31. The diagram, which is not to scale, shows a square with side length 1, divided into four rectangles whose areas are equal. What is the length labelled x?

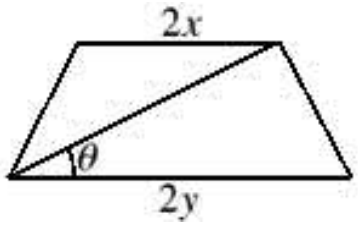


    A $\frac{2}{3}$ B. $\frac{17}{24}$. C. $\frac{4}{5}$. D. $\frac{49}{60}$. E $\frac{5}{6}$.

32. How many two-digit numbers have remainder 1 when divided by 3 and remainder 2 when divided by 4?

    A. 8 B. 7 C. 6 D. 5. E. 4

33. The parallel sides of a trapezium have lengths $2x$ and $2y$ respectively. The diagonals are equal in length, and a diagonal makes an angle θ with the parallel sides, as shown. What is the length of each diagonal?



A. $x + y$ B. $\frac{x+y}{\sin\theta}$. C. $(x + y)\cos\theta$ D. $(x + y)\tan\theta$. E. $\frac{x+y}{\cos\theta}$.

34. What is the smallest prime number that is equal to the sum of two prime numbers and is also equal to the sum of three different prime numbers?

A. 7 B. 11 C. 13 D. 17 E. 19

35. $PQRS$ is a quadrilateral inscribed in a circle of which PR is a diameter. The lengths of PQ, QR and RS are 60, 25 and 52 respectively. What is the length of SP?

A. $21\frac{2}{3}$. B. $28\frac{11}{13}$. C. 33. D. 36 E. 39

Answer Sheet

1....	2....	3....	4....	5....	6....	7....	8....	9....	10...	11...	12...
13...	14...	15...	16...	17...	18...	19...	20...	21...	22...	23...	24...
25...	26...	27...	28...	29...	30...	31...	32....	33....	34...	35...	