10 升 11 入学测试卷（英文数学）

试题整理：新航道国际备考教研中心

（满分 100 分，考试时间 80mins）

姓名：_____ 分数：_____

注意事项：

1. 答题时，考生务必在相应位置写好自己的姓名；
2. 答题时，必须在答题卷上写出相应的计算步骤或主要步骤.

Part A

Q1

a) Simplify $x^{\frac{3}{2}} \cdot \left(\frac{1}{x^{\frac{5}{2}}}\right)^2$

b) Simplify $\frac{4y}{2y^2+3y-27} - \frac{y+1}{6y^2+27y}$

Q2

a) Express $18 + 16x - 2x^2$ in the form $a + b(x + c)^2$, where a, b, c are integers.

b) A function f is defined by f: $x \to 18 + 16x - 2x^2$. Write down the coordinates of the stationary point on the graph of $y = f(x)$.

c) Sketch the graph of $y = f(x)$.

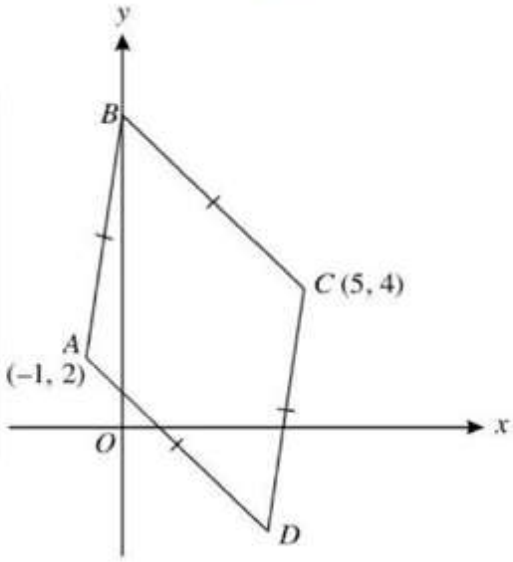
Q3

The diagram shows a rhombus ABCD in which the point A is $(-1, 2)$, the point C is $(5, 4)$ and the point B lies on the y-axis. Find

a) The equation of the perpendicular bisector of AC.

b) The coordinates of B and D.

c) The area of the rhombus.

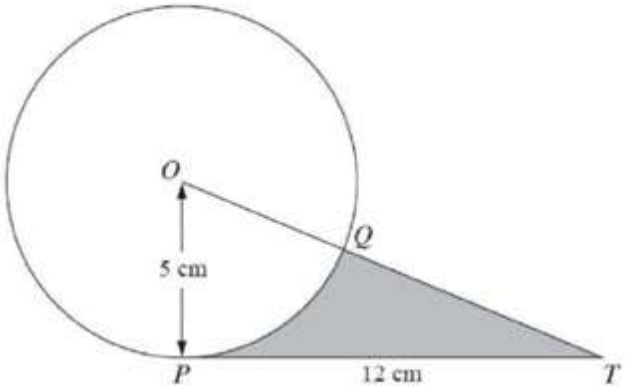


Q4

The diagram shows a circle with centre O and radius 5 cm. the point P lies on the circle. PT is a tangent to the circle and PT = 12 cm. the line OT cuts the circle at the point Q.

a) Find the perimeter of the shaded region.

b) Find the area of the shaded region.



Q5

Complete the following table.

Sequence	1st term	2nd term	3rd term	4th term	5th term	6th term		*n*th term
A	15	8	1	−6				
B	$\frac{5}{18}$	$\frac{6}{19}$	$\frac{7}{20}$	$\frac{8}{21}$				
C	2	5	10	17				
D	2	6	18	54				

Part B

Q6

a) Find the first three terms in the expansion, in ascending powers of x, of $(1-2x)^5$.

b) Given that the coefficient of x^2 in the expansion of $(1+ax+2x^2)(1-2x)^5$ is 12, find the value of the constant a.

Q7

A curve has equation $y = 3x^3 - 6x^2 + 4x + 2$. Show that the gradient of the curve is never negative.

Q8

Find the set of values of k for which $kx^2 + 6x + k = 0$ has two distinct roots.

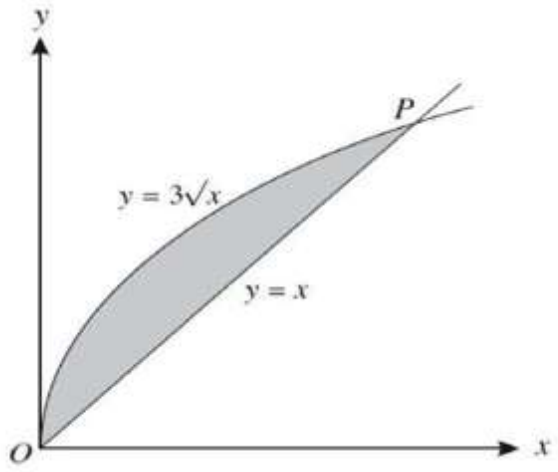
Q9

a) Prove the identity $(\sin\theta + \cos\theta)(1 - \sin\theta\cos\theta) \equiv \sin^3\theta + \cos^3\theta$

b) Hence, solve the equation $(\sin\theta + \cos\theta)(1 - \sin\theta\cos\theta) = 3\cos^3\theta$ for $0° \leq \theta \leq 360°$

Q10

The diagram shows the curve $y = 3\sqrt{x}$ and the line $y = x$ intersecting at O and P. Find the coordinates of P and the area of the shaded region.



Q11

Five men, four children and two women are asked to stand in a queue at the post office. Find how many ways they can do this if:

a) The women must be separated

b) All of the children must be separated from each other.