C2

Knightswood Secondary School

MATHEMATICS
Standard Grade
Credit Level

Prelim Exam 2006

Paper 2 (calculator allowed)

Time: 1 hour 20 minutes

Answer as many questions as you can.
In this paper good thinking is looked for as well as correct answers. Your working gives an indication of your thinking so SHOW YOUR WORKING CLEARLY.
You may use a calculator.
Square ruled paper is available.
Give all answers to 1 decimal place **unless otherwise stated.**

Formulae List

The roots of $ax^2 + bx + c = 0$ are $x = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

The Sine Rule: $\dfrac{a}{\sin A} = \dfrac{b}{\sin B} = \dfrac{c}{\sin C}$

Cosine Rule: $a^2 = b^2 + c^2 - 2bc\cos A$ or $\cos A = \dfrac{b^2 + c^2 - a^2}{2bc}$

Area of triangle: $A = \frac{1}{2}ab\sin C$

Trigonometric Relationships: $\dfrac{\sin x}{\cos x} = \tan x$, $\sin^2 x + \cos^2 x = 1$

Based on a publication by Perfect Papers 2006

	KU	RE

1. The distance from the sun to the earth is 1.5×10^{11} metres.
The speed of light is 2.998×10^{8} metres per second.

Calculate the time taken for light to travel from the sun to the earth, giving your answer to the nearest minute. | 3 |

2. A list of the number of goals scored by six football teams in a league season is shown below.

85, 55, 43, 28, 29, 31

The mean is calculated by $\bar{x} = \frac{\sum x}{n}$

and the standard deviation is calculated by $s = \sqrt{\frac{\sum x^2 - \frac{(\sum x)^2}{n}}{n-1}}$

a) Find the mean and standard deviation of the goals scored. | 4 |

b) The standard deviation of a sample of teams from a second league is 26.7

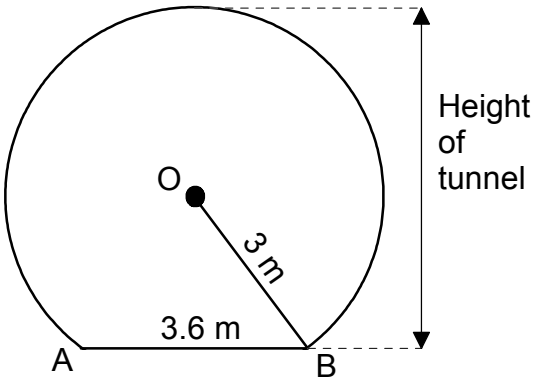
Make a valid comparison comment between the goal scoring figures in the two leagues. | | 1 |

3. Solve the equation $3x^2 + 5x - 5 = 0$, giving your answers to 1 decimal place. | 4 |

4. The diagram opposite shows the cross-section of a circular tunnel with a horizontal floor.

The circular part of the tunnel has a radius of 3m and the horizontal floor, AB, is 3.6m long.

Find the height of the tunnel.



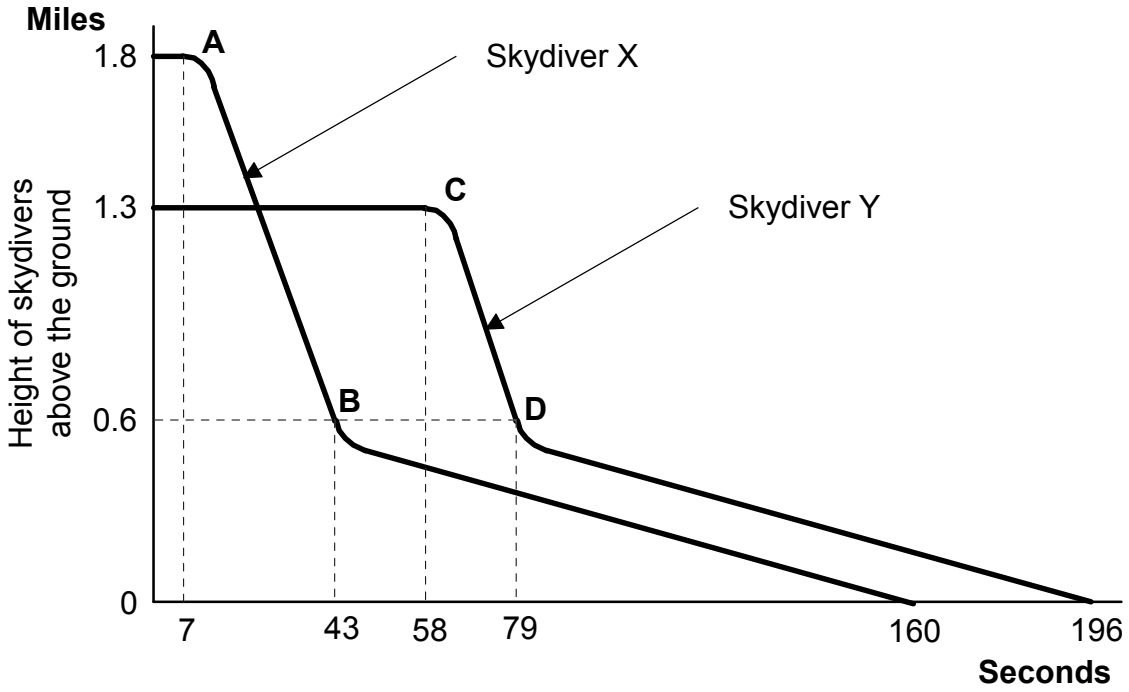
| | | 4 |

5. A man wins L50,000 on the National Lottery and decides to invest his money by opening a savings account. The account pays compound interest at a fixed rate of 4% per annum for 5 years.

Calculate the total amount of **interest** earned over the 5 year period. | 3 |

	KU	RE

6. Two Skydivers, X and Y, jump from two separate aircraft at different times. After free-falling they deploy their parachutes for a safe landing. The graph below shows how their height above the ground changes over a period of time.



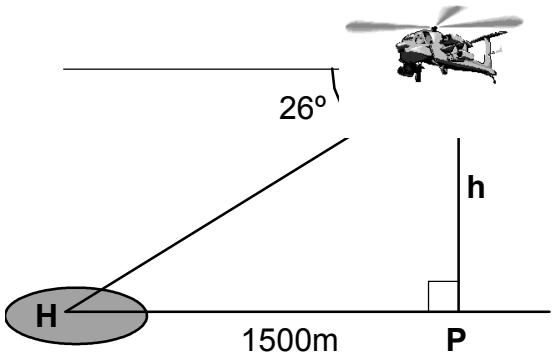
a) Which Skydiver jumped first? — KU: 1

b) At what height did both Skydivers open their parachutes? — KU: 1

c) Both Skydivers reached the same maximum speed during free-fall (labelled AB and CD on the graph).
Use the information on the graph to calculate this maximum speed, giving you answer in **miles per hour**. — RE: 3

7. A helicopter is vertically above point **P**. The angle of depression of the helipad, **H**, is 26s from the helicopter.
Point **P** is 1500m from the Helipad.

Calculate, **h**, the height of the helicopter to 3 significant figures.



RE: 3

8. A straight line passes through the points (0,3) and (5,13)

Find the equation of the line. — KU: 4

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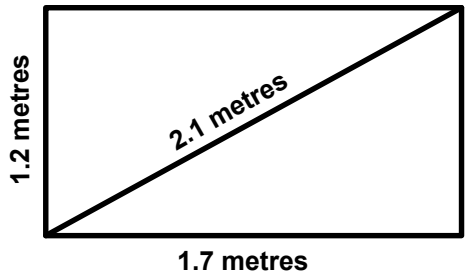
KU	RE

9. A gate has measurements as shown in the diagram opposite.



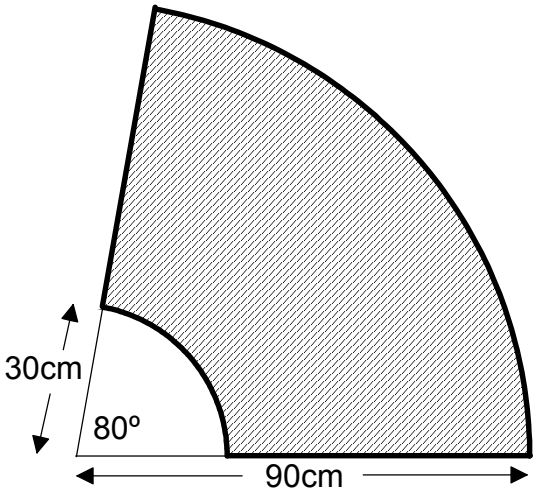
Are the corners of the gate right angles?

(you must justify your answer with calculations)

3

10. An office furiture manufacturer has designed a receptionist's desk.
It is made from a large circle of radius 90cm with a smaller circle of radius 30cm cut out of it's centre.
A sector of angle 80s is then cut out and forms the desk as shown below.

Calculate the area of the desk top (shaded in the diagram).



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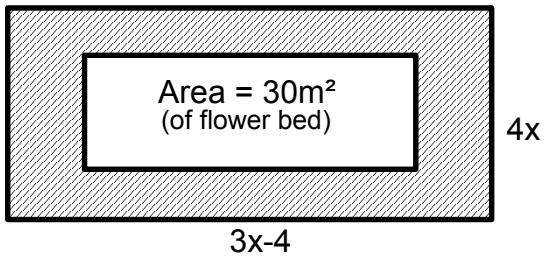
11. A rectangular lawn has a length of (3x-4) metres and a breadth of 4x metres.

A rectangular flower bed is cut from the middle of the lawn and has an area of 30m². The area of the lawn left (shaded in the diagram) is also 30m².



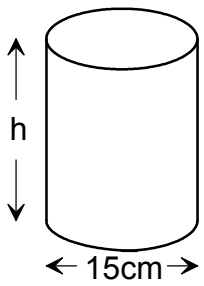
Calculate the value of x.

5

12. A bag contains 75 litres of compost. A gardiner can fill exactly 20 identical flower pots with the bag of compost.
Each flower pot is a cylinder with diameter of 15cm.

Find the height, h, of each pot.

(Volume of a cylinder = $\pi r^2 h$)



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END OF QUESTION PAPER

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