



**Entrance test**

**Mathematics**

April 2011

**Time allowed: One hour ten minutes**

**Answer all questions.**

**It is advised that you work quickly and that you leave behind questions that are taking you too long to answer.**

**You should only bring in writing material (pens, pencils, erasers, rulers).**

**No calculators are allowed.**

**All your rough calculations have to be presented. Answers with no evidence of calculations will not score any marks.**

**Use the blank pages of the exam paper to do your rough work.**

**Nothing should be removed from the exam room.**

**The sum of  $n$  terms of the arithmetic progression  $a, a+d, a+2d, a+3d\dots$  is**

$$S = \frac{n}{2}[2a + (n-1)d]$$

**Question 1** If  $x = 5$ ,  $y = 2$  is a solution of the system  $\begin{cases} ax + y = 12 \\ x^2 + xy = 35 \end{cases}$  find the value of  $a$  and then find the other solution of the system.

Answer:  $a =$       and the other solution is  $(x, y) = ( \quad , \quad )$  .

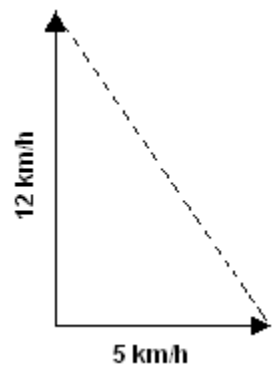
**Question 2**

Simplify as much as possible the expression  $A = \left( \frac{(a+b)^2}{a-b} - \frac{(a-b)^2}{a+b} \right) \cdot \frac{a^2 - b^2}{3a^2b + b^3}$

**Question 3**

A car travels along a straight road at a speed of 5 km/h (kilometres per hour). Another car starts at the same time from the same point and travels along a perpendicular direction with speed 12 km/h. When will the two cars be at a distance 65 km apart?

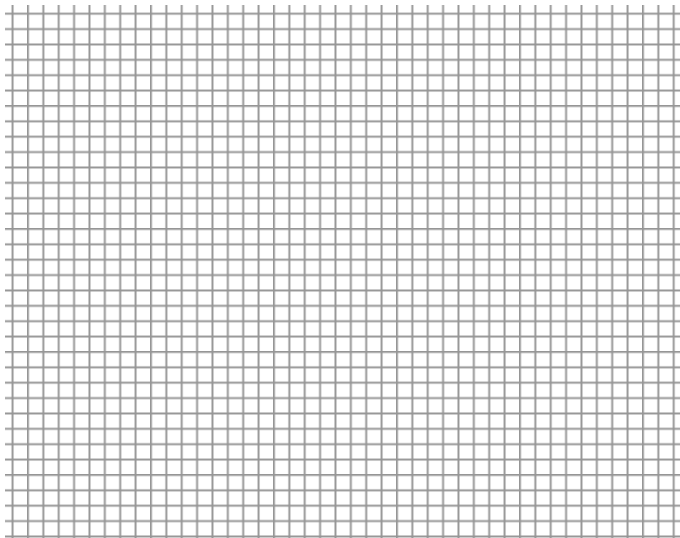
Answer:  $A =$



Perpendicular = at 90 degree angle

Answer: In      hours from the start

**Question 4** Draw as clearly as possible the curve  $y = x^2 - 4x + 3$  for  $0 \leq x \leq 4$ , indicating a) the points A, B where it cuts the x-axis, b) its turning point C and c) the points D, E where it meets the line  $y=3$ . Also calculate the area of triangle CDE.



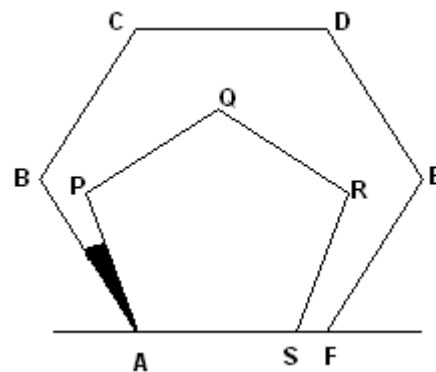
Answer: The area of CDE is .

**Question 5** The sum of consecutive numbers starting from 20 is 630. How many are the numbers?

Consecutive = one after the other; k, k+1, k+2 etc

Answer: There are numbers

**Question 6** A regular pentagon APQRS is inside a regular hexagon ABCDEF. Here AS and AF are on the same straight line. Find the value of angle BAP.



Regular = with equal sides and equal angles

Answer: Angle BAP is