The City School

Unified Mid Year Examination

2016 - 2017

CLASS 10

CANDIDATE NAME: _____

INDEX NUMBER: _____ _____ _____ _____ _____ DATE: _____

MATHEMATICS (SYLLABUS D) **4024/22**
Paper 2 **2 hours 30 minutes**

Candidate answer on the Question paper.
Additional Materials: Electronic Calculator
Geometrical instruments
Tracing paper (optional)

READ THE INSTRUCTIONS FIRST
Write your Index number, Date and Class/Section on all the work you hand in.
Write in dark blue or black pen.
You may use a soft pencil for any diagrams or graphs.
Do not use staples, paper clips, highlighters, glue or correction fluid.

Answer **all** questions.
If working is needed for any question it must be shown below that question.
Essential working must be shown for full marks to be awarded.

Electronic calculators should be used.
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.
For π, use either your calculator value or 3.142, unless the question requires the answer in terms of π.

At the end of the examination, fasten all your work securely together.
The number of marks is given in brackets [ ] at the end of each question or part question. The total number of marks for this paper is **100**.

Invigilated by: _____ Marked by: _____ Counter checked by: _____

This question paper consists of **12** printed pages.

1)

I. The following is a table of values for the function $y = x^2 + \frac{10}{x} - 6$.

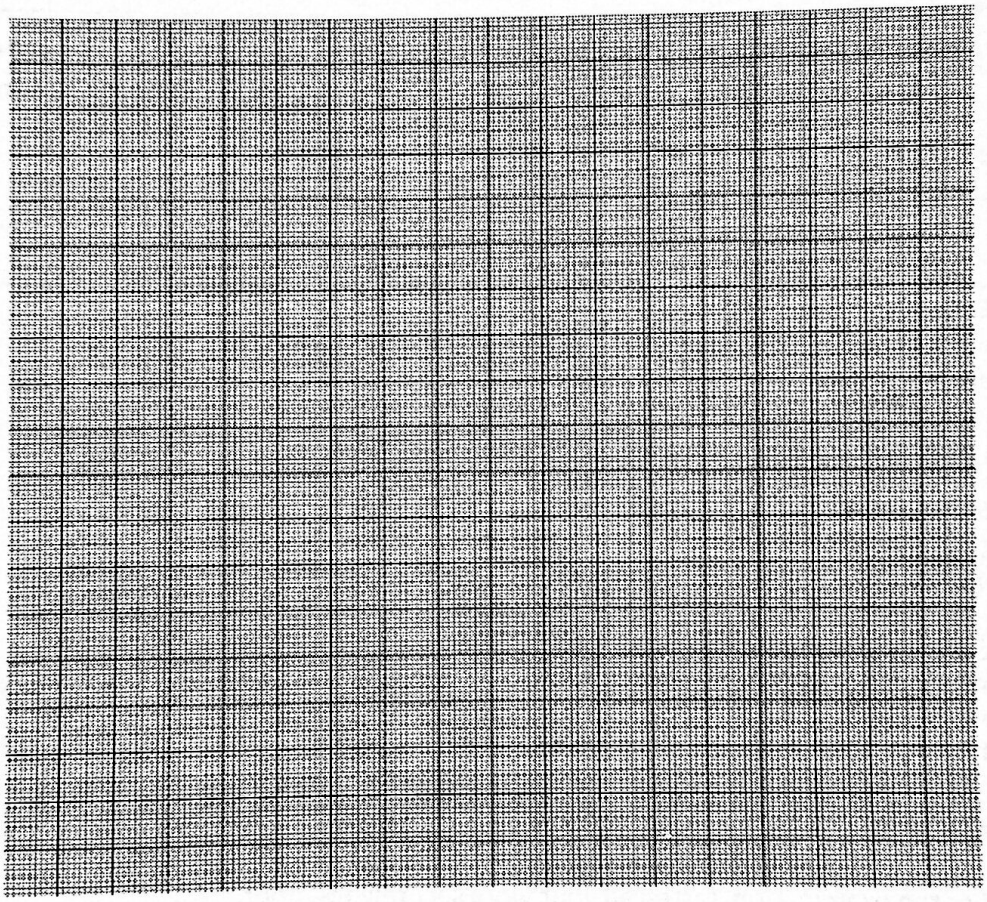
x	0.5	1	1.5	2	3	4
y	10.2	5	h	3	6.3	12.5

(a) Find the value of h.

Answer: _____ [2]

(b) Choose suitable scales to draw the graph of $y = x^2 + \frac{10}{x} - 6$ for $0.5 \leq x \leq 4$.

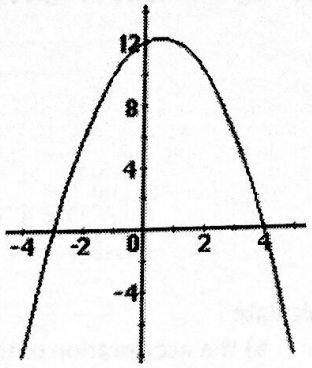
[4]



(c) Use your graph to find the value of y when $x = 2.4$.

Answer: _____ [2]

II. The diagram shows part of the graph of $y = 12 + x - x^2$. The graph cuts the x-axis at P and R, and the y-axis at Q.



(a) Find the coordinates of P, Q and R.

Answer: _____, _____, _____ **[3]**

(b) Write down the equation of the line of symmetry of the graph $y = 12 + x - x^2$

Answer: _____ **[2]**

(c) Find the maximum value of y.

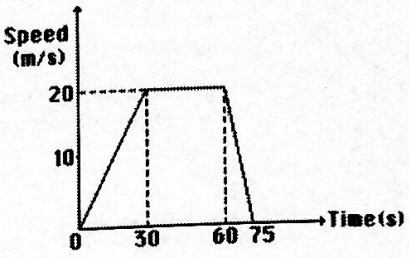
Answer: _____ **[2]**

(d) Find the equation of the straight line that must be drawn on the diagram to solve the following equation $x^2 - 5 = 0$ graphically.

Answer: _____ **[3]**

2)

I. The diagram shows the speed- time graph of a car.



Calculate

a) the acceleration of the car during the first 30 seconds.

Answer _____ [3]

b) the total distance the car travels from rest before it begins to decelerate.

Answer _____ [3]

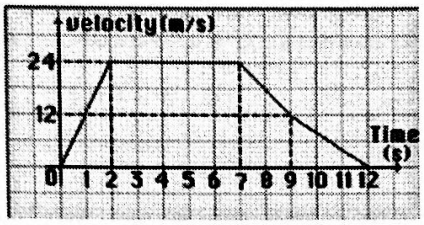
c) the deceleration of the car during the last 5 seconds of its motion

Answer_____ [3]

d) convert 20m/s into kilometres per hour.

Answer _____ [3]

II. The diagram shows the velocity – time graph of a particle. Find



a) The acceleration of the particle.

Answer _____ [3]

b) The greatest retardation of the particle.

Answer _____ [3]

c) The distance of the particle at time t=10 seconds.

Answer _____ [3]

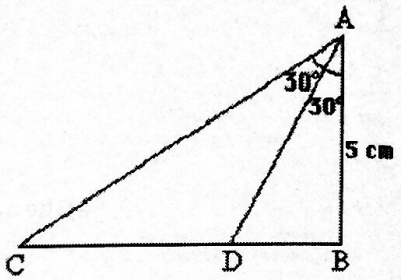
d) The distance travelled in the last 5 seconds of its motion.

Answer _____ [3]

3) In the diagram, $AB = 5$ cm, $\angle ABC = 90°$ and $\angle BAD = \angle CAD = 30°$. Using as much of the information below as possible, calculate

I. CD

[Given that $\sin 30° = 0.5 = \cos 60°$,
$\sin 60° = \cos 30° = 0.87$,
$\tan 30° = 0.58$ and $\tan 60° = 1.73$.]



Answer _____ [3]

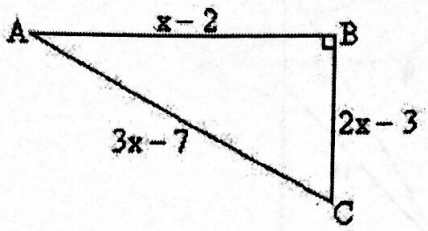
II. AC

Answer _____ [4]

III. In the figure, $\angle ABC = 90°$, $AB = (x - 2)$cm, $BC = (2x - 3)$cm and $AC = (3x - 7)$cm. Calculate (a) the value of x,

Answer _____ [5]

(b) $\angle BAC$

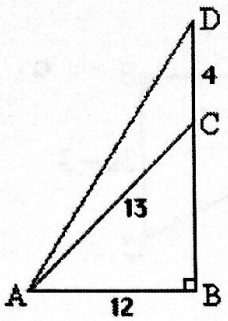


Answer _____ [4]

IV. The angle of depression of a boat 58.5 m from the base of a cliff is 35.6°. How high is the cliff? (Give your answer correct to 1 decimal place.) [3]

4)

I. In the figure, $\angle ABD = 90°$, $AB = 12$ cm, $AC = 13$ cm and $CD = 4$ cm. Calculate
(a) AD,



Answer: _____ **[4]**

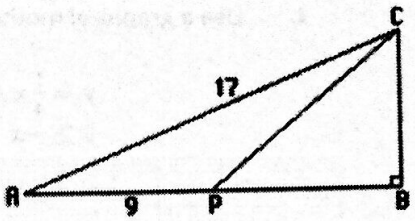
(b)$\angle ACB$

Answer: _____ **[3]**

(c)$\angle CAD$

Answer: _____ **[4]**

II. In the diagram, APB is a straight line. ABC = 90^0, AC = 17 cm, AP = 9 cm and area of APC = 36 cm^2



Calculate

a) BC

Answer _____ [3]

b) $\tan C\widehat{P}B$

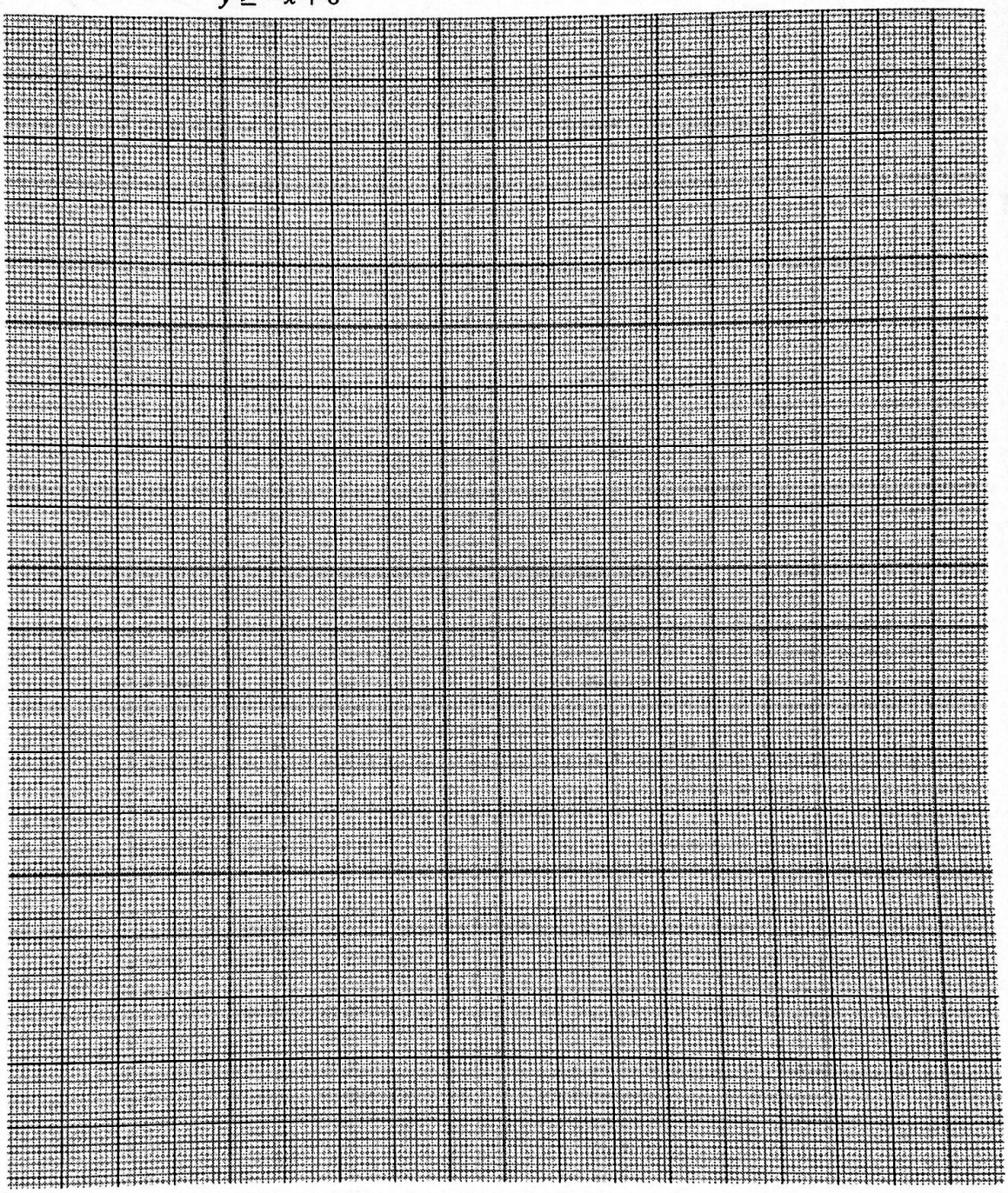
Answer _____ [4]

5)

I. Use a graphical method to solve the system of equations and inequalities:

$$y = \frac{1}{4}x + 1$$
$$y \geq -x + 6$$

answer = [2]



Graphical representation = [3]

II. $f(x) = \frac{2x+7}{3}$

a) Find $f^{-1}(x)$

Answer _____ [3]

b) Given that $f(m) = \frac{m}{2}$, *find* m.

Answer _____ [3]

III. $f(x) = \frac{3x+2}{5}$, find

a)F(-4)

Answer _____ [3]

b) The value of g such that f(g) = 7

Answer _____ [3]

c) $f^{-1}(x)$

Answer _____ [4]
