

Final-Year Examination Specimen Paper 1

Marks Obtained
50

Duration: 1 hour

1 Express $\frac{4}{25}$ as

- (a) a decimal, [1]
(b) a percentage. [1]

Answer: (a) _____
(b) _____%

2 Simplify

- (a) $\frac{6x^2yz^3}{8xz} \div \left(\frac{y^2}{4x^3z}\right)^2$, [2]
(b) $\frac{4}{m^2 + 2mn - 3n^2} - \frac{1}{m - n}$. [3]

Answer: (a) _____
(b) _____

3 Factorise

(a) $9a^2 - 49b^2$,

[1]

(b) $3p - q - 6pq + 2q^2$.

[2]

Answer: (a) _____

(b) _____

4 Given that $a^2 + 2ab = b$, express b in terms of a .

[2]

Answer: _____

5 Solve the equation $\frac{x+20}{x+2} = 2x$.

[3]

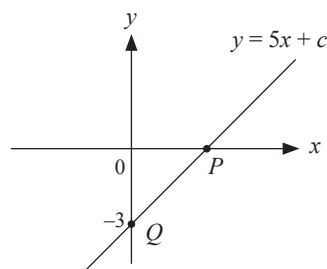
Answer: $x =$ _____ or _____

- 6 A map is drawn to a scale of 2 cm to 15 km. Calculate
- (a) the actual distance, in km, between Town X and Town Y which are 11 cm apart on the map, [2]
 - (b) the area on the map, in cm^2 , of a field which has an actual area of 450 km^2 . [2]

Answer: (a) _____ km
 (b) _____ cm^2

- 7 The straight line $y = 5x + c$ cuts the x -axis at the point P and the y -axis at the point Q as shown in the diagram.

- (a) State the gradient of the straight line. [1]
- (b) Find the value of c . [1]
- (c) Write down the coordinates of the point P . [2]



Answer: (a) _____
 (b) $c =$ _____
 (c) $P = ($ _____ , _____)

- 8 Solve the following simultaneous equations:

$$\begin{aligned} 5x - 4y - 1.5 &= 0 \\ x - 2y &= 0 \end{aligned} \quad [3]$$

Answer: (a) $x =$ _____
 (b) $y =$ _____

- 9 The number of days needed to manufacture a certain number of toys (d) is inversely proportional to the number of workers employed in a factory (w). 250 workers are employed to produce 8000 toys in 4 days.
- (a) Express d in terms of w . [2]
- (b) How many days are needed for 400 workers to produce 16 000 toys? [2]
- (c) How many toys will be produced by 500 workers in 10 days? [2]

Answer: (a) _____

(b) _____ days

(c) _____ toys

- 10 The mean of a set of ten integers is 75.
- (a) If the mean of seven of the integers is 72, calculate the mean of the other three integers. [3]
- (b) If nine of the integers are 76, 70, 65, 60, 80, 67, 78, 89 and 90, find its median. [2]

Answer: (a) _____

(b) _____

- 11 Box A contains 25 blue and yellow marbles, of which 9 are yellow. Box B contains 15 black marbles and 10 blue marbles.
- (a) A marble is chosen randomly from box A . Calculate the probability that it is
- (i) a blue marble, [2]
- (ii) a red marble. [1]

All the marbles from box A and box B are then put into a bag. A marble is chosen randomly from the bag.

- (b) Calculate the probability that it is a blue marble. [2]

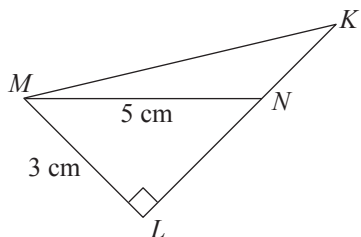
Answer: (a) (i) _____

(ii) _____

(b) _____

12 In the diagram, KLM is a right-angled triangle. The point N lies on the line KL such that $LN = 2NK$. Given that $LM = 3$ cm and $MN = 5$ cm, find

- (a) the length of LN ,
- (b) the length of KM ,
- (c) the area of $\triangle KMN$.



[2]

[3]

[3]

Answer: (a) _____ cm

(b) _____ cm

(c) _____ cm²

Final-Year Examination Specimen Paper 2

PART I (40 marks)

Duration: 1 hour

Marks Obtained
50

- 1 The diagram shows two similar rectangles, $KLMN$ and $NPQR$. LN and NQ are the diagonals of the rectangles $KLMN$ and $NPQR$ respectively. $KN = 7$ cm, $KL = 24$ cm and $2LN = 5NP$.

(a) Find the length of NP . [2]

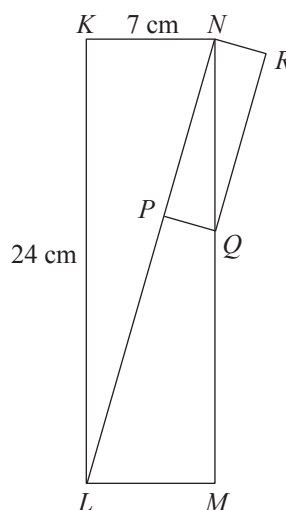
(b) Write down the ratio $\frac{KL}{NP}$. [1]

Hence, calculate

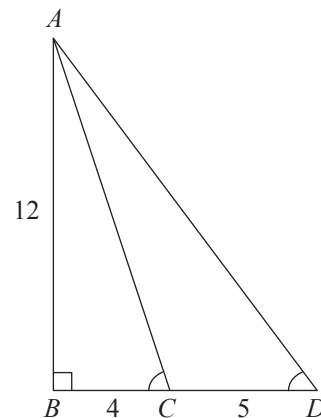
(c) the length of NQ , [2]

(d) the area of the rectangle $NPQR$, [2]

(e) the area of the quadrilateral $PQML$. [2]

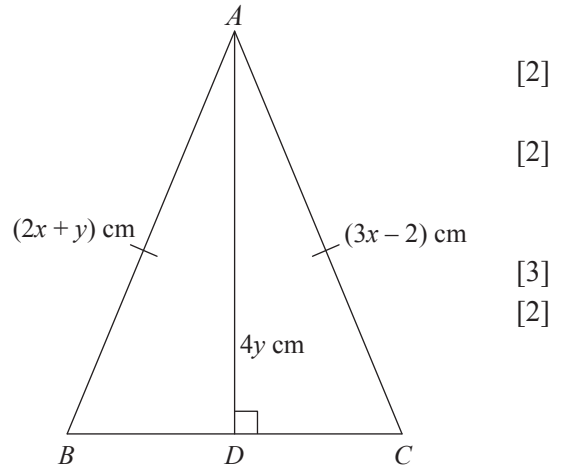


- 2 The figure shows $\triangle ABD$ such that $\angle ABD = 90^\circ$, $AB = 12$ m, $BC = 4$ m and $CD = 5$ m.
- (a) Calculate the length of AD . [3]
- (b) Giving your answer as a fraction, state the value of
- (i) $\tan \angle ACB$, [1]
- (ii) $\cos \angle ADB$. [1]
- (c) Which angle is represented by $\sin^{-1} \frac{12}{15}$? [1]



3 In the diagram, ABC is an isosceles triangle with $AB = AC$. $AD = \frac{12}{13}AC$, $AB = (2x + y)$ cm, $AC = (3x - 2)$ cm and $AD = 4y$ cm.

- (a) From the length of AD , construct a linear equation in terms of x and y . [2]
- (b) Construct another linear equation in terms of x and y . [2]
- (c) Solve for the value of
 - (i) x ,
 - (ii) y .
- (d) Hence, find the length of DC . [3]



[2]

[2]

[3]

[2]

- 4 The times taken for 50 athletes to complete 1.5 km run were recorded in the table below.

Time taken (minutes)	10 – 11	12 – 13	14 – 15	16 – 17	18 – 19	20 – 21
Number of athletes	3	18	12	9	6	2

- (a) Write down the modal class. [1]
(b) Find the median class. [1]
(c) Estimate the mean of the distribution. [3]

An athlete is chosen at random. Find the probability that the athlete chosen took

- (d) 16.5 minutes to complete the run, [1]
(e) more than 13 minutes to complete the run. [2]

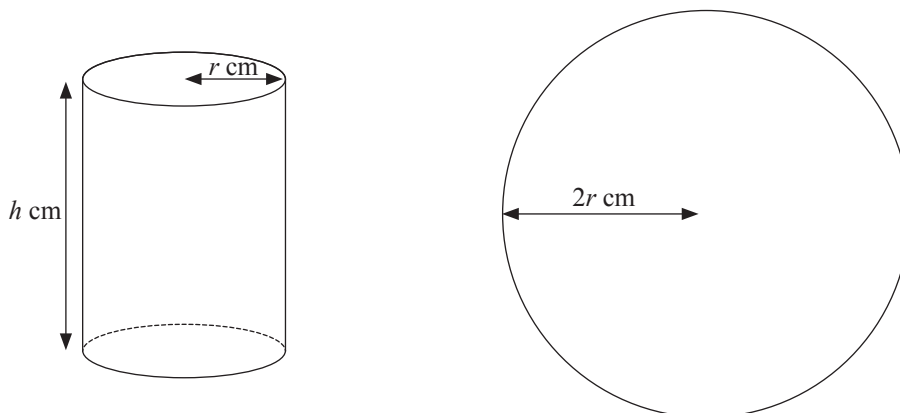
5 Answer the whole of this question on a sheet of graph paper.

The variables x and y are related by the equation $y = 2x^2 - 3x - 2$. The table below shows some values of x and y that satisfy the equation $y = 2x^2 - 3x - 2$.

x	-1	-0.5	0	0.5	1	1.5	2	2.5
y	3	a	-2	-3	-3	b	0	3

- (a) Find the value of
- (i) a ,
 - (ii) b . [2]
- (b) Draw the graph of $y = 2x^2 - 3x - 2$, using a scale of 4 cm to represent 1 unit on both the axes. [3]
- (c) Use the graph to estimate
- (i) the value of y when $x = 1.2$, [1]
 - (ii) the values of x when $2x^2 - 3x - 2 = 0$. [2]

EITHER



The diagram shows a solid cylinder and a solid sphere. The volume of the cylinder is $\frac{1}{4}$ of the volume of the sphere.

(a) Express h , the height of the cylinder, in terms of r . [3]

The surface area of the sphere is $(8r^2 + 6)\pi \text{ cm}^2$ greater than the surface area of the cylinder.

(b) Show that $h = \frac{3r^2 - 3}{r}$. [3]

(c) Find

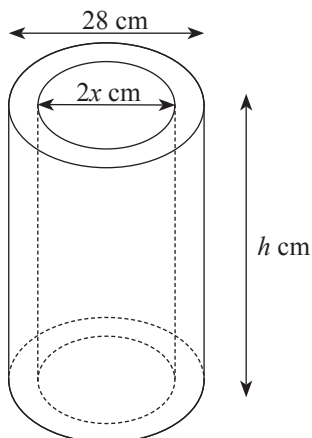
(i) the value of r , [2]

(ii) the value of h , [1]

(iii) the volume of the cylinder. [1]

OR

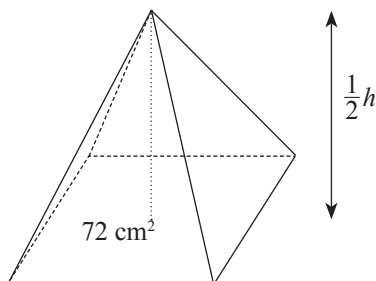
[Take $\pi = \frac{22}{7}$]



The diagram shows a hollow cylindrical metal container. It has a mass of 3.00 kg. Each cubic centimetre of the container weighs 5.0 grams.

- (a) Find the volume, in cm^3 , of the container. [1]
(b) Express x , the inner radius of the container, in terms of its height, h . [3]

The metal container is melted and recast into a square pyramid as shown in the diagram below. The pyramid has a base area of 72 cm^2 and its height is half of the height of the hollow cylinder.



- (c) Find the volume of the pyramid in terms of h . [2]
(d) Solve for
(i) the value of h , [1]
(ii) the value of x . [1]
(e) Calculate the total surface area of the hollow cylinder. [2]