

SET – 1

Series : HRK/C

कोड नं.
Code No.

30/1

रोल नं.

--	--	--	--	--	--	--

Roll No.

परीक्षार्थी कोड को उत्तर-पुस्तिका के मुख-पृष्ठ पर अवश्य लिखें ।

Candidates must write the Code on the title page of the answer-book.

- कृपया जाँच कर लें कि इस प्रश्न-पत्र में मुद्रित पृष्ठ 11 हैं ।
- प्रश्न-पत्र में दाहिने हाथ की ओर दिए गए कोड नम्बर को छात्र उत्तर-पुस्तिका के मुख-पृष्ठ पर लिखें ।
- कृपया जाँच कर लें कि इस प्रश्न-पत्र में 31 प्रश्न हैं ।
- कृपया प्रश्न का उत्तर लिखना शुरू करने से पहले, प्रश्न का क्रमांक अवश्य लिखें ।
- इस प्रश्न-पत्र को पढ़ने के लिए 15 मिनट का समय दिया गया है । प्रश्न-पत्र का वितरण पूर्वाह्न में 10.15 बजे किया जाएगा । 10.15 बजे से 10.30 बजे तक छात्र केवल प्रश्न-पत्र को पढ़ेंगे और इस अवधि के दौरान वे उत्तर-पुस्तिका पर कोई उत्तर नहीं लिखेंगे ।
- Please check that this question paper contains 11 printed pages.
- Code number given on the right hand side of the question paper should be written on the title page of the answer-book by the candidate.
- Please check that this question paper contains 31 questions.
- **Please write down the Serial Number of the question before attempting it.**
- 15 minute time has been allotted to read this question paper. The question paper will be distributed at 10.15 a.m. From 10.15 a.m. to 10.30 a.m., the students will read the question paper only and will not write any answer on the answer-book during this period.

संकलित परीक्षा - II

SUMMATIVE ASSESSMENT - II

गणित

MATHEMATICS

निर्धारित समय : 3 घण्टे
Time allowed : 3 hours

अधिकतम अंक : 90
Maximum Marks : 90

सामान्य निर्देश :

- (i) सभी प्रश्न अनिवार्य हैं।
- (ii) इस प्रश्न-पत्र में 31 प्रश्न हैं जो चार खण्डों – अ, ब, स और द में विभाजित हैं।
- (iii) खण्ड अ में एक-एक अंक वाले 4 प्रश्न हैं। खण्ड ब में 6 प्रश्न हैं जिनमें से प्रत्येक 2 अंक का है। खण्ड स में 10 प्रश्न तीन-तीन अंकों के हैं। खण्ड द में 11 प्रश्न हैं जिनमें से प्रत्येक 4 अंक का है।
- (iv) कैलकुलेटर्स के प्रयोग की अनुमति नहीं है।

General Instructions :

- (i) All questions are compulsory.
- (ii) This question paper consists of 31 questions divided into four sections – A, B, C and D.
- (iii) Section A contains 4 questions of 1 mark each. Section B contains 6 questions of 2 marks each, Section C contains 10 questions of 3 marks each and Section D contains 11 questions of 4 marks each.
- (iv) Use of calculators is **not** permitted.

खण्ड – अ

SECTION – A

प्रश्न संख्या 1 से 4 तक प्रत्येक प्रश्न 1 अंक का है।

Question numbers 1 to 4 carry 1 mark each.

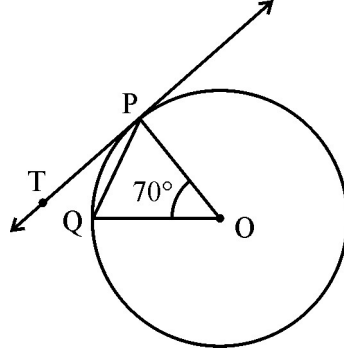
1. यदि किसी 30 मी ऊँचे टावर की दिन के किसी समय भूमि पर पड़ती छाया की लंबाई $10\sqrt{3}$ मी है, तो उस समय सूर्य का उन्नयन कोण ज्ञात कीजिए।

The shadow of a 30 m high tower on the ground at some time of the day is $10\sqrt{3}$ m long. Find the angle of elevation of the sun at that time.

2. यदि एक समांतर श्रेणी $-1, 4, 9, 14, \dots$ का n वाँ पद 129 है, तो n का मान ज्ञात कीजिए।

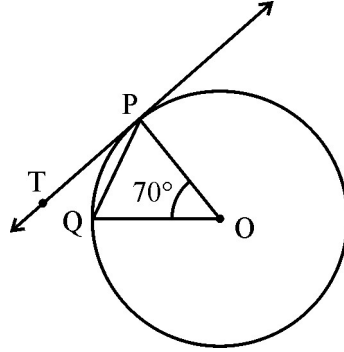
If the n^{th} term of the A.P. $-1, 4, 9, 14, \dots$ is 129, find the value of n .

3. आकृति 1 में O वृत्त का केन्द्र है, PQ वृत्त की एक जीवा है तथा PT वृत्त की बिंदु P पर स्पर्श-रेखा है।
यदि $\angle POQ = 70^\circ$ है, तो $\angle TPQ$ ज्ञात कीजिए।



(आकृति - 1)

In Fig. 1, O is the centre of the circle, PQ is a chord and PT is tangent to the circle at P.
If $\angle POQ = 70^\circ$, find $\angle TPQ$.



(Fig. - 1)

4. यदि तीन विभिन्न सिक्के एक साथ उछाले गये हों, तो दो चित आने की प्रायिकता ज्ञात कीजिए।
If three different coins are tossed together, then find the probability of getting two heads.

खण्ड - ब

SECTION - B

प्रश्न संख्या 5 से 10 तक प्रत्येक प्रश्न 2 अंकों का है।

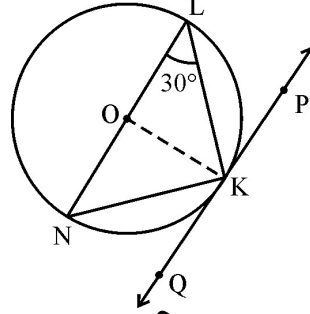
Question numbers 5 to 10 carry 2 marks each.

5. ज्ञात कीजिए कि k के किस मान के लिए द्विघात समीकरण $2x^2 + kx + 8 = 0$ के मूल समान होंगे।

Find the value of k for which the roots of the quadratic equation $2x^2 + kx + 8 = 0$ will have equal value.

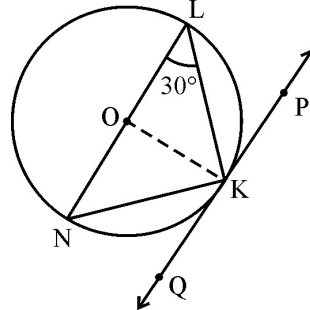
6. वह समांतर श्रेढी ज्ञात कीजिए जिसका तीसरा पद 5 तथा सातवाँ पद 9 है ।
Determine the AP whose third term is 5 and the seventh term is 9.

7. आकृति 2 में O वृत्त का केन्द्र है तथा LN एक व्यास है । यदि वृत्त के बिंदु K पर PQ एक स्पर्श-रेखा है तथा $\angle KLN = 30^\circ$ है, तो $\angle PKL$ ज्ञात कीजिए ।



(आकृति - 2)

In Fig. 2, O is the centre of the circle and LN is a diameter. If PQ is a tangent to the circle at K and $\angle KLN = 30^\circ$, find $\angle PKL$.

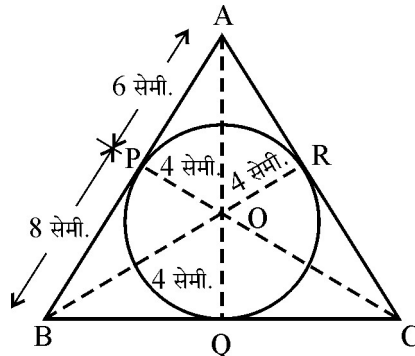


(Fig. - 2)

8. यदि बिंदु (x, y) बिंदुओं $(a + b, b - a)$ तथा $(a - b, a + b)$ से समदूरस्थ है तो सिद्ध कीजिए कि $bx = ay$.

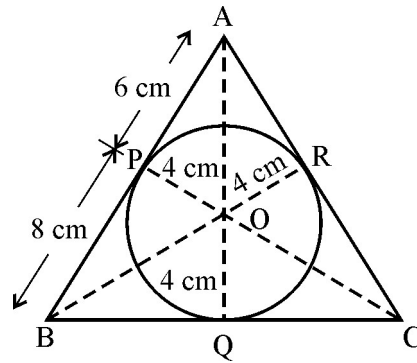
If the point (x, y) is equidistant from the points $(a + b, b - a)$ and $(a - b, a + b)$, prove that $bx = ay$.

9. एक त्रिभुज ABC, जिसका क्षेत्रफल 84 वर्ग सेमी हैं, के अन्तःवृत्त की त्रिज्या 4 सेमी है तथा उन दो रेखाखंडों AP तथा BP की लंबाईया, जिनमें भुजा AB स्पर्श बिंदु P द्वारा विभाजित होती है, 6 सेमी तथा 8 सेमी हैं । भुजाओं AC तथा BC की लंबाईया ज्ञात कीजिए । (देखिए आकृति 3).



(आकृति - 3)

In Fig. 3, the radius of incircle of $\triangle ABC$ of area 84 cm^2 is 4 cm and the lengths of the segments AP and BP into which side AB is divided by the point of contact P are 6 cm and 8 cm . Find the lengths of the sides AC and BC .



(Fig. - 3)

10. यदि बिंदुओं $A(2, 1)$ तथा $B(5, -8)$ को मिलाने वाला रेखाखंड बिंदुओ P तथा Q पर समत्रिभाजित होता है, तो P के निर्देशांक ज्ञात कीजिए।

If the line segment joining the points $A(2, 1)$ and $B(5, -8)$ is trisected at the points P and Q , find the coordinates of P .

खण्ड - स

SECTION - C

प्रश्न संख्या 11 से 20 तक प्रत्येक प्रश्न 3 अंक का है।

Question numbers 11 to 20 carry 3 marks each.

11. n के किस मान के लिए दो समांतर श्रेणियों $63, 65, 67, \dots$ तथा $3, 10, 17, \dots$ के n वें पद समान होंगे ?
For what value of n are the n^{th} terms of two A.P.'s $63, 65, 67, \dots$ and $3, 10, 17, \dots$ equal ?
12. भूमि के एक बिंदु से एक 20 मी ऊँचे भवन के शिखर पर लगी संचार मीनार के तल और शिखर के उन्नयन कोण क्रमशः 45° और 60° हैं। मीनार की ऊँचाई ज्ञात कीजिए।

From a point on the ground, the angles of elevation of the bottom and top of a transmission tower fixed on the top of a 20 m high building are 45° and 60° respectively. Find the height of the tower.

13. एक ठोस बेलन, जिसकी ऊँचाई 8 सेमी तथा त्रिज्या 6 सेमी है, में से उसी ऊँचाई तथा उसी त्रिज्या का एक शंकुवाकार खोल काट लिया गया है। शेष बचे ठोस का कुल पृष्ठीय क्षेत्रफल ज्ञात कीजिए। ($\pi = 3.14$ लीजिए)

From a solid cylinder whose height is 8 cm and radius 6 cm, a conical cavity of same height and same base radius is hollowed out. Find the total surface area of the remaining solid. (Take $\pi = 3.14$)

14. एक तार को एक समबाहु त्रिभुज के आकार में मोड़ने पर वह $121\sqrt{3}$ सेमी² का क्षेत्रफल घेरती है। यदि उसी तार को वृत्ताकार में मोड़ा जाए तो उस द्वारा घेरा जाने वाला क्षेत्रफल ज्ञात कीजिए। ($\pi = \frac{22}{7}$ लीजिए)

A wire when bent in the form of an equilateral triangle encloses an area of $121\sqrt{3}$ cm². If the wire is bent in the form of a circle, find the area enclosed by the circle (use $\pi = \frac{22}{7}$).

15. उस त्रिभुज, जिसके शीर्षों के निर्देशांक (0, -1), (2, 1) तथा (0, 3) हैं, की भुजाओं के मध्य बिंदुओं को मिलाने वाली त्रिभुज का क्षेत्रफल ज्ञात कीजिए।

Find the area of the triangle formed by joining the mid-points of the sides of a triangle, whose coordinates of vertices are (0, -1), (2, 1) and (0, 3).

16. 144 बॉलपेनों के एक समूह में 20 बॉलपेन खराब हैं। ग्राहक वही बॉलपेन खरीदेगा जो अच्छा है, परंतु खराब बॉलपेन नहीं खरीदेगा। दुकानदार इन बॉलपेनों में से यादृच्छया निकाल कर एक पेन ग्राहक को देता है। इसकी क्या प्रायिकता है कि

- (i) ग्राहक बॉलपेन खरीदेगा
(ii) ग्राहक बॉलपेन नहीं खरीदेगा

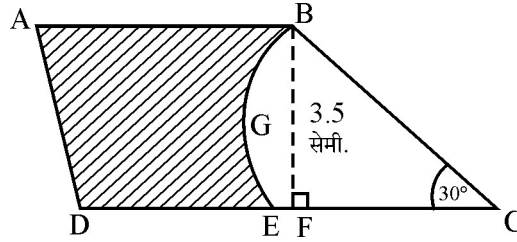
A lot consists of 144 ball pens of which 20 are defective. The customer will buy a ball pen if it is good, but will not buy a defective ball pen. The shopkeeper draws one pen at random from the lot and gives it to the customer. What is the probability that

- (i) customer will buy the ball pen
(ii) customer will not buy the ball pen

17. 6 मी. चौड़ी और 1.5 मी गहरी एक नहर में पानी 10 किमी. प्रति घंटा की चाल से बह रहा है। 30 मिनट में यह नहर कितने क्षेत्रफल की सिंचाई कर पाएगी, जबकि सिंचाई के लिए 8 सेमी गहरे पानी की आवश्यकता है ?

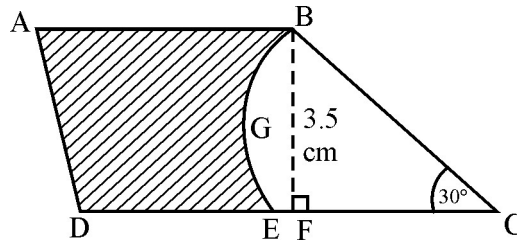
Water in a canal 6 m wide and 1.5 m deep, is flowing with a speed of 10 km/h. How much area will it irrigate in 30 minutes, if 8 cm of standing water is needed for irrigation ?

18. आकृति 4 में ABCD एक समलंब है जिसमें $AB \parallel DC$ है तथा $\angle BCD = 30^\circ$ है। BGEC एक वृत्त, जिसका केन्द्र C है, का एक त्रिज्यखंड है। यदि $AB = BC = 7$ सेमी तथा $DE = 4$ सेमी है तथा $BF = 3.5$ सेमी है, तो छायांकित क्षेत्र का क्षेत्रफल ज्ञात कीजिए। ($\pi = \frac{22}{7}$ लीजिए)



(आकृति - 4)

In Fig. 4, ABCD is a trapezium with $AB \parallel DC$ and $\angle BCD = 30^\circ$. If BGEC is a sector of a circle with centre C and $AB = BC = 7$ cm, $DE = 4$ cm and $BF = 3.5$ cm, then find the area of the shaded region (use $\pi = \frac{22}{7}$).



(Fig. - 4)

19. x के लिए हल कीजिए : $\sqrt{2}x^2 + 7x + 5\sqrt{2} = 0$

Solve for x : $\sqrt{2}x^2 + 7x + 5\sqrt{2} = 0$

20. रामपाल ने विकलांगों के कल्याण के लिए बने एक केन्द्र को 10 टैटों के लिये (कैनवस) देने का विचार किया। प्रत्येक टैट शकंवाकार है जिसके आधार का व्यास 14 मी तथा ऊँचाई 24 मी है। यदि दो मी चौड़े कैनवस का मूल्य ₹ 40 प्रति मी है, तो रामपाल द्वारा केन्द्र को कितनी राशि से सहायता की गई ?

Rampal decided to donate canvas for 10 tents, conical in shape with base diameter 14 m and height 24 m to a centre for handicapped persons' welfare. If the cost of 2 m wide canvas is ₹ 40 per metre, find the amount by which Rampal helped the centre.

खण्ड – द

SECTION – D

प्रश्न संख्या 21 से 31 तक प्रत्येक प्रश्न 4 अंक का है।

Question numbers 21 to 31 carry 4 marks each.

21. x के लिए हल कीजिए : $\frac{1}{x-2} + \frac{2}{x-1} = \frac{6}{x}, x \neq 0, 1, 2$

Solve for x : $\frac{1}{x-2} + \frac{2}{x-1} = \frac{6}{x}, x \neq 0, 1, 2$

22. A तथा B मिलकर एक काम को 6 दिन में कर सकते हैं। यदि A उसी काम को करने में B से 5 दिन कम लेता है, तो B अकेला उस काम को कितनों दिनों में करेगा ?

A and B working together can do a work in 6 days. If A takes 5 days less than B to finish the work, in how many days B alone can do the work ?

23. एक समांतर श्रेणी, जिसका n वाँ पद $a_n = 3 + 2n$ द्वारा दिया गया है, के प्रथम 24 पदों का योगफल ज्ञात कीजिए।

Find the sum of first 24 terms of an A.P. whose n^{th} term is given by $a_n = 3 + 2n$.

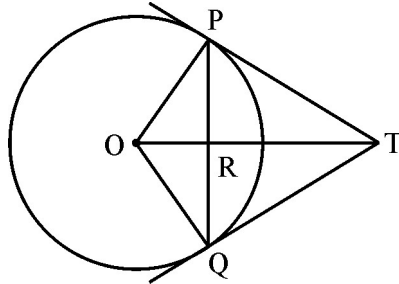
24. सिद्ध कीजिए कि वृत्त के किसी बिंदु पर खींची गई स्पर्श-रेखा, स्पर्श बिंदु से होकर जाने वाली त्रिज्या पर लंब होती है।

Prove that the tangent drawn at any point of a circle is perpendicular to the radius through the point of contact.

25. एक समद्विबाहु त्रिभुज ABC की रचना कीजिए जिसके आधार BC की लंबाई 8 सेमी तथा उसके A से खींचे गये शीर्षलंब AD की लंबाई 4 सेमी है। फिर एक अन्य त्रिभुज की रचना कीजिए जिसकी भुजाएँ ΔABC की संगत भुजाओं का $\frac{2}{3}$ भाग हैं।

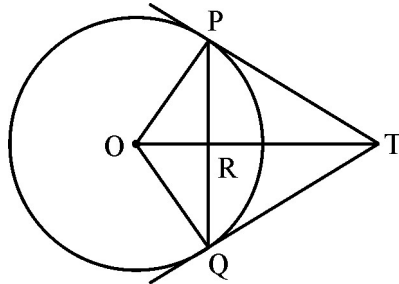
Draw an isosceles triangle ABC in which the base BC is 8 cm long and its altitude AD through A is 4 cm long. Then draw another triangle whose sides are $\frac{2}{3}$ of the corresponding sides of ΔABC .

26. आकृति 5 में, 5 सेमी त्रिज्या के वृत्त की एक 8 सेमी लंबी जीवा PQ है। P और Q पर खींची स्पर्श-रेखाएँ परस्पर बिंदु T पर प्रतिच्छेद करती हैं। TP की लंबाई ज्ञात कीजिए।



(आकृति - 5)

In Fig. 5, PQ is a chord of length 8 cm of a circle of radius 5 cm. The tangents drawn at P and Q intersect at T. Find the length of TP.



(Fig. - 5)

27. भूमि के एक बिंदु P से एक 10 मी ऊँचे भवन के शिखर तथा उसके ठीक ऊपर कुछ दूरी पर मंडराते हेलिकॉप्टर के उन्नयन कोण क्रमशः 30° तथा 60° हैं। भूमि से हेलिकॉप्टर की ऊँचाई ज्ञात कीजिए।

From a point P on the ground, the angles of elevation of the top of a 10 m tall building and a helicopter, hovering at some height vertically over the top the building are 30° and 60° respectively. Find the height of the helicopter above the ground.

28. 52 पत्तों की ताश की गड्डी में से लाल रंग के गुलाम तथा बादशाह और काले रंग की बेगम तथा इक्के निकाल दिये जाते हैं। शेष पत्तों को अच्छी प्रकार से मिलाकर यादृच्छया एक पत्ता निकाला जाता है। प्रायिकता ज्ञात कीजिए कि निकाला गया पत्ता

- (i) एक काली बेगम है।
- (ii) एक लाल रंग का पत्ता है।
- (iii) काले रंग का गुलाम है।
- (iv) एक तस्वीर वाला पत्ता है।

From a pack of 52 playing cards, Jacks and Kings of red colour and Queens and Aces of black colour are removed. The remaining cards are mixed and a card is drawn at random. Find the probability that the drawn card is

- (i) a black Queen
- (ii) a card of red colour
- (iii) a Jack of black colour
- (iv) a face card

29. यदि दो बिंदुओं के निर्देशांक $A(3, 4)$, $B(5, -2)$ हैं तथा एक अन्य बिंदु $P(x, 5)$ इस प्रकार है कि $PA = PB$ है, तो ΔPAB का क्षेत्रफल ज्ञात कीजिए।

If the coordinates of two points are $A(3, 4)$, $B(5, -2)$, and a point $P(x, 5)$ is such that $PA = PB$ then find the area of ΔPAB .

30. 12 सेमी व्यास तथा 15 सेमी ऊँचाई के धातु के एक ठोस बेलन को पिघलाकर कुछ खिलौने बनाए जाते हैं जो 3 सेमी त्रिज्या वाले शंकु के आकार के हैं तथा जिनकी ऊँचाई 9 सेमी है, तो इस प्रकार बनने वाले खिलौनों की संख्या ज्ञात कीजिए ।

A solid metallic cylinder of diameter 12 cm and height 15 cm is melted and recast into toys each in the shape of a cone of radius 3 cm and height 9 cm. Find the number of toys so formed.

31. एक बाल्टी शंकु के छिन्नक के आकार की है जिसकी ऊँचाई 42 सेमी है तथा वृत्तीय सिरो की त्रिज्याएँ 30 सेमी तथा 10 सेमी हैं । ज्ञात कीजिए कि इस बाल्टी में कितने लीटर दूध आयेगा तथा ₹ 40 प्रति लीटर के भाव से बेचने पर कितनी राशि मिलेगी ।

यदि दूध वाला आधा दूध वित्तीय रूप से कमजोर वर्ग के लोगों को कम भाव पर बेचता है, तो ऐसा करने में वह किस मूल्य को दर्शाता है ?

A bucket, is in the form of frustum of a cone whose height is 42 cm and the radii of its circular ends are 30 cm and 10 cm. Find the amount of milk (in litres) which this bucket can hold. If the milkman sells the milk at the rate of ₹ 40 per litre, what amount he will get from the sale ?

If the milkman sells half the milk at less rate to the economically weaker section of society, what value he exhibits by doing this ?

Secondary School Certificate Examination

July 2017

Marking Scheme — Mathematics 30/1, 30/2, 30/3 [Outside Delhi]

General Instructions:

1. The Marking Scheme provides general guidelines to reduce subjectivity in the marking. The answers given in the Marking Scheme are suggested answers. The content is thus indicative. If a student has given any other answer which is different from the one given in the Marking Scheme, but conveys the meaning, such answers should be given full weightage
2. Evaluation is to be done as per instructions provided in the marking scheme. It should not be done according to one's own interpretation or any other consideration — Marking Scheme should be strictly adhered to and religiously followed.
3. Alternative methods are accepted. Proportional marks are to be awarded.
4. If a candidate has attempted an extra question, marks obtained in the question attempted first should be retained and the other answer should be scored out.
5. A full scale of marks - 0 to 90 has to be used. Please do not hesitate to award full marks if the answer deserves it.
6. Separate Marking Scheme for all the three sets has been given.
7. As per orders of the Hon'ble Supreme Court. The candidates would now be permitted to obtain photocopy of the Answer book on request on payment of the prescribed fee. All examiners/Head Examiners are once again reminded that they must ensure that evaluation is carried out strictly as per value points for each answer as given in the Marking Scheme.

QUESTION PAPER CODE 30/1
EXPECTED ANSWER/VALUE POINTS

SECTION A

1. $\tan \theta = \frac{30}{10\sqrt{3}} = \sqrt{3}, \quad \therefore \theta = 60^\circ$ $\frac{1}{2} + \frac{1}{2}$
2. $-1 + (n - 1)5 = 129, \quad \therefore n = 27$ $\frac{1}{2} + \frac{1}{2}$
3. $\angle OPQ = \angle OQP = 55^\circ \quad \therefore \angle TPQ = 35^\circ$ $\frac{1}{2} + \frac{1}{2}$
4. Total number of outcomes = 8, $P(2 \text{ heads}) = \frac{3}{8}$ $\frac{1}{2} + \frac{1}{2}$

SECTION B

5. For equal roots, $k^2 - 4(2)(8) = 0$ 1
 $k^2 = 64 \Rightarrow k = \pm 8$ 1
6. $a + 2d = 5$ and $a + 6d = 9$ 1
 Solving to get $a = 3, d = 1 \therefore$ AP is 3, 4, 5, 6,... 1
7. $OK = OL \Rightarrow \angle OKL = \angle OLK = 30^\circ$ 1
 $\angle OKP = 90^\circ \therefore \angle PKL = 90^\circ - 30^\circ = 60^\circ$ 1
8. Let $P(x, y), A(a + b, b - a)$ and $B(a - b, a + b)$ be the given points
 $PA^2 = PB^2 \Rightarrow [x - (a + b)]^2 + [y - (b - a)]^2 = [x - (a - b)]^2 + [y - (a + b)]^2$ 1
 Solving to get $bx = ay$ 1
9. Here, $BP = BQ = 8$ cm, $AP = AR = 6$ cm, Let $CQ = CR = x$ cm.
 Perimeter of $\Delta ABC = (28 + 2x)$ cm $\frac{1}{2}$
 $\therefore \text{area } \Delta ABC = \frac{1}{2}(28 + 2x)(4) = 84 \text{ cm}^2$

$$\Rightarrow x = 7$$

1

$$\therefore AC = 6 + 7 = 13 \text{ cm and } BC = 8 + 7 = 15 \text{ cm}$$

 $\frac{1}{2}$

10. A horizontal line segment AB with points A, P, Q, and B marked on it. Below the line, the coordinates are given: A(2, 1), P(x, y), Q, and B(5, -8).

P(x, y) divides AB in the ratio 1 : 2

1

$$\therefore x = \frac{1(5) + 2(2)}{1 + 2} = 3, y = \frac{1(-8) + 2(1)}{1 + 2} = -2$$

1

\therefore Coordinates of P are (3, -2)

SECTION C

11. 63, 65, 67, ... $\Rightarrow a_n = 63 + (n - 1)2$

1

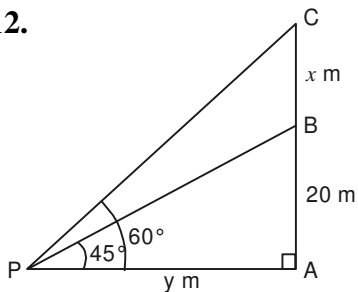
3, 10, 17, ... $\Rightarrow a_n = 3 + (n - 1)7$

 $\frac{1}{2}$

$$63 + (n - 1)2 = 3 + (n - 1)7 \Rightarrow n = 13.$$

 $\frac{1}{2} + 1$

12.



For Correct figure:

 $\frac{1}{2}$

Let AP = y m and BC = x m

$$\therefore \frac{20}{y} = \tan 45^\circ = 1 \Rightarrow y = 20 \text{ m.}$$

 $\frac{1}{2} + \frac{1}{2}$

$$\frac{x + 20}{y} = \tan 60^\circ$$

 $\frac{1}{2}$

$$\frac{x + 20}{20} = \sqrt{3} \Rightarrow x = 20(\sqrt{3} - 1) \text{ m}$$

 $\frac{1}{2} + \frac{1}{2}$

or 14.64 m

13. Surface area of remaining solid

$$= 2\pi rh + \pi r^2 + \pi rl.$$

1

$$\begin{aligned}
 &= \pi[2 \times 6 \times 8 + (6)^2 + 6 \times \sqrt{6^2 + 8^2}] \text{ cm}^2 && 1 \\
 &= 3.14 [96 + 36 + 60] \text{ cm}^2 \\
 &= 3.14 \times 192 = 602.88 \text{ cm}^2 && 1
 \end{aligned}$$

14. Let a be the side of triangle, then $\frac{\sqrt{3}a^2}{4} = 121\sqrt{3} \Rightarrow a = 22 \text{ cm}$ 1
 $\frac{1}{2}$

\therefore Length of wire = 66 cm. $\frac{1}{2}$

$\Rightarrow 2 \times \frac{22}{7} \times r = 66 \Rightarrow r = \frac{21}{2} \text{ cm}$ 1

\therefore Area of enclosed circle = $\frac{22}{7} \times \frac{21}{2} \times \frac{21}{2} = 346.5 \text{ cm}^2$ 1

15. Let the vertices of given triangle be A(0, -1), B(2, 1) and C(0, 3)

Coordinates of mid-points are P(1, 0), Q(1, 2) and R(0, 1) $\frac{1}{2}$

\therefore area $\Delta PQR = \frac{1}{2}[1(2-1) + 1(1-0) + 0(0-2)] = 1 \text{ sq. units.}$ $\frac{1}{2}$

16. Total number of pens = 144, Number of defective pens = 20

(i) P(customer will buy) = P(Pen is good) = $\frac{124}{144}$ or $\frac{31}{36}$ $\frac{1}{2}$

(ii) P(customer will not buy) = $\frac{20}{144}$ or $\frac{5}{36}$ $\frac{1}{2}$

17. Speed = 10 km/h \therefore length in 30 minutes = 5000 m. $\frac{1}{2}$

\therefore Volume of water in 30 minutes = $6 \times 1.5 \times 5000 \text{ m}^3$. 1

Area, that will be irrigated = $\frac{6 \times 1.5 \times 5000}{.08} \text{ m}^2$ 1

= 562500 m^2 $\frac{1}{2}$

18. Given $AB = BC = 7$ cm, $DE = 4$ cm, $BF = 3.5$ cm

$$\text{Area of trapezium ABCD} = \frac{1}{2}[7 + 11] \times 3.5 = 31.5 \text{ cm}^2 \quad 1$$

$$\text{Area of the sector BGEC} = \frac{22}{7} \times 7 \times 7 \times \frac{30}{360} = \frac{77}{6} = 12.83 \text{ cm}^2 \quad 1$$

$$\therefore \text{Area of shaded region} = 31.50 - 12.83 = 18.67 \text{ cm}^2 \quad 1$$

19. $\sqrt{2}x^2 + 7x + 5\sqrt{2} = 0 \Rightarrow \sqrt{2}x^2 + 2x + 5x + 5\sqrt{2} = 0 \quad 1$

$$\sqrt{2}x(x + \sqrt{2}) + 5(x + \sqrt{2}) = 0 \Rightarrow (\sqrt{2}x + 5)(x + \sqrt{2}) = 0 \quad 1$$

$$\Rightarrow x = -\sqrt{2}, = \frac{-5}{\sqrt{2}} \text{ or } \frac{-5\sqrt{2}}{2} \quad 1$$

20. Here $r = 7$ m, $h = 24$ m $\therefore l = \sqrt{7^2 + 24^2} = 25$ m $\frac{1}{2}$

$$\text{Canvas required for 10 tents} = 10 \times \frac{22}{7} \times 7 \times 25 = 5500 \text{ m}^2 \quad 1 \frac{1}{2}$$

$$\text{cost of cloth} = \frac{5500}{2} \times 40 = ₹ 110000 \quad 1$$

\therefore Rampal helped the centre by ₹ 110000

SECTION D

21. Given equation can be written as $\frac{3x - 5}{x^2 - 3x + 2} = \frac{6}{x} \quad 1 \frac{1}{2}$

$$\Rightarrow 6x^2 - 18x + 12 = 3x^2 - 5x \text{ or } 3x^2 - 13x + 12 = 0 \quad 1$$

$$\Rightarrow (x - 3)(3x - 4) = 0 \quad 1$$

$$\therefore x = 3, x = \frac{4}{3} \quad 1 \frac{1}{2}$$

22. Let B takes x days to finish the work, then A takes $(x - 5)$ days to finish $\frac{1}{2}$

$$\therefore \frac{1}{x} + \frac{1}{x - 5} = \frac{1}{6} \quad 1 \frac{1}{2}$$

$$\Rightarrow 6(2x - 5) = x^2 - 5x \text{ or } x^2 - 17x + 30 = 0 \quad \frac{1}{2}$$

$$\Rightarrow (x - 15)(x - 2) = 0 \therefore x = 15 \text{ or } x = 2. \quad 1$$

$$x \neq 2 \text{ as } x > 5 \therefore x = 15$$

So, B can finish the work in 15 days. $\frac{1}{2}$

23. $a_n = 3 + 2n \Rightarrow a = 5, d = a_2 - a = 7 - 5 = 2.$ 1+1

$$S_{24} = \frac{24}{2}[10 + 23 \times 2] \quad 1$$

$$= 12 \times 56 = 672 \quad 1$$

24. For correct given, To prove, Construction and figure $4 \times \frac{1}{2} = 2$

Correct proof 2

25. Constructing ΔABC $1 \frac{1}{2}$

Constructing a triangle similar to ΔABC $2 \frac{1}{2}$

26. ΔTPQ is isosceles and TO is angle bisector of $\angle PTQ$

$$\therefore OT \perp PQ, \text{ so } OT \text{ bisects } PQ, \therefore PR = RQ = 4 \text{ cm} \quad \frac{1}{2}$$

$$\text{Also, } OR = \sqrt{OP^2 - PR^2} = \sqrt{5^2 - 4^2} = 3 \text{ cm} \quad \frac{1}{2}$$

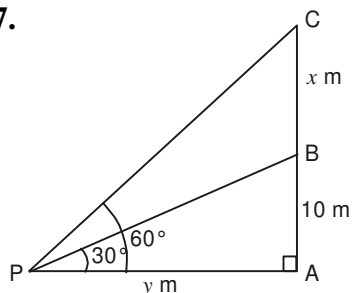
$$\text{Let } TP = x \text{ and } TR = y, \text{ then } x^2 = y^2 + 16 \quad \dots(i) \quad 1$$

$$\text{Also in } \Delta OPT, x^2 + (5)^2 = (y + 3)^2 \quad \dots(ii) \quad 1$$

$$\text{Solving (i) and (ii) to get } y = \frac{16}{3} \text{ and } x = \frac{20}{3} \quad 1$$

$$\therefore TP = \frac{20}{3} \text{ cm}$$

27.



Correct Figure

1

$$\text{In } \triangle ABP, \frac{10}{y} = \tan 30^\circ = \frac{1}{\sqrt{3}}$$

$$\Rightarrow y = 10\sqrt{3} \text{ m}$$

1

$$\text{In } \triangle ACP, \frac{x+10}{10\sqrt{3}} = \tan 60^\circ = \sqrt{3}$$

1

$$\Rightarrow x + 10 = 30 \text{ m} \Rightarrow x = 20 \text{ m}$$

Height above the ground = $20 + 10 = 30 \text{ m}$.

1

28. Number of cards removed = 8

$$\text{Number of remaining cards} = 52 - 8 = 44$$

1

$$P(\text{black queen}) = 0$$

 $\frac{1}{2}$

$$P(\text{a red card}) = \frac{22}{44} = \frac{1}{2}$$

 $\frac{1}{2}$

$$P(\text{a jack of black colour}) = \frac{2}{44} \text{ or } \frac{1}{22}$$

1

$$P(\text{a face card}) = \frac{6}{44} \text{ or } \frac{3}{22}$$

1

$$29. PA^2 = PB^2 \Rightarrow (x-3)^2 + (5-4)^2 = (x-5)^2 + (5+2)^2$$

1

Solving to get $x = 16$.

1

$$\therefore \text{Area } \triangle PAB = \frac{1}{2}[16(4+2) + 3(-2-5) + 5(5-4)]$$

1

$$= \frac{1}{2}[96 - 21 + 5] = 40 \text{ sq. units}$$

1

$$30. \text{ Volume of cylinder} = \pi \cdot (6)^2 \cdot (15) \text{ cm}^3.$$

1

$$\text{Volume of one conical toy} = \frac{1}{3}\pi(3)^2 \cdot 9 \text{ cm}^3$$

1

Let n. be the number of toys formed

$$\Rightarrow n \cdot \frac{1}{3} \pi \cdot (3)^2 \cdot 9 = \pi(6)^2(15) \quad 1$$

$$\Rightarrow n = 20. \quad 1$$

31. $h = 42$ cm, $r_1 = 30$ cm, $r_2 = 10$ cm.

$$\therefore \text{Capacity of bucket} = \frac{1}{3} \times \frac{22}{7} \times 42 \times [900 + 100 + 300] \text{ cm}^3 \quad 1 \frac{1}{2}$$

$$= 57200 \text{ cm}^3 = 57.2 \text{ litres} \quad \frac{1}{2}$$

$$\text{Selling price} = 57.5 \times 40 = ₹ 2288 \quad 1$$

Any relevant value 1

30/2
SECTION A

1. Total number of outcomes = 8, $P(2 \text{ heads}) = \frac{3}{8}$ $\frac{1}{2} + \frac{1}{2}$
2. $-1 + (n - 1)5 = 129$, $\therefore n = 27$ $\frac{1}{2} + \frac{1}{2}$
3. $\tan \theta = \frac{30}{10\sqrt{3}} = \sqrt{3}$, $\therefore \theta = 60^\circ$ $\frac{1}{2} + \frac{1}{2}$
4. $\angle OPQ = \angle OQP = 55^\circ$ $\therefore \angle TPQ = 35^\circ$ $\frac{1}{2} + \frac{1}{2}$

SECTION B

5. $OK = OL \Rightarrow \angle OKL = \angle OLK = 30^\circ$ 1
 $\angle OKP = 90^\circ \therefore \angle PKL = 90^\circ - 30^\circ = 60^\circ$ 1
6. Let $P(x, y)$, $A(a + b, b - a)$ and $B(a - b, a + b)$ be the given points
 $PA^2 = PB^2 \Rightarrow [x - (a + b)]^2 + [y - (b - a)]^2 = [x - (a - b)]^2 + [y - (a + b)]^2$ 1
 Solving to get $bx = ay$ 1
7. 1
 $P(x, y)$ divides AB in the ratio $1 : 2$ 1
 $\therefore x = \frac{1(5) + 2(2)}{1 + 2} = 3, y = \frac{1(-8) + 2(1)}{1 + 2} = -2$ 1
 \therefore Coordinates of P are $(3, -2)$
8. Here, $BP = BQ = 8$ cm, $AP = AR = 6$ cm, Let $CQ = CR = x$ cm.
 Perimeter of $\triangle ABC = (28 + 2x)$ cm $\frac{1}{2}$
 \therefore area $\triangle ABC = \frac{1}{2}(28 + 2x)(4) = 84$ cm²
 $\Rightarrow x = 7$ 1

$$\therefore AC = 6 + 7 = 13 \text{ cm and } BC = 8 + 7 = 15 \text{ cm} \quad \frac{1}{2}$$

9. For equal roots, $k^2 - 4(2)(8) = 0$ 1

$$k^2 = 64 \Rightarrow k = \pm 8 \quad 1$$

10. $a + 4d = 26$, $a + 9d = 51$ 1

Solving to get $a = 6$, $d = 5$ \therefore AP is 6, 11, 16, ... 1

SECTION C

11. Speed = 10 km/h \therefore length in 30 minutes = 5000 m. 1

\therefore Volume of water in 30 minutes = $6 \times 1.5 \times 5000 \text{ m}^3$. 1

$$\text{Area, that will be irrigated} = \frac{6 \times 1.5 \times 5000}{.08} \text{ m}^2 \quad 1$$

$$= 562500 \text{ m}^2 \quad \frac{1}{2}$$

12. Given $AB = BC = 7 \text{ cm}$, $DE = 4 \text{ cm}$, $BF = 3.5 \text{ cm}$

$$\text{Area of trapezium ABCD} = \frac{1}{2}[7 + 11] \times 3.5 = 31.5 \text{ cm}^2 \quad 1$$

$$\text{Area of the sector BGEC} = \frac{22}{7} \times 7 \times 7 \times \frac{30}{360} = \frac{77}{6} = 12.83 \text{ cm}^2 \quad 1$$

\therefore Area of shaded region = $31.50 - 12.83 = 18.67 \text{ cm}^2$ 1

13. Total number of pens = 144, Number of defective pens = 20

(i) $P(\text{customer will buy}) = P(\text{Pen is good}) = \frac{124}{144}$ or $\frac{31}{36}$ 1

(ii) $P(\text{customer will not buy}) = \frac{20}{144}$ or $\frac{5}{36}$ 1

14. Here $r = 7 \text{ m}$, $h = 24 \text{ m}$ $\therefore l = \sqrt{7^2 + 24^2} = 25 \text{ m}$ 1

Canvas required for 10 tents = $10 \times \frac{22}{7} \times 7 \times 25 = 5500 \text{ m}^2$ 1

$$\text{cost of cloth} = \frac{5500}{2} \times 40 = ₹ 110000 \quad 1$$

∴ Rampal helped the centre by ₹ 110000

15. Surface area of remaining solid

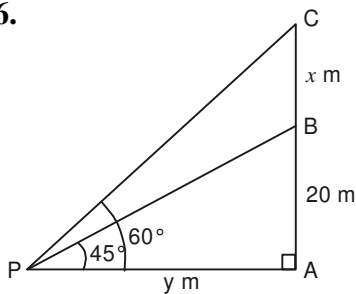
$$= 2\pi rh + \pi r^2 + \pi rl. \quad 1$$

$$= \pi[2 \times 6 \times 8 + (6)^2 + 6 \times \sqrt{6^2 + 8^2}] \text{ cm}^2 \quad 1$$

$$= 3.14 [96 + 36 + 60] \text{ cm}^2$$

$$= 3.14 \times 192 = 602.88 \text{ cm}^2 \quad 1$$

16.



For Correct figure:

$\frac{1}{2}$

Let AP = y m and BC = x m

$$\therefore \frac{20}{y} = \tan 45^\circ = 1 \Rightarrow y = 20 \text{ m.} \quad \frac{1}{2} + \frac{1}{2}$$

$$\frac{x + 20}{y} = \tan 60^\circ \quad \frac{1}{2}$$

$$\frac{x + 20}{20} = \sqrt{3} \Rightarrow x = 20(\sqrt{3} - 1) \text{ m} \quad \frac{1}{2} + \frac{1}{2}$$

or 14.64 m

17. Let a be the side of triangle, then $\frac{\sqrt{3}a^2}{4} = 121\sqrt{3} \Rightarrow a = 22 \text{ cm} \quad \frac{1}{2}$

∴ Length of wire = 66 cm. $\frac{1}{2}$

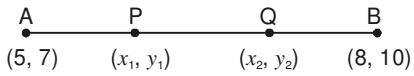
$$\Rightarrow 2 \times \frac{22}{7} \times r = 66 \Rightarrow r = \frac{21}{2} \text{ cm} \quad 1$$

$$\therefore \text{Area of enclosed circle} = \frac{22}{7} \times \frac{21}{2} \times \frac{21}{2} = 346.5 \text{ cm}^2 \quad 1$$

18. The number divisible by 9 are 306, 315, 324, ..., 693 1

$$\therefore 693 = 306 + (n - 1)9 \quad \text{1} \frac{1}{2}$$

$$\Rightarrow n = 44 \quad \frac{1}{2}$$

19.  Let $P(x_1, y_1)$ and $Q(x_2, y_2)$ trisect \overline{AB} 1

\therefore P divides AB in the ratio 1 : 2 1

$$\therefore x_1 = \frac{1(8) + 2(5)}{3} = 6; y_1 = \frac{1(10) + 2(7)}{3} = 8 \quad \therefore P(6, 8) \quad \text{1}$$

$$Q \text{ is mid-point of } PB \Rightarrow x_2 = \frac{6+8}{2} = 7; y_2 = \frac{8+10}{2} = 9 \quad \therefore Q(7, 9) \quad \text{1}$$

20. $2x^2 + \sqrt{3}x - 3 = 0 \Rightarrow 2x^2 + 2\sqrt{3}x - \sqrt{3}x - 3 = 0$ 1

$$2x(x + \sqrt{3}) - \sqrt{3}(x + \sqrt{3}) = 0$$

$$(2x - \sqrt{3})(x + \sqrt{3}) = 0 \quad \text{1}$$

$$\Rightarrow x = \frac{\sqrt{3}}{2}, x = -\sqrt{3} \quad \text{1}$$

SECTION D

21. Volume of cylinder = $\pi \cdot (6)^2 \cdot (15) \text{ cm}^3$. 1

$$\text{Volume of one conical toy} = \frac{1}{3} \pi (3)^2 \cdot 9 \text{ cm}^3 \quad \text{1}$$

Let n. be the number of toys formed

$$\Rightarrow n \cdot \frac{1}{3} \pi \cdot (3)^2 \cdot 9 = \pi (6)^2 (15) \quad \text{1}$$

$$\Rightarrow n = 20. \quad \text{1}$$

22. $h = 42$ cm, $r_1 = 30$ cm, $r_2 = 10$ cm.

$$\therefore \text{Capacity of bucket} = \frac{1}{3} \times \frac{22}{7} \times 42 \times [900 + 100 + 300] \text{ cm}^3 \quad 1 \frac{1}{2}$$

$$= 57200 \text{ cm}^3 = 57.2 \text{ litres} \quad \frac{1}{2}$$

$$\text{Selling price} = 57.5 \times 40 = ₹ 2288 \quad 1$$

Any relevant value 1

23. Given equation can be written as $\frac{3x-5}{x^2-3x+2} = \frac{6}{x}$ 1 $\frac{1}{2}$

$$\Rightarrow 6x^2 - 18x + 12 = 3x^2 - 5x \text{ or } 3x^2 - 13x + 12 = 0 \quad 1$$

$$\Rightarrow (x-3)(3x-4) = 0 \quad 1$$

$$\therefore x = 3, x = \frac{4}{3} \quad \frac{1}{2}$$

24. ΔTPQ is isosceles and TO is angle bisector of $\angle PTQ$

$$\therefore OT \perp PQ, \text{ so } OT \text{ bisects } PQ, \therefore PR = RQ = 4 \text{ cm} \quad \frac{1}{2}$$

$$\text{Also, } OR = \sqrt{OP^2 - PR^2} = \sqrt{5^2 - 4^2} = 3 \text{ cm} \quad \frac{1}{2}$$

$$\text{Let } TP = x \text{ and } TR = y, \text{ then } x^2 = y^2 + 16 \quad \dots(i) \quad 1$$

$$\text{Also in } \Delta OPT, x^2 + (5)^2 = (y+3)^2 \quad \dots(ii) \quad 1$$

$$\text{Solving (i) and (ii) to get } y = \frac{16}{3} \text{ and } x = \frac{20}{3} \quad 1$$

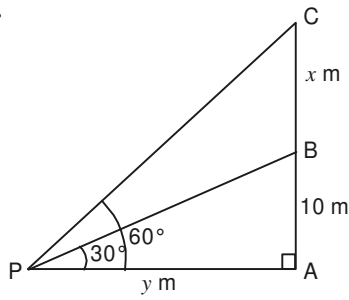
$$\therefore TP = \frac{20}{3} \text{ cm}$$

25. $a_n = 3 + 2n \Rightarrow a = 5, d = a_2 - a = 7 - 5 = 2.$ 1+1

$$S_{24} = \frac{24}{2} [10 + 23 \times 2] \quad 1$$

$$= 12 \times 56 = 672 \quad 1$$

26.



Correct Figure

1

In $\triangle ABP$, $\frac{10}{y} = \tan 30^\circ = \frac{1}{\sqrt{3}}$

$\Rightarrow y = 10\sqrt{3} \text{ m}$

1

In $\triangle ACP$, $\frac{x+10}{10\sqrt{3}} = \tan 60^\circ = \sqrt{3}$

1

$\Rightarrow x + 10 = 30 \text{ m} \Rightarrow x = 20 \text{ m}$

Height above the ground = $20 + 10 = 30 \text{ m}$.

1

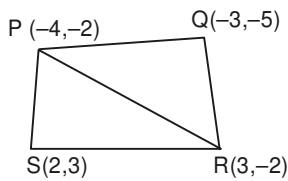
27. For correct given, To prove, Construction and figure

$4 \times \frac{1}{2} = 2$

Correct proof

2

28.



Area $\triangle PQR = \frac{1}{2}[-4(-3) - 3(0) + 3(3)] = \frac{21}{2} \text{ sq.units}$

$1 \frac{1}{2}$

Area $\triangle PRS = \frac{1}{2}[-4(-5) + 3(5) + 2(0)] = \frac{35}{2} \text{ sq.units}$

$1 \frac{1}{2}$

$\therefore \text{area PQRS} = \frac{21}{2} + \frac{35}{2} = 28 \text{ sq.units}$

1

29. Total number of possible outcomes = 36

$\frac{1}{2}$

Favourable outcomes are:

$\{(1, 1), (1, 4), (2, 2), (3, 3), (4, 1), (4, 4), (5, 5), (6, 6)\}$

$1 \frac{1}{2}$

\therefore Number of favourable outcomes = 8

1

Required probability = $\frac{8}{36} = \frac{2}{9}$

1

30. Let her marks in English be x

then, Marks in Mathematics = $30 - x$

$\frac{1}{2}$

$$\therefore (x - 3)(30 - x + 2) = 210 \quad 1$$

$$\Rightarrow x^2 - 35x + 306 = 0 \quad \frac{1}{2}$$

$$(x - 18)(x - 17) = 0 \Rightarrow x = 17, 18 \quad 1$$

\therefore If marks in English = 17, then marks in Maths = 13 $\frac{1}{2}$

If marks in English = 18, then marks in Maths = 12 $\frac{1}{2}$

31. Constructing $\triangle ABC$ (correctly) $1\frac{1}{2}$

Correct construction of triangle similar to ABC $2\frac{1}{2}$

30/3
SECTION A

1. $\angle OPQ = \angle OQP = 55^\circ \quad \therefore \angle TPQ = 35^\circ$ $\frac{1}{2} + \frac{1}{2}$
2. Total number of outcomes = 8, $P(2 \text{ heads}) = \frac{3}{8}$ $\frac{1}{2} + \frac{1}{2}$
3. $\tan \theta = \frac{30}{10\sqrt{3}} = \sqrt{3}, \quad \therefore \theta = 60^\circ$ $\frac{1}{2} + \frac{1}{2}$
4. $-1 + (n-1)5 = 129, \quad \therefore n = 27$ $\frac{1}{2} + \frac{1}{2}$

SECTION B

5. $\begin{array}{cccc} \text{A} & \text{P} & \text{Q} & \text{B} \\ \bullet & \bullet & \bullet & \bullet \\ (2, 1) & (x, y) & & (5, -8) \end{array}$
- $P(x, y)$ divides AB in the ratio $1 : 2$ 1
- $\therefore x = \frac{1(5) + 2(2)}{1+2} = 3, y = \frac{1(-8) + 2(1)}{1+2} = -2$ 1
- \therefore Coordinates of P are $(3, -2)$
6. Let $P(x, y), A(a + b, b - a)$ and $B(a - b, a + b)$ be the given points
- $PA^2 = PB^2 \Rightarrow [x - (a + b)]^2 + [y - (b - a)]^2 = [x - (a - b)]^2 + [y - (a + b)]^2$ 1
- Solving to get $bx = ay$ 1
7. For equal roots, $k^2 - 4(2)(8) = 0$ 1
- $k^2 = 64 \Rightarrow k = \pm 8$ 1
8. Here, $BP = BQ = 8 \text{ cm}, AP = AR = 6 \text{ cm},$ Let $CQ = CR = x \text{ cm}.$
- Perimeter of $\triangle ABC = (28 + 2x) \text{ cm}$ $\frac{1}{2}$
- $\therefore \text{area } \triangle ABC = \frac{1}{2}(28 + 2x)(4) = 84 \text{ cm}^2$

$$\Rightarrow x = 7 \quad 1$$

$$\therefore AC = 6 + 7 = 13 \text{ cm and } BC = 8 + 7 = 15 \text{ cm} \quad \frac{1}{2}$$

9. $OK = OL \Rightarrow \angle OKL = \angle OLK = 30^\circ$ 1

$$\angle OKP = 90^\circ \therefore \angle PKL = 90^\circ - 30^\circ = 60^\circ \quad 1$$

10. $S_n = \frac{n}{2} \left[2(-6) + (n-1) \frac{1}{2} \right] = 0$ 1

$$\Rightarrow n = 25 \quad 1$$

SECTION C

11. Let a be the side of triangle, then $\frac{\sqrt{3}a^2}{4} = 121\sqrt{3} \Rightarrow a = 22 \text{ cm}$ 1

$$\therefore \text{Length of wire} = 66 \text{ cm.} \quad \frac{1}{2}$$

$$\Rightarrow 2 \times \frac{22}{7} \times r = 66 \Rightarrow r = \frac{21}{2} \text{ cm} \quad 1$$

$$\therefore \text{Area of enclosed circle} = \frac{22}{7} \times \frac{21}{2} \times \frac{21}{2} = 346.5 \text{ cm}^2 \quad 1$$

12. Let the vertices of given triangle be A(0, -1), B(2, 1) and C(0, 3)

$$\text{Coordinates of mid-points are P(1, 0), Q(1, 2) and R(0, 1)} \quad \frac{1}{2}$$

$$\therefore \text{area } \Delta PQR = \frac{1}{2} [1(2-1) + 1(1-0) + 0(0-2)] = 1 \text{ sq. units.} \quad \frac{1}{2}$$

13. Speed = 10 km/h \therefore length in 30 minutes = 5000 m. 1

$$\therefore \text{Volume of water in 30 minutes} = 6 \times 1.5 \times 5000 \text{ m}^3. \quad 1$$

$$\text{Area, that will be irrigated} = \frac{6 \times 1.5 \times 5000}{.08} \text{ m}^2 \quad 1$$

$$= 562500 \text{ m}^2 \quad \frac{1}{2}$$

14. Surface area of remaining solid

$$= 2\pi rh + \pi r^2 + \pi rl. \quad 1$$

$$= \pi[2 \times 6 \times 8 + (6)^2 + 6 \times \sqrt{6^2 + 8^2}] \text{ cm}^2 \quad 1$$

$$= 3.14 [96 + 36 + 60] \text{ cm}^2$$

$$= 3.14 \times 192 = 602.88 \text{ cm}^2 \quad 1$$

15. Here $r = 7\text{m}$, $h = 24\text{m}$ $\therefore l = \sqrt{7^2 + 24^2} = 25\text{ m}$ $\frac{1}{2}$

$$\text{Canvas required for 10 tents} = 10 \times \frac{22}{7} \times 7 \times 25 = 5500 \text{ m}^2 \quad 1 \frac{1}{2}$$

$$\text{cost of cloth} = \frac{5500}{2} \times 40 = ₹ 110000 \quad 1$$

\therefore Rampal helped the centre by ₹ 110000

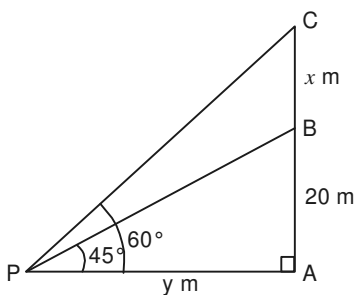
16. Given $AB = BC = 7\text{ cm}$, $DE = 4\text{ cm}$, $BF = 3.5\text{ cm}$

$$\text{Area of trapezium ABCD} = \frac{1}{2}[7 + 11] \times 3.5 = 31.5 \text{ cm}^2 \quad 1$$

$$\text{Area of the sector BGEC} = \frac{22}{7} \times 7 \times 7 \times \frac{30}{360} = \frac{77}{6} = 12.83 \text{ cm}^2 \quad 1$$

$$\therefore \text{Area of shaded region} = 31.50 - 12.83 = 18.67 \text{ cm}^2 \quad 1$$

17.



For Correct figure:

$\frac{1}{2}$

Let $AP = y\text{ m}$ and $BC = x\text{ m}$

$$\therefore \frac{20}{y} = \tan 45^\circ = 1 \Rightarrow y = 20 \text{ m.} \quad \frac{1}{2} + \frac{1}{2}$$

$$\frac{x + 20}{y} = \tan 60^\circ \quad \frac{1}{2}$$

$$\frac{x + 20}{20} = \sqrt{3} \Rightarrow x = 20(\sqrt{3} - 1) \text{ m} \quad \frac{1}{2} + \frac{1}{2}$$

or 14.64 m

(17)

30/3

18. -3 is a root of $2x^2 + px - 15 = 0 \Rightarrow 2(9) - 3p - 15 = 0$ 1
- $\Rightarrow p = 1$ $\frac{1}{2}$
- $x^2 - 4px + k = 0$ has equal roots $\Rightarrow 16 - 4k = 0$ 1
- $\Rightarrow k = 4$ $\frac{1}{2}$
19. $a = 10, S_{14} = 1050 \Rightarrow 7[20 + 13d] = 1050$ 1
- $\Rightarrow d = 10$ 1
- $a_{20} = 10 + 19(10) = 200$ 1
20. Number of all 2-digit number are 90 1
- { 10, 11, 12, ..., 99}
- Multiple of 7 are { 7, 14, 21, ..., 98 } i.e. 14 1
- \therefore Required probability = $\frac{14}{90}$ or $\frac{7}{45}$ 1

SECTION D

21. For correct given, To prove, Construction and figure $4 \times \frac{1}{2} = 2$
- Correct proof 2
22. Volume of cylinder = $\pi \cdot (6)^2 \cdot (15) \text{ cm}^3$. 1
- Volume of one conical toy = $\frac{1}{3} \pi (3)^2 \cdot 9 \text{ cm}^3$ 1
- Let n. be the number of toys formed
- $\Rightarrow n \cdot \frac{1}{3} \pi \cdot (3)^2 \cdot 9 = \pi (6)^2 (15)$ 1
- $\Rightarrow n = 20$. 1

23. $h = 42$ cm, $r_1 = 30$ cm, $r_2 = 10$ cm.

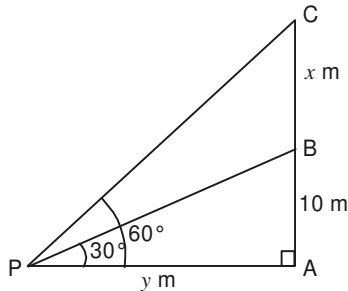
$$\therefore \text{Capacity of bucket} = \frac{1}{3} \times \frac{22}{7} \times 42 \times [900 + 100 + 300] \text{ cm}^3$$

$$= 57200 \text{ cm}^3 = 57.2 \text{ litres}$$

$$\text{Selling price} = 57.5 \times 40 = ₹ 2288$$

Any relevant value

24.



$$\text{In } \triangle ABP, \frac{10}{y} = \tan 30^\circ = \frac{1}{\sqrt{3}}$$

$$\Rightarrow y = 10\sqrt{3} \text{ m}$$

$$\text{In } \triangle ACP, \frac{x+10}{10\sqrt{3}} = \tan 60^\circ = \sqrt{3}$$

$$\Rightarrow x + 10 = 30 \text{ m} \Rightarrow x = 20 \text{ m}$$

$$\text{Height above the ground} = 20 + 10 = 30 \text{ m.}$$

Correct Figure

25. $\triangle TPQ$ is isosceles and TO is angle bisector of $\angle PTQ$

$$\therefore OT \perp PQ, \text{ so } OT \text{ bisects } PQ, \therefore PR = RQ = 4 \text{ cm}$$

$$\text{Also, } OR = \sqrt{OP^2 - PR^2} = \sqrt{5^2 - 4^2} = 3 \text{ cm}$$

$$\text{Let } TP = x \text{ and } TR = y, \text{ then } x^2 = y^2 + 16 \quad \dots(i)$$

$$\text{Also in } \triangle OPT, x^2 + (5)^2 = (y + 3)^2 \quad \dots(ii)$$

$$\text{Solving (i) and (ii) to get } y = \frac{16}{3} \text{ and } x = \frac{20}{3}$$

$$\therefore TP = \frac{20}{3} \text{ cm}$$

26. Given equation can be written as $\frac{3x-5}{x^2-3x+2} = \frac{6}{x}$ $1\frac{1}{2}$
- $\Rightarrow 6x^2 - 18x + 12 = 3x^2 - 5x$ or $3x^2 - 13x + 12 = 0$ 1
- $\Rightarrow (x-3)(3x-4) = 0$ 1
- $\therefore x = 3, x = \frac{4}{3}$ $\frac{1}{2}$
27. $a_n = 3 + 2n \Rightarrow a = 5, d = a_2 - a = 7 - 5 = 2.$ 1+1
- $S_{24} = \frac{24}{2}[10 + 23 \times 2]$ 1
- $= 12 \times 56 = 672$ 1
28. Total number of shirts = 125
- No. of shirts with no defect = 110
- No. of shirts with minor defect = 12
- No. of shirts with major defects = 3.
- $P(\text{Ram Lal will buy the shirt}) = \frac{110}{125}$ or $\frac{22}{25}$ 2
- $P(\text{Naveen will buy the shirt}) = \frac{122}{125}$ 2
29. Constructing ΔABC (correctly) $1\frac{1}{2}$
- Constructing a triangle similar to ΔABC $2\frac{1}{2}$
30. Let one tap takes x minutes to fill the cistern
- \therefore Other tap can fill the cistern in $(x+1)$ minutes $\frac{1}{2}$
- $\Rightarrow \frac{1}{x} + \frac{1}{x+1} = \frac{11}{30}$ $1\frac{1}{2}$

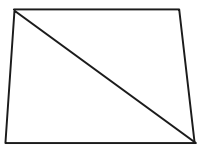
$$\Rightarrow 11x^2 - 49x - 30 = 0$$

$$\text{or } (11x + 6)(x - 5) = 0 \Rightarrow x = 5$$

\therefore One tap can fill the cistern in 5 minutes

While, the other takes 6 minutes.

 $1\frac{1}{2}$
 $\frac{1}{2}$
 $1\frac{1}{2}$
 $1\frac{1}{2}$
 1

31. A (3, 1) B (8, 1)

 D (5, 3) C (7, 2)
 \therefore

$$\text{Area } \Delta ABC = \frac{1}{2}[3(-1) + 8(1) + 7(0)] = \frac{5}{2} \text{ sq. units}$$

$$\text{Area } \Delta ACD = \frac{1}{2}[3(-1) + 7(2) + 5(-1)] = 3 \text{ sq. units}$$

$$\text{Area } ABCD = \frac{5}{2} + 3 = \frac{11}{2} \text{ sq. units}$$