SET – 1

Series : HRK/1/C

कोड नं.
Code No. **30/1/1**

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 **8** 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 **8** 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** घंटे*
*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) *कैलकुलेटरों 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.

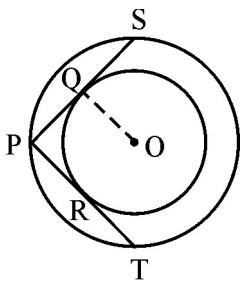
1. 1.5 मी. ऊँचा एक प्रेषक 30 मी. ऊँचे एक मीनार से 28.5 मी. की दूरी पर है । मीनार के शिखर का प्रेषक की आँख से उन्नयन कोण ज्ञात कीजिए ।

   An observer, 1.5 m tall, is 28.5 m away from a 30 m high tower. Determine the angle of elevation of the top of the tower from the eye of the observer.

2. समांतर श्रेढ़ी $\frac{1}{m}, \frac{1+m}{m}, \frac{1+2m}{m}, \ldots\ldots\ldots$ का nवाँ पद लिखिए ।

   Write the n^{th} term of the A.P. $\frac{1}{m}, \frac{1+m}{m}, \frac{1+2m}{m}, \ldots\ldots\ldots$

3. आकृति-1 में दो सकेन्द्री वृत्त हैं जिनका केन्द्र O है । बाह्य वृत्त के एक बिंदु P से आंतरिक वृत्त पर PQS तथा PRT दो स्पर्श रेखाएँ हैं । यदि PR = 5 सेमी है, तो PS की लंबाई लिखिए ।



आकृति – 1

In fig. 1, there are two concentric circles with centre O. PRT and PQS are tangents to the inner circle from a point P lying on the outer circle. If PR = 5 cm, find the length of PS.

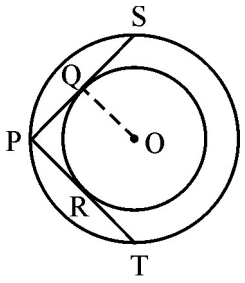


Fig. – 1

4. एक थैले में 3 लाल और 5 काली गेंदें हैं । इस थैलें में एक गेंद यादृच्छया निकाली जाती है । प्रायिकता क्या है कि निकाली गई गेंद लाल न हो ?

A bag contains 3 red and 5 black balls. A ball is drawn at random from the bag. What is the probability that the drawn ball is not red ?

खण्ड – ब
SECTION – B

प्रश्न संख्या **5** से **10** तक प्रत्येक प्रश्न **2** अंक का है ।
Question numbers **5** to **10** carry **2** marks each.

5. x के लिए हल कीजिए :

$\frac{x+3}{x+2} = \frac{3x-7}{2x-3}, x \neq -2, \frac{3}{2}$

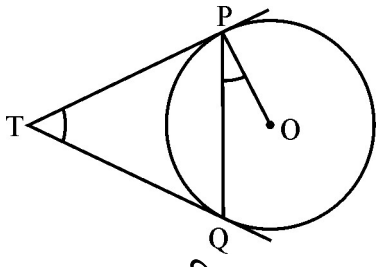
Solve for x :

$\frac{x+3}{x+2} = \frac{3x-7}{2x-3}, x \neq -2, \frac{3}{2}$

6. एक समांतर श्रेढ़ी का 10वाँ पद (– 4) है तथा 22वाँ पद (–16) है । उसका 38वाँ पद ज्ञात कीजिए ।

The 10^{th} term of an A.P. is (– 4) and its 22^{nd} term is (–16). Find its 38^{th} term.

7. आकृति–2 में O केन्द्र वाले वृत्त पर बाह्य बिंदु T से दो स्पर्श रेखाएँ TP तथा TQ खींची गई हैं । सिद्ध कीजिए कि $\angle$ PTQ = 2 $\angle$ OPQ.



आकृति–2

In fig. 2, two tangents TP and TQ are drawn to a circle with centre O, from an external point T. Prove that $\angle PTQ = 2\ \angle OPQ$.

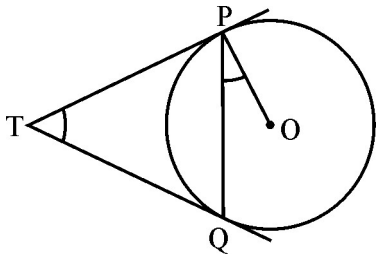


Fig. – 2

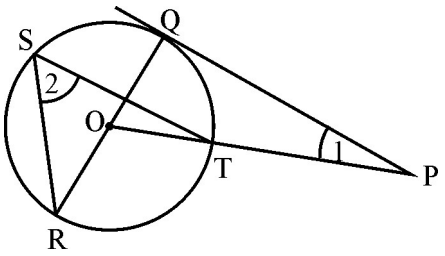
8. k का वह मान ज्ञात कीजिए जिसके लिए बिंदु (–5, 1), (1, k) तथा (4, –2) संरेखी हैं ।

Find the value of k for which the points (–5, 1), (1, k) and (4, –2) are collinear.

9. बिंदु P(– 4, 6), बिंदुओं A(– 6, 10) और B(3, –8) को मिलाने वाले रेखाखण्ड को किस अनुपात में विभाजित करता है ?

In what ratio does the point P(–4, 6) divide the line segment joining the points. A(– 6, 10) and B(3, –8) ?

10. आकृति–3 में एक बाह्य बिंदु P से PQ, O केन्द्र वाले वृत्त की स्पर्श रेखा है, OP वृत्त को बिंदु T पर काटती है तथा QOR एक व्यास है । यदि $\angle$ POR = 130° है तथा S वृत्त पर एक बिंदु है, तो $\angle 1 + \angle 2$ ज्ञात कीजिए ।



आकृति–3

In fig. 3, PQ is a tangent from an external point P to a circle with centre O and OP cuts the circle at T and QOR is a diameter. If $\angle$POR = 130° and S is a point on the circle, find $\angle 1 + \angle 2$.

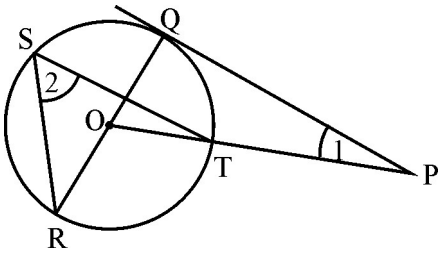


Fig. – 3

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. 8 के प्रथम 15 गुणजों का योग ज्ञात कीजिए ।

Find the sum of first 15 multiples of 8.

12. 120 मी. ऊँची मीनार के शिखर से एक व्यक्ति, दो कारों, जो मीनार की विपरीत दिशाओं में तथा मीनार के पाद से एक ही रेखा में हैं, के अवनमन कोण 60° तथा 45° देखता है । कारों के बीच की दूरी ज्ञात कीजिए । ($\sqrt{3}$ = 1.732 लीजिए ।)

From the top of a 120 m high tower, a man observes two cars on the opposite sides of the tower and in straight line with the base of tower with angles of depression as 60° and 45°. Find the distance between the two cars. (Take $\sqrt{3}$ = 1.732)

13. एक सर्कस टेंट बेलन के ऊपर अध्यारोपित उसी व्यास वाले शंकु के आकार का है । यदि उनका उभयनिष्ठ व्यास 56 मी., बेलनाकार भाग की ऊँचाई 6 मी तथा भूमि से टेंट की कुल ऊँचाई 27 मी. है, तो टेंट में लगने वाले कैनवस का क्षेत्रफल ज्ञात कीजिए ।

A circus tent is in the shape of a cylinder surmounted by a conical top of same diameter. If their common diameter is 56 cm, the height of cylindrical part is 6 m and the total height of the tent above the ground is 27 m, find the area of canvas used in making the tent.

14. एक बड़े वृत्त की त्रिज्या तथा एक छोटे वृत्त की त्रिज्या में अंतर 7 सेमी है तथा दोनों वृत्तों के क्षेत्रफलों में अंतर 1078 वर्ग सेमी है, तो छोटे वृत्त की त्रिज्या ज्ञात कीजिए ।

The difference between the radii of the smaller circle and the larger circle is 7 cm and the difference between the areas of the two circles is 1078 sq.cm. Find the radius of the smaller circle.

15. x-अक्ष पर स्थित उस बिंदु के निर्देशांक ज्ञात कीजिए जो बिंदुओं A(2, –5) तथा B(–2, 9) से समदूरस्थ है ।

Find the coordinates of a point on the x-axis which is equidistant from the points A(2, –5) and B(–2, 9).

16. एक खेल एक रुपये के सिक्के को तीन बार उछालने पर प्रत्येक बार आने वाले परिणाम को नोट करने से संबंधित है । रमेश खेल तब जीतता है जब सभी उछालों में समान (एक ही) परिणाम (अर्थात तीनों बार चित अथवा तीनों बार पट) आए, अन्यथा वह हार जाता है । इस खेल में रमेश के हारने की प्रायिकता ज्ञात कीजिए ।

A game consists of tossing a one-rupee coin 3 times and noting the outcome each time. Ramesh wins the game if all the tosses give the same result (i.e. three heads or three tails) and loses otherwise. Find the probability of Ramesh losing the game.

17. 5 किमी/घंटे की चाल से बहता पानी एक 14 सेमी व्यास वाले पाइप द्वारा एक आयताकार टंकी, जिसकी विमाएँ 50 मी. × 44 मी. हैं, में जा रहा है । वह समय ज्ञात कीजिए जिसमें टंकी में पानी का स्तर 7 सेमी बढ़ जायेगा ।

Water is flowing at the rate of 5 km/hour through a pipe of diameter 14 cm into a rectangular tank of dimensions 50 m × 44 m. Find the time in which the level of water in the tank will rise by 7 cm.

18. 21 सेमी त्रिज्या वाले वृत्त की एक चाप केन्द्र पर 60° का कोण अन्तरित करती है, तो चाप द्वारा बने त्रिज्य-खंड का क्षेत्रफल ज्ञात कीजिए ।

In a circle of radius 21 cm, an arc subtends an angle of 60° at the centre. Find the area of sector formed by the arc.

19. दर्शाइए कि यदि निम्न द्विघाती समीकरण के मूल समान हैं, तो ad = bc है

$x^2(a^2 + b^2) + 2(ac + bd)x + (c^2 + d^2) = 0$

Show that if the roots of the following quadratic equation are equal, then ad = bc

$x^2(a^2 + b^2) + 2(ac + bd)x + (c^2 + d^2) = 0$

20. एक ठोस बेलन, जिसकी ऊँचाई 24 सेमी तथा व्यास 14 सेमी है, में से उसी ऊँचाई तथा उसी व्यास का एक शंकु काट कर निकाल लिया जाता है । शेष ठोस का कुल पृष्ठीय क्षेत्रफल ज्ञात कीजिए ।

From a solid cylinder of height 24 cm and diameter 14 cm, a conical cavity of the same height and same diameter is hollowed out. Find the total surface area of the remaining solid.

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 :

$\frac{x+3}{x-2} - \frac{1-x}{x} = \frac{17}{4}; x \neq 0, 2$

Solve for x :

$\frac{x+3}{x-2} - \frac{1-x}{x} = \frac{17}{4}; x \neq 0, 2$

22. दो क्रमागत विषम प्राकृत संख्याएँ ज्ञात कीजिए, जिनके वर्गों का योग 394 है ।

Find two consecutive odd natural numbers, the sum of whose squares is 394.

23. यदि एक समांतर श्रेढ़ी के 11वें पद तथा 18वें पद में 2 : 3 का अनुपात है, तो उसके प्रथम पाँच पदों के योग का उसके प्रथम 10 पदों के योग में अनुपात ज्ञात कीजिए ।

If the ratio of the 11^{th} term of an AP to its 18^{th} term is 2 : 3, find the ratio of the sum of the first five terms to the sum of its first 10 terms.

24. सिद्ध कीजिए कि किसी बाह्य बिंदु से वृत्त पर खींची गई स्पर्श रेखाओं की लंबाइयाँ समान होती हैं ।

Prove that lengths of tangents drawn from an external point to a circle are equal.

25. एक समकोण त्रिभुज बनाइए जिसकी भुजाओं की लंबाइयाँ (कर्ण को छोड़कर) 8 सेमी तथा 6 सेमी हैं । फिर एक अन्य त्रिभुज बनाइए जिसकी भुजाएँ दी गई त्रिभुज की संगत भुजाओं का $\frac{3}{4}$ गुना हो ।

Draw a right triangle in which the sides (other than hypotenuse) are 8 cm and 6 cm. Then construct another triangle whose sides are $\frac{3}{4}$ times the (corresponding) sides of given triangle.

26. एक वृत्त के परिगत एक चतुर्भुज ABCD खींचा गया है । सिद्ध कीजिए कि AB + CD = AD + BC.

A quadrilateral ABCD is drawn to circumscribe a circle. Prove that AB + CD = AD + BC.

27. एक सीधा राजमार्ग एक मीनार के पाद तक जाता है । मीनार के शिखर पर खड़ा एक आदमी एक कार को 30° के अवनमन कोण पर देखता है, जो मीनार के पाद की ओर एकसमान चाल से जाती है । 6 सेकण्ड बाद कार का अवनमन कोण 60° हो जाता है । इस बिंदु से मीनार के पाद तक पहुँचने में कार द्वारा लिया गया समय ज्ञात कीजिए ।

A straight highway leads to the foot of a tower. A man standing on its top observes a car at an angle of depression of 30°, which is approaching the foot of tower with a uniform speed. 6 seconds later, the angle of depression of the car becomes 60°. Find the time taken by the car to reach the foot of tower from this point.

28. एक डिब्बे में कार्ड हैं जिन पर 1 से 90 तक संख्याएँ लिखी हैं । डिब्बे में से एक कार्ड यादृच्छया निकाला गया । प्रायिकता ज्ञात कीजिए कि निकाले गये कार्ड पर एक

(i) दो अंकीय संख्या है ।

(ii) पूर्ण वर्ग संख्या है ।

A box contains cards, number from 1 to 90. A card is drawn at random from the box. Find the probability that the selected card bears a

(i) two digit number.

(ii) perfect square number.

29. चतुर्भुज ABCD का क्षेत्रफल ज्ञात कीजिए जिसके शीर्षों के निर्देशांक A(1, 1), B(7, –3), C(12, 2), D(7, 21) हैं ।

Find the area of a quadrilateral ABCD whose vertices are A(1, 1), B(7, –3), C(12, 2) and D(7, 21).

30. एक धातु की शीट से बनी बाल्टी शंकु के छिन्नक के आकार की है जिसकी ऊँचाई 35 सेमी तथा जिसके वृत्तीय सिरों की त्रिज्याएँ 30 सेमी तथा 12 सेमी हैं । उस पूरी भरी बाल्टी में कितने लीटर दूध आयेगा ? यदि यह दूध ₹ 40 प्रति लीटर के भाव से बेचा जाए, तो बेचने पर प्राप्त राशि ज्ञात कीजिए ।

यदि वह व्यक्ति आधा दूध वित्तीय रूप से कमज़ोर वर्ग के लोगों को आधे भाव पर बेचे तो इस प्रश्न से क्या मूल्य प्रदर्शित होता है ?

A bucket, made of metal sheet, is in the form of frustum of a cone whose height is 35 cm and the radii of its circular ends are 30 cm and 12 cm. How many litres of milk it can contain if it is full to the brim ? If the milk is sold at ₹ 40/litre, find the amount received by the person.

If the person sells half the milk at half the rate to the economically weaker section of society, what value is exhibited through this question ?

31. लकड़ी के आयताकार ब्लॉक, जिसकी विमाएँ 15 सेमी × 10 सेमी × 3.5 सेमी हैं, में से चार शंक्वाकार खोल खोदकर एक पेन–स्टैंड बनाया गया है । प्रत्येक खोल की त्रिज्या 0.5 सेमी तथा गहराई 2.1 सेमी है । पेन स्टैंड में बची लकड़ी का आयतन ज्ञात कीजिए ।

From a rectangular block of wood, having dimensions 15 cm × 10 cm × 3.5 cm, a pen stand is made by making four conical depressions. The radius of each one of the depression is 0.5 cm and the depth is 2.1 cm. Find the volume of wood left in the pen-stand.

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Secondary School Certificate Examination

July 2017

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

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.

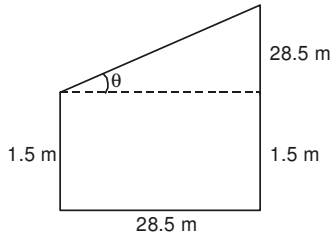
7. As per orders of the Hon'ble Supreme Court. The candidates would now be permitted to obtain photocopy of the Answer book on request on payment of the prescribed fee. All examiners/Head Examiners are once again reminded that they must ensure that evaluation is carried out strictly as per value points for each answer as given in the Marking Scheme.

QUESTION PAPER CODE 30/1/1

EXPECTED ANSWER/VALUE POINTS

SECTION A

1.



$\tan\theta = \frac{28.5}{28.5} = 1$ $\frac{1}{2}$

$\therefore \quad \theta = 45°$ $\frac{1}{2}$

2. $d = \frac{1+m}{m} - \frac{1}{m} = 1$ $\frac{1}{2}$

$\therefore \quad a_n = \frac{1}{m} + n - 1$ $\frac{1}{2}$

3. PQ = PR = 5 cm $\frac{1}{2}$

$\therefore \quad$ PS = 2PQ = 10 cm $\frac{1}{2}$

4. Total number of outcomes = 8 $\frac{1}{2}$

$\therefore \quad$ P(drawn ball is not red) $= \frac{5}{8}$ $\frac{1}{2}$

SECTION B

5. $(x + 3)(2x - 3) = (3x - 7)(x + 2)$ $\frac{1}{2}$

$\Rightarrow \quad x^2 - 4x - 5 = 0$ $\frac{1}{2}$

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

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

6. $a + 9d = -4$
$a + 21d = -16$ } 1

Solving to get $d = -1$ and $a = 5$ $\frac{1}{2}$

$\therefore \quad t_{38} = 5 + 37(-1) = -32.$ $\frac{1}{2}$

7. Let $\angle OPQ = \theta$

$\therefore \quad TPQ = 90° - \theta$ $\frac{1}{2}$

$\Rightarrow \quad \angle PQT = 90° - \theta$ $\frac{1}{2}$

Hence $\angle PTQ = 180° - (90° - \theta + 90° - \theta)$

$= 2\theta$ or $2\angle OPQ$ 1

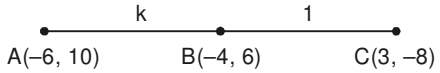
8. For points to be collinear

$-5(k + 2) + 1(-2 - 1) + 4(1 - k) = 0$ 1

$\Rightarrow \quad -9k - 9 = 0$

$\Rightarrow \quad k = -1$ 1

9.



Let AP : PB = k : 1

$\therefore \quad \frac{3k - 6}{k + 1} = -4$ 1

$\Rightarrow \quad k = \frac{2}{7}$ $\frac{1}{2}$

Hence AP : PB = 2 : 7 $\frac{1}{2}$

10. $\angle 2 = \frac{1}{2}\angle ROT = \frac{1}{2} \times 130° = 65°$ $\frac{1}{2}$

$\angle POQ = 180° - 130° = 50°$ $\frac{1}{2}$

$\therefore \quad \angle 1 = 40°$ $\frac{1}{2}$

Hence $\angle 2 + \angle 1 = 65° + 40° = 105°$ $\frac{1}{2}$

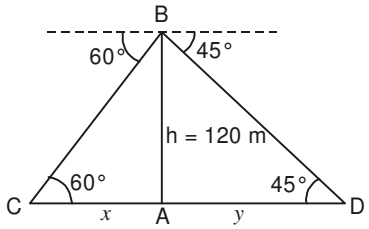
SECTION C

11. $S_{15} = 8(1 + 2 + 3 + ... + 15)$ 1

$= 8 \times \frac{15 \times 16}{2}$ 1

$= 960$ 1

12.



Correct Figure $\frac{1}{2}$

$\tan 45° = \frac{120}{y}$

$\Rightarrow \quad 1 = \frac{120}{y} \quad \Rightarrow \quad y = 120$ 1

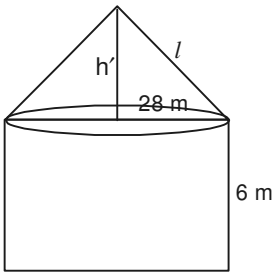
$\tan 60° = \sqrt{3} = \frac{120}{x}$

$\Rightarrow \quad x = \frac{120}{\sqrt{3}} = 40\sqrt{3}$ 1

Hence distance between the cars = $40 \times 1.732 + 120$

$= 189.28$ m $\frac{1}{2}$

13.



$h' = 27 - 6 = 21$ m

$l = \sqrt{21^2 + 28^2} = 35$ m 1

Area of canvas used = $2\pi rh + \pi rl$ 1

$= \frac{22}{7} \times 28 (12 + 35)$

$= 4136 \text{ m}^2$ 1

Note: Full marks should be given to any solution with diameter 56 cm

14. Here $r_2 - r_1 = 7$ cm $\quad (r_2 > r_1)$ $\quad$ ...(i) $\quad \frac{1}{2}$

and $\pi(r_2^2 - r_1^2) = 1078$ cm^2 $\quad \frac{1}{2}$

$\Rightarrow \quad \pi(r_2 - r_1)(r_2 + r_1) = 1078$ cm^2

$\Rightarrow \quad r_2 + r_1 = \frac{1078 \times 7}{22 \times 7} = 49$ cm $\quad$ ...(ii) $\quad 1$

Solving (i) and (ii) to get

$r_2 = 28$ cm

$r_1 = 21$ cm $\quad 1$

$\therefore$ Radius of smaller circle = 21 cm.

15. Let the point P on x-axis be P$(x_1, 0)$ $\quad \frac{1}{2}$

$PA^2 = PB^2 \Rightarrow (x_1 - 2)^2 + 25 = (x_1 + 2)^2 + 81$ $\quad 1$

Solving to get $x_1 = -7$ $\quad 1$

$\therefore$ Point on x-axis is $(-7, 0)$ $\quad \frac{1}{2}$

16. Total number of possible outcomes = 8 $\quad 1$

Prob (Ramesh wins the game) $= \frac{2}{8} = \frac{1}{4}$ $\quad 1$

$\therefore$ Prob (Ramesh loses the gaem) $= 1 - \frac{1}{4} = \frac{3}{4}$ $\quad 1$

17. Speed = 5 km/hr $\quad \therefore$ length in t hrs = 5000 t m. $\quad \frac{1}{2}$

Volume of water flown = Volume of water in tank $\quad \frac{1}{2}$

$\Rightarrow \quad \frac{22}{7} \times \left(\frac{7}{100}\right)^2 \times 5000\,t = 50 \times 44 \times \frac{7}{100}$ m^3 $\quad 1$

$\Rightarrow$ $t = 2$

Hence required time is 2 hrs. 1

18. Here $r = 21$ cm, $\theta = 60°$

$\therefore$ Area of the sector formed $= \frac{22}{7} \times 21 \times 21 \times \frac{60}{360}$ 2

$= 231 \text{ cm}^2$ 1

19. For roots to be equal

$D = 4(ac + bd)^2 - 4(a^2 + b^2)(c^2 + d^2) = 0$ 1

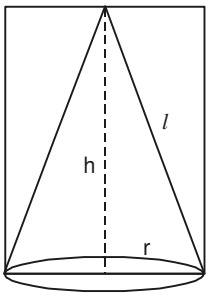
$\Rightarrow$ $a^2c^2 + b^2d^2 + 2acbd - a^2c^2 - a^2d^2 - b^2c^2 - b^2d^2 = 0$

$\Rightarrow$ $a^2d^2 + b^2c^2 - 2abcd = 0$ 1

$\Rightarrow$ $(ad - bc)^2 = 0$ $\frac{1}{2}$

$\Rightarrow$ $ad = bc$ $\frac{1}{2}$

20.



Here $h = 24$ cm, $r = 7$ cm

$\therefore$ $l = 25$ cm. $\frac{1}{2}$

Surface Area of remaining solid

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

$= \frac{22}{7} \times 7 (7 + 48 + 25)$ 1

$= 1760 \text{ cm}^2$. $\frac{1}{2}$

SECTION D

21. $4[(x + 3)x - (1 - x)(x - 2)] = 17x(x - 2)$ 1

$\Rightarrow$ $4(x^2 + 3x + x^2 - 3x + 2) = 17x^2 - 34x$ 1

$\Rightarrow \quad 9x^2 - 34x - 8 = 0$ $\frac{1}{2}$

$\Rightarrow \quad 9x^2 - 36x + 2x - 8 = 0$

$\Rightarrow \quad (x - 4)(9x + 2) = 0$ 1

$\Rightarrow \quad x = 4, \frac{-2}{9}$ $\frac{1}{2}$

22. Let the two consecutive odd natural numbers be x and x + 2. 1

Therefore $x^2 + (x + 2)^2 = 394$ $\frac{1}{2}$

$\Rightarrow \quad 2x^2 + 4x - 390 = 0$ $\frac{1}{2}$

$\Rightarrow \quad 2(x + 15)(x - 13) = 0$ 1

$\Rightarrow \quad x \neq -15 \quad \therefore x = 13$ $\frac{1}{2}$

Hence numbers are 13 and 15. $\frac{1}{2}$

23. $\frac{a_{11}}{a_{18}} = \frac{a + 10d}{a + 17d} = \frac{2}{3}$ 1

$\Rightarrow \quad a = 4d \qquad ...(i)$ $\frac{1}{2}$

$\frac{S_5}{S_{10}} = \frac{\frac{5}{2}(2a + 4d)}{5(2a + 9d)}$ 1

$= \frac{8d + 4d}{2(8d + 9d)}$ 1

$= \frac{6}{17}$ $\frac{1}{2}$

Hence $S_5 : S_{10} = 6 : 17$.

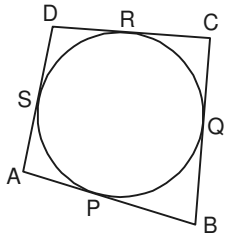
24. For correct given, To prove, construction and figure $4\times\frac{1}{2}=2$

For correct proof 2

25. For correct construction of right triangle $1\frac{1}{2}$

constructing a similar triangle $2\frac{1}{2}$

26.



Here AP = AS

BP = BQ

CQ = CR 2

and DR = DS

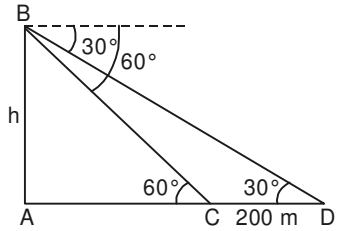
Hence AB + CD = (AP + PB) + (CR + DR) $\frac{1}{2}$

= (AS + BQ) + (CQ + DS) $\frac{1}{2}$

= (AS + DS) + (BQ + CQ) $\frac{1}{2}$

or AB + CD = AD + BC $\frac{1}{2}$

27.



Correct Figure 1

Let speed of car be x m/sec.

Therefore DC = 6x m. $\frac{1}{2}$

Distance CA covered in t sec = tx m $\frac{1}{2}$

Now, $\tan 30^\circ = \frac{1}{\sqrt{3}} = \frac{h}{x(6+t)}$

$\Rightarrow \quad \frac{h}{x} = \frac{6+t}{\sqrt{3}}$ ...(i) $\frac{1}{2}$

$\tan 60° = \sqrt{3} = \frac{h}{tx}$

$\Rightarrow \quad \frac{h}{x} = \sqrt{3}t$ ...(ii) $\frac{1}{2}$

Solving (i) and (ii) to get

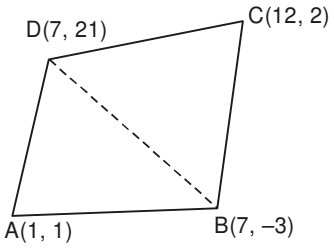
$t = 3$ sec. 1

28. Total number of possible outcomes = 90 1

(i) Prob (getting a two digit number) = $\frac{81}{90}$ or $\frac{9}{10}$ $1\frac{1}{2}$

(ii) Prob (getting a perfect square number) = $\frac{9}{90}$ or $\frac{1}{10}$ $1\frac{1}{2}$

29.



Area of quad ABCD = Ar ΔABD + Ar ΔBCD

Area $\Delta ABD = \frac{1}{2}|1(-24) + 7(20) + 7(4)|$

$= \frac{1}{2} \times 144$

$= 72$ sq.units $1\frac{1}{2}$

Area $\Delta BCD = \frac{1}{2}|7(19) + 7(5) + 12(-24)|$

$= \frac{1}{2} \times 120$

$= 60$ sq.units $1\frac{1}{2}$

Hence Area ABCD = 72 + 60 = 132 sq.units 1

30. Capacity of the bucket $= \frac{1}{3}\pi h(r_1^2 + r_2^2 + r_1 r_2)$

$= \frac{1}{3} \times \frac{22}{7} \times 35\,(900 + 144 + 360)$ 1

$= 51480 \text{ cm}^3$

$= 51.48$ litres 1

Amount received = Rs 40×51.48

= Rs 2059.20 1

Any relevant value like we must help economic weaker section of the society to our best. 1

31. Volume of wood in the block $= 15 \times 10 \times 3.5 \text{ cm}^3$

$= 525 \text{ cm}^3$ 1

Volume of wood removed $= 4 \times \frac{1}{3} \times \frac{22}{7} \times \left(\frac{5}{10}\right)^2 \times \frac{21}{10} \text{ cm}^3$ 1

$= 2.2 \text{ cm}^3$ 1

Volume of wood in remaining solid = 525 – 2.2

$= 522.80 \text{ cm}^3$ 1

30/1/2

SECTION A

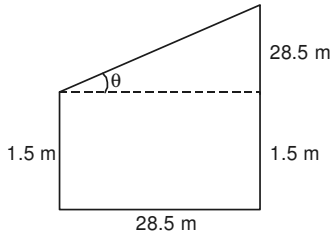
1. Total number of outcomes = 8 $\frac{1}{2}$

$\therefore$ P(drawn ball is not red) $= \frac{5}{8}$ $\frac{1}{2}$

2. $d = \frac{1+m}{m} - \frac{1}{m} = 1$ $\frac{1}{2}$

$\therefore$ $a_n = \frac{1}{m} + n - 1$ $\frac{1}{2}$

3.



$\tan\theta = \frac{28.5}{28.5} = 1$ $\frac{1}{2}$

$\therefore$ $\theta = 45°$ $\frac{1}{2}$

4. PQ = PR = 5 cm $\frac{1}{2}$

$\therefore$ PS = 2PQ = 10 cm $\frac{1}{2}$

SECTION B

5. For points to be collinear

$-5(k + 2) + 1(-2 - 1) + 4(1 - k) = 0$ 1

$\Rightarrow$ $-9k - 9 = 0$

$\Rightarrow$ $k = -1$ 1

6. Let $\angle OPQ = \theta$

$\therefore$ $TPQ = 90° - \theta$ $\frac{1}{2}$

$\Rightarrow \quad \angle PQT = 90° - \theta$ $\frac{1}{2}$

Hence $\angle PTQ = 180° - (90° - \theta + 90° - \theta)$

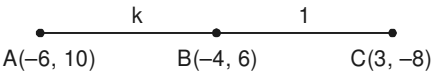
$= 2\theta$ or $2\angle OPQ$ 1

7. $\angle 2 = \frac{1}{2}\angle ROT = \frac{1}{2} \times 130° = 65°$ $\frac{1}{2}$

$\angle POQ = 180° - 130° = 50°$ $\frac{1}{2}$

$\therefore \quad \angle 1 = 40°$ $\frac{1}{2}$

Hence $\angle 2 + \angle 1 = 65° + 40° = 105°$ $\frac{1}{2}$

8. 

Let AP : PB = k : 1

$\therefore \quad \frac{3k - 6}{k + 1} = -4$ 1

$\Rightarrow \quad k = \frac{2}{7}$ $\frac{1}{2}$

Hence AP : PB = 2 : 7 $\frac{1}{2}$

9. $(x + 3)(2x - 3) = (3x - 7)(x + 2)$ $\frac{1}{2}$

$\Rightarrow \quad x^2 - 4x - 5 = 0$ $\frac{1}{2}$

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

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

10. Here a = 11, d = –3

$a_n = -150 = 11 - 3(n - 1)$ $\frac{1}{2}$

$\Rightarrow \quad n = \frac{164}{3}$ or $54\frac{2}{3}$ 1

Since n is not a natural number therefore –150 is not a term of the sequence $\frac{1}{2}$

SECTION C

11. Speed = 5 km/hr $\therefore$ length in t hrs = 5000 t m. $\frac{1}{2}$

Volume of water flown = Volume of water in tank $\frac{1}{2}$

$\Rightarrow \quad \frac{22}{7} \times \left(\frac{7}{100}\right)^2 \times 5000\,t = 50 \times 44 \times \frac{7}{100}\,m^3$ 1

$\Rightarrow \quad t = 2$

Hence required time is 2 hrs. 1

12. Here r = 21 cm, $\theta = 60°$

$\therefore$ Area of the sector formed = $\frac{22}{7} \times 21 \times 21 \times \frac{60}{360}$ 2

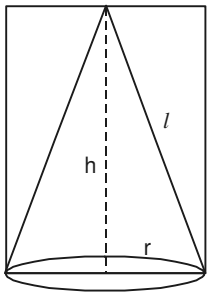
$= 231\ cm^2$ 1

13. Total number of possible outcomes = 8 1

Prob (Ramesh wins the game) = $\frac{2}{8} = \frac{1}{4}$ 1

$\therefore$ Prob (Ramesh loses the gaem) = $1 - \frac{1}{4} = \frac{3}{4}$ 1

14.



Here h = 24 cm, r = 7 cm

$\therefore$ $l = 25$ cm. $\frac{1}{2}$

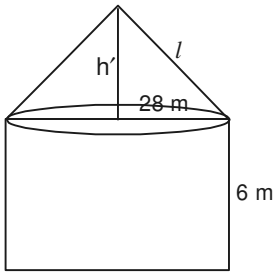
Surface Area of remaining solid

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

$= \frac{22}{7} \times 7\,(7 + 48 + 25)$ 1

$= 1760\ cm^2$. $\frac{1}{2}$

15.



$h' = 27 - 6 = 21$ m

$l = \sqrt{21^2 + 28^2} = 35$ m 1

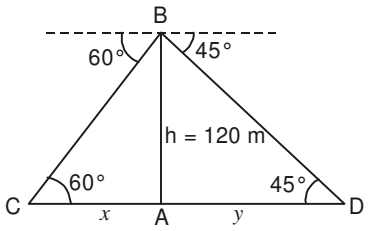
Area of canvas used = $2\pi rh + \pi rl$ 1

$= \frac{22}{7} \times 28\,(12 + 35)$

$= 4136\ m^2$ 1

Note: Full marks should be given to any solution with diameter 56 cm

16.



Correct Figure $\frac{1}{2}$

$\tan 45° = \frac{120}{y}$

$\Rightarrow \quad 1 = \frac{120}{y} \quad \Rightarrow \quad y = 120$ 1

$\tan 60° = \sqrt{3} = \frac{120}{x}$

$\Rightarrow \quad x = \frac{120}{\sqrt{3}} = 40\sqrt{3}$ 1

Hence distance between the cars = $40 \times 1.732 + 120$

$= 189.28$ m $\frac{1}{2}$

17. Here $r_2 - r_1 = 7$ cm $\quad (r_2 > r_1)$ $\quad ...(i)$ $\frac{1}{2}$

and $\pi(r_2^2 - r_1^2) = 1078$ cm^2 $\frac{1}{2}$

$\Rightarrow \quad \pi(r_2 - r_1)(r_2 + r_1) = 1078$ cm^2

$\Rightarrow \quad r_2 + r_1 = \frac{1078 \times 7}{22 \times 7} = 49$ cm $\quad ...(ii)$ 1

Solving (i) and (ii) to get

$r_2 = 28$ cm

$r_1 = 21$ cm 1

$\therefore$ Radius of smaller circle = 21 cm.

18. Here $a = 12$, $d = 4$, $a_n = 96$ 1

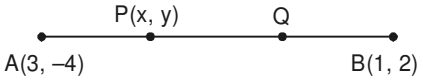
Therefore $96 = 12 + (n - 1) \times 4$

$\Rightarrow \quad n = 22$ 1

Hence $S_{22} = 11[24 + 21 \times 4]$

$= 1188.$ 1

19.



Here AP : PB = 1 : 2 1

$x = \frac{7}{3}, y = -2$ $1 + \frac{1}{2}$

$\therefore$ Point P is $\left(\frac{7}{3}, -2\right)$ $\frac{1}{2}$

20. For roots to be equal

$4(k - 12)^2 - 4(k - 12) \times 2 = 0$ 1

$\Rightarrow \quad 4(k - 12)(k - 12 - 2) = 0 \Rightarrow k = 12, 14$ 1

$\because \quad k \neq 12 \quad \therefore k = 14$ 1

SECTION D

21. Capacity of the bucket = $\frac{1}{3}\pi h(r_1^2 + r_2^2 + r_1 r_2)$

$= \frac{1}{3} \times \frac{22}{7} \times 35\,(900 + 144 + 360)$ 1

$= 51480\ cm^3$

$= 51.48$ litres 1

Amount received = Rs 40×51.48

= Rs 2059.20 1

Any relevant value like we must help economic weaker section of the society to our best. 1

22. Volume of wood in the block = $15 \times 10 \times 3.5\ cm^3$

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$= 2.2\ cm^3$ 1

Volume of wood in remaining solid = $525 - 2.2$

$= 522.80\ cm^3$ 1

23. $4[(x + 3)x - (1 - x)(x - 2)] = 17x(x - 2)$ 1

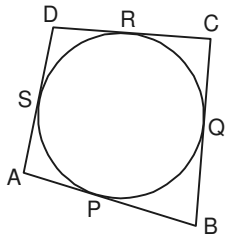
$\Rightarrow \quad 4(x^2 + 3x + x^2 - 3x + 2) = 17x^2 - 34x$ 1

$\Rightarrow \quad 9x^2 - 34x - 8 = 0$ $\frac{1}{2}$

$\Rightarrow \quad 9x^2 - 36x + 2x - 8 = 0$

$\Rightarrow \quad (x - 4)(9x + 2) = 0$ 1

$\Rightarrow \quad x = 4, \frac{-2}{9}$ $\frac{1}{2}$

24. 

Here AP = AS

BP = BQ

CQ = CR 2

and DR = DS

Hence AB + CD = (AP + PB) + (CR + DR) $\frac{1}{2}$

= (AS + BQ) + (CQ + DS) $\frac{1}{2}$

= (AS + DS) + (BQ + CQ) $\frac{1}{2}$

or AB + CD = AD + BC $\frac{1}{2}$

25. $\frac{a_{11}}{a_{18}} = \frac{a+10d}{a+17d} = \frac{2}{3}$ 1

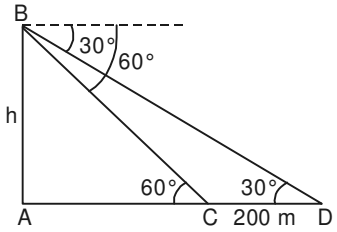
$\Rightarrow$ $a = 4d$ ...(i) $\frac{1}{2}$

$\frac{S_5}{S_{10}} = \frac{\frac{5}{2}(2a+4d)}{5(2a+9d)}$ 1

$= \frac{8d+4d}{2(8d+9d)}$ 1

$= \frac{6}{17}$ $\frac{1}{2}$

Hence $S_5 : S_{10} = 6 : 17$.

26. 

Correct Figure 1

Let speed of car be x m/sec.

Therefore DC = 6x m. $\frac{1}{2}$

Distance CA covered in t sec = tx m $\frac{1}{2}$

Now, $\tan 30° = \frac{1}{\sqrt{3}} = \frac{h}{x(6+t)}$

$\Rightarrow \quad \frac{h}{x} = \frac{6+t}{\sqrt{3}}$ ...(i) $\frac{1}{2}$

$\tan 60° = \sqrt{3} = \frac{h}{tx}$

$\Rightarrow \quad \frac{h}{x} = \sqrt{3}t$ ...(ii) $\frac{1}{2}$

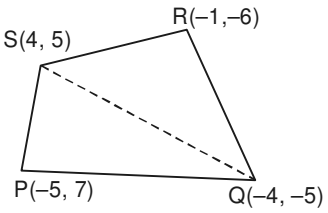
Solving (i) and (ii) to get

$t = 3$ sec. 1

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

For correct proof 2

28.



Ar. PQRS = Ar. PQS + Ar. QRS

Ar $\Delta PQS = \frac{1}{2} | (-5)(-10) - 4(-2) + 4(12) |$

$= \frac{1}{2} \times 106 = 53$ sq.units $1\frac{1}{2}$

Ar $\Delta QRS = \frac{1}{2} | (-4)(-11) - 1(10) + 4(1) |$

$= \frac{1}{2} \times 38 = 19$ sq.units $1\frac{1}{2}$

$\therefore$ Area PQRS = 53 + 19 = 72 sq.units 1

29. Total number of remaining cards = 49 $\frac{1}{2}$

(i) Prob. (a face card) = $\frac{9}{49}$ 1

(ii) Prob. (a card of heart) = $\frac{13}{49}$ 1

(iii) Prob. (a card of club) = $\frac{10}{49}$ 1

(iv) Prob. (a queen of diamond) = $\frac{1}{49}$ $\frac{1}{2}$

30. Let speed of the car be x km/hr

Therefore time taken = $\frac{x}{2}$ hr. 1

Hence $x = \frac{2592}{x/2}$ 1

$\Rightarrow \quad x^2 = 5184$

$\Rightarrow \quad x = 72$ 1

$\therefore \quad$ Time taken = 36 hrs. 1

31. Correct construction of first triangle $1\frac{1}{2}$

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

30/1/3

SECTION A

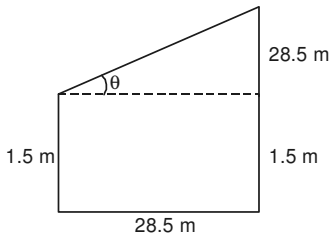
1. PQ = PR = 5 cm $\frac{1}{2}$

$\therefore$ PS = 2PQ = 10 cm $\frac{1}{2}$

2. Total number of outcomes = 8 $\frac{1}{2}$

$\therefore$ P(drawn ball is not red) = $\frac{5}{8}$ $\frac{1}{2}$

3.



$\tan\theta = \frac{28.5}{28.5} = 1$ $\frac{1}{2}$

$\therefore$ $\theta = 45°$ $\frac{1}{2}$

4. $d = \frac{1+m}{m} - \frac{1}{m} = 1$ $\frac{1}{2}$

$\therefore$ $a_n = \frac{1}{m} + n - 1$ $\frac{1}{2}$

SECTION B

5. Let $\angle OPQ = \theta$

$\therefore$ $TPQ = 90° - \theta$ $\frac{1}{2}$

$\Rightarrow$ $\angle PQT = 90° - \theta$ $\frac{1}{2}$

Hence $\angle PTQ = 180° - (90° - \theta + 90° - \theta)$

$= 2\theta$ or $2\angle OPQ$ 1

6. For points to be collinear

$-5(k + 2) + 1(-2 - 1) + 4(1 - k) = 0$ 1

$\Rightarrow \quad -9k - 9 = 0$

$\Rightarrow \quad k = -1$ 1

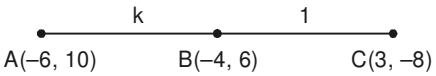
7. $(x + 3)(2x - 3) = (3x - 7)(x + 2)$ $\frac{1}{2}$

$\Rightarrow \quad x^2 - 4x - 5 = 0$ $\frac{1}{2}$

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

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

8.



Let AP : PB = k : 1

$\therefore \quad \frac{3k - 6}{k + 1} = -4$ 1

$\Rightarrow \quad k = \frac{2}{7}$ $\frac{1}{2}$

Hence AP : PB = 2 : 7 $\frac{1}{2}$

9. $\angle 2 = \frac{1}{2}\angle ROT = \frac{1}{2} \times 130° = 65°$ $\frac{1}{2}$

$\angle POQ = 180° - 130° = 50°$ $\frac{1}{2}$

$\therefore \quad \angle 1 = 40°$ $\frac{1}{2}$

Hence $\angle 2 + \angle 1 = 65° + 40° = 105°$ $\frac{1}{2}$

10. Here $a = 3, d = 9$

$a_{50} = 3 + 49 \times 9 = 444$ 1

$\therefore \quad a_n = 444 + 90 = 534 = 3 + (n - 1) \times 9$ $\frac{1}{2}$

$\Rightarrow \quad n = 60$ $\frac{1}{2}$

SECTION C

11. Here $r_2 - r_1 = 7$ cm $\quad (r_2 > r_1) \quad \ldots(i)$ $\frac{1}{2}$

and $\pi(r_2^2 - r_1^2) = 1078 \text{ cm}^2$ $\frac{1}{2}$

$\Rightarrow \quad \pi(r_2 - r_1)(r_2 + r_1) = 1078 \text{ cm}^2$

$\Rightarrow \quad r_2 + r_1 = \frac{1078 \times 7}{22 \times 7} = 49 \text{ cm} \quad \ldots(ii)$ 1

Solving (i) and (ii) to get

$r_2 = 28$ cm

$r_1 = 21$ cm 1

$\therefore \quad$ Radius of smaller circle = 21 cm.

12. Total number of possible outcomes = 8 1

Prob (Ramesh wins the game) $= \frac{2}{8} = \frac{1}{4}$ 1

$\therefore \quad$ Prob (Ramesh loses the gaem) $= 1 - \frac{1}{4} = \frac{3}{4}$ 1

13. Speed = 5 km/hr $\quad \therefore$ length in t hrs = 5000 t m. $\frac{1}{2}$

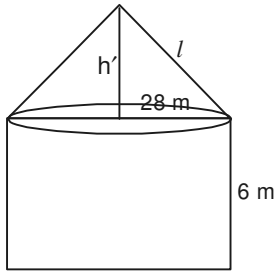
Volume of water flown = Volume of water in tank $\frac{1}{2}$

$\Rightarrow \quad \frac{22}{7} \times \left(\frac{7}{100}\right)^2 \times 5000 \text{ t} = 50 \times 44 \times \frac{7}{100} \text{ m}^3$ 1

$\Rightarrow \quad t = 2$

Hence required time is 2 hrs. 1

14.



$h' = 27 - 6 = 21$ m

$l = \sqrt{21^2 + 28^2} = 35$ m 1

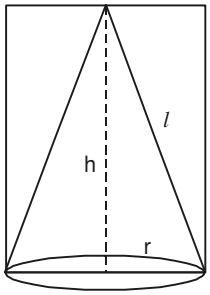
Area of canvas used = $2\pi rh + \pi rl$ 1

$= \frac{22}{7} \times 28\,(12 + 35)$

$= 4136\ m^2$ 1

Note: Full marks should be given to any solution with diameter 56 cm

15.



Here h = 24 cm, r = 7 cm

$\therefore \quad l = 25$ cm. $\frac{1}{2}$

Surface Area of remaining solid

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

$= \frac{22}{7} \times 7\,(7 + 48 + 25)$ 1

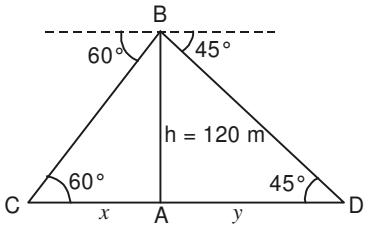
$= 1760\ cm^2.$ $\frac{1}{2}$

16. Here r = 21 cm, $\theta = 60°$

$\therefore \quad$ Area of the sector formed = $\frac{22}{7} \times 21 \times 21 \times \frac{60}{360}$ 2

$= 231\ cm^2$ 1

17.



Correct Figure $\frac{1}{2}$

$\tan 45° = \frac{120}{y}$

$\Rightarrow \quad 1 = \frac{120}{y} \quad \Rightarrow \quad y = 120$ 1

$$\tan 60° = \sqrt{3} = \frac{120}{x}$$

$\Rightarrow$ $$x = \frac{120}{\sqrt{3}} = 40\sqrt{3}$$ 1

Hence distance between the cars = $40 \times 1.732 + 120$

$= 189.28$ m $\frac{1}{2}$

18. For roots to be equal

$4(c + 1)^2 - 16 (c + 1) = 0$ 1

$\Rightarrow$ $4(c + 1) (c + 1 - 4) = 0$ 1

$\Rightarrow$ $c = -1, 3$ 1

19. We have to find $1 + 3 + 5 + 7 + ... + 49$ 1

$\therefore$ $49 = 1 + (n - 1) \times 2$

$\Rightarrow$ $n = 25$ 1

$$S_{25} = \frac{25}{2}[2 + 48]$$

$= 625$ 1

20. Let the point on y-axis be P(0, y) $\frac{1}{2}$

$PA^2 = PB^2 \Rightarrow 25 + (y - 3)^2 = 1 + (y + 5)^2$ 1

$\Rightarrow$ $25 + y^2 + 9 - 6y = 1 + y^2 + 10y + 25$

$\Rightarrow$ $y = \frac{1}{2}$ 1

$\therefore$ Point on y-axis is $P\left(0, \frac{1}{2}\right)$ $\frac{1}{2}$

SECTION D

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For correct proof 2

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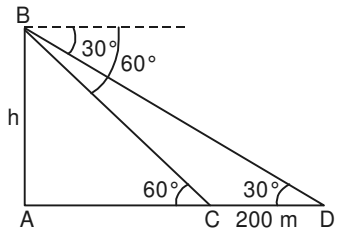

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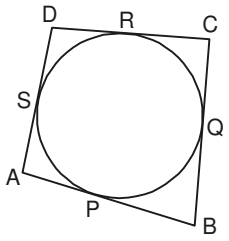

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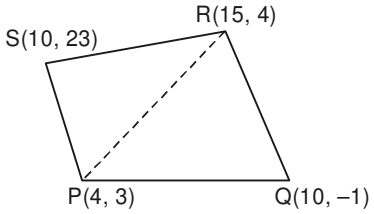

Area PQRS = Ar PQR + Ar PRS

Ar. $\Delta PQR = \frac{1}{2}|4(-5)+10(1)+15(4)|$

$= \frac{1}{2}\times 50 = 25$ sq.units $1\frac{1}{2}$

Ar $\Delta PRS = \frac{1}{2}|4(-19)+15(20)+10(-1)|$

$= \frac{1}{2}\times 214 = 107$ sq.units $1\frac{1}{2}$

Ar. PQRS = 25 + 107 = 132 sq.units 1

29. Correct construction of ΔABC $1\frac{1}{2}$

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

30. Let Bhagat alone can do in x number of days

$\therefore$ Ram takes $(x-6)$ number of days $\frac{1}{2}$

According to the questioon

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

$\Rightarrow \quad x^2 - 14x + 24 = 0$ 1

$\Rightarrow \quad (x - 12)\ (x - 2) = 0$ 1

$\Rightarrow \quad x = 12$, as $x \neq 2$ $\frac{1}{2}$

31. Total number of cards = 100

(i) Prob. (an even number) = $\frac{50}{100}$ or $\frac{1}{2}$ 1

(ii) Prob. (a number multiple of 13) = $\frac{7}{100}$ 1

(iii) Prob. (a perfect square number) = $\frac{10}{100}$ or $\frac{1}{10}$ 1

(iv) Prob. (a prime no. less than 20) = $\frac{8}{100}$ or $\frac{2}{25}$ 1