QUESTION BANK
CLASS-X
MATHS

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.

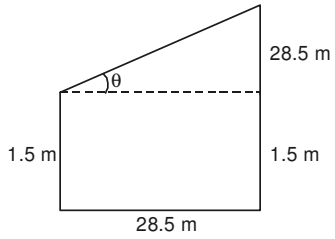
4. If a candidate has attempted an extra question, marks obtained in the question attempted first should be retained and the other answer should be scored out.

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.

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 $\frac{1}{2}$

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

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

$\therefore$ 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

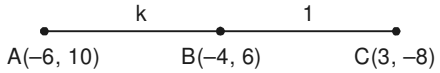
8. For points to be collinear

$-5(k + 2) + 1(-2 - 1) + 4(1 - k) = 0$ 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 $\angle 2 + \angle 1 = 65° + 40° = 105°$ $\frac{1}{2}$

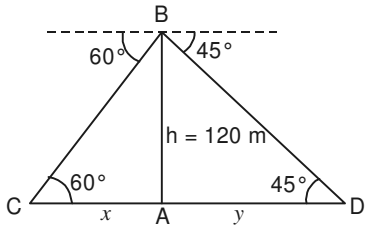
SECTION C

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

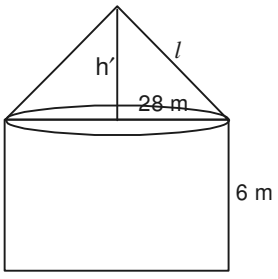
$\tan 60° = \sqrt{3} = \frac{120}{x}$

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

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

$= 4136\ m^2$ 1

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

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

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.

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

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

Solving to get $x_1 = -7$ 1

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

16. 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

17. 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 $\frac{1}{2}$

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

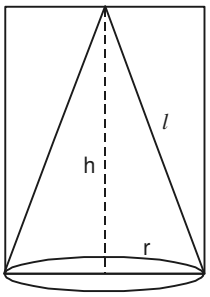
$\Rightarrow$ $a^2c^2 + b^2d^2 + 2acbd - a^2c^2 - a^2d^2 - b^2c^2 - b^2d^2 = 0$

$\Rightarrow$ $a^2d^2 + b^2c^2 - 2abcd = 0$ 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 $S_5 : S_{10} = 6 : 17$.

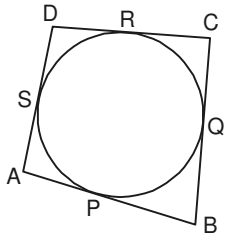
24. For correct given, To prove, construction and figure $4\times\frac{1}{2}=2$

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

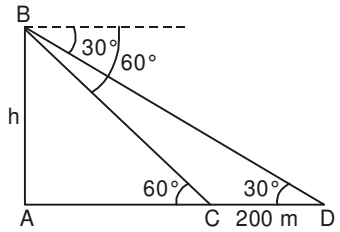
Hence AB + CD = (AP + PB) + (CR + DR) $\frac{1}{2}$

= (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

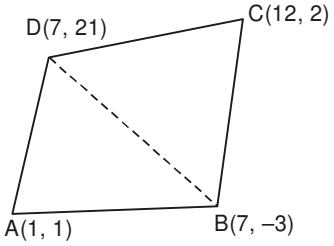
$t = 3$ sec. 1

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