# CBSE Class 10 Maths Solutions

**30/1/1**

## QUESTION PAPER CODE 30/1/1

## EXPECTED ANSWER/VALUE POINTS

### SECTION A

**1.** $\angle APB = 80^\circ$ $\frac{1}{2}$

$\therefore \quad \angle AOB = 100^\circ$ $\frac{1}{2}$

**2.** DB = 3.46 m $\frac{1}{2}$

$\therefore \quad$ DC = 4 m $\frac{1}{2}$

**3.** $l = 185$, $d = -4$ $\frac{1}{2}$

$l_9 = 153$ $\frac{1}{2}$

**4.** Possible outcomes are 4, 9, 16, 25, 36, 49, i.e. 6. $\frac{1}{2}$

$\therefore \quad$ P(perfect square number) = $\frac{6}{48}$ or $\frac{1}{8}$ $\frac{1}{2}$

### SECTION B

**5.** $\frac{-7}{a} = \frac{2}{3} - 3$

$\Rightarrow \quad a = 3$ 1

and $\frac{b}{a} = \frac{2}{3} \times (-3)$

$\Rightarrow \quad b = -6$ 1

**6.** Let the point on y-axis be (0, y) and AP: PB = K : 1 $\frac{1}{2}$

Therefore $\frac{5-k}{k+1} = 0$ gives $k = 5$

Hence required ratio is 5 : 1. $\frac{1}{2}$

$y = \frac{-4(5)-6}{6} = \frac{-13}{3}$ $\frac{1}{2}$

Hence point on y-axis is $\left(0, \frac{-13}{3}\right)$. $\frac{1}{2}$

**7.** Let AD = AF = x

$\therefore$ DB = BE = 12 – x

and CF = CE = 10 – x

BC = BE + EC $\Rightarrow$ 8 = 12 – x + 10 – x

$\Rightarrow$ x = 7 1

$\therefore$ AD = 7 cm, BE = 5 cm, CF = 3 cm 1

**8.** Let the point P be (2y, y) $\frac{1}{2}$

PQ = PR $\Rightarrow \sqrt{(2y-2)^2+(y+5)^2} = \sqrt{(2y+3)^2+(y-6)^2}$ $\frac{1}{2}$

Solving to get y = 8 $\frac{1}{2}$

Hence coordinates of point P are (16, 8). $\frac{1}{2}$

**9.** Here a = 18, d = –2, Sn = 0 $\frac{1}{2}$

Therefore $\frac{n}{2}[36+(n-1)(-2)] = 0$ 1

$\Rightarrow$ n = 19 $\frac{1}{2}$

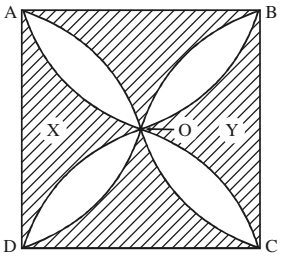
**10.** PA = PB $\frac{1}{2}$

$\Rightarrow$ $\angle$PAB = $\angle$PBA = 60° $\frac{1}{2}$

$\therefore$ $\Delta$PAB is an equilateral triangle. $\frac{1}{2}$

Hence AB = PA = 5 cm. $\frac{1}{2}$

## SECTION C

**11.** 


Area of square = 196 $cm^2$ $\frac{1}{2}$

Area of semicircles AOB + DOC = $\frac{22}{7}\times 49 = 154\ cm^2$ $\frac{1}{2}$

Hence area of two shaded parts (X + Y) = 196 – 154 = 42 $cm^2$ 1

Therefore area of four shaded parts = 84 $cm^2$. 1

**12.** Surface area of block = $216-\frac{22}{7}\times\frac{3.5}{2}\times\frac{3.5}{2}+2\times\frac{22}{7}\times\frac{3.5}{2}\times\frac{3.5}{2}$ $1+\frac{1}{2}+\frac{1}{2}$

= 225.42 $cm^2$. 1

**13.** Using Mid Point formula

coordinates of point B are (2, 1) $\frac{1}{2}$

and coordinates of point C are (0, 3). $\frac{1}{2}$

Area $\Delta ABC = \frac{1}{2}[0+2(3+1)+0] = 4$ sq u. 1

Coordinates of point F are (1, 2)

Area of $\Delta DEF = \frac{1}{2}|1(1-2)+0+1(0-1)| = 1$ sq u. 1

**14.** $\angle POQ = 60^\circ$ $\frac{1}{2}$

Area of segment PAQM = $\left(\frac{100\pi}{6}-\frac{100\sqrt{3}}{4}\right)cm^2$. 1

Area of semicircle = $\frac{25\pi}{2}cm^2$ $\frac{1}{2}$

Area of shaded region = $\frac{25\pi}{2}-\left(\frac{50\pi}{3}-25\sqrt{3}\right)$.

= $25\left(\sqrt{3}-\frac{\pi}{6}\right)cm^2$. 1

**15.** $S_7 = 49 \Rightarrow 2a + 6d = 14$ $\frac{1}{2}$

$S_{17} = 289 \Rightarrow 2a + 16d = 34$ $\frac{1}{2}$

Solving equations to get a = 1 and d = 2 1

Hence $Sn = \frac{n}{2}[2+(n-1)2] = n^2$. 1

**16.** $2x(2x + 3) + (x - 3) + (3x + 9) = 0$ 1

$\Rightarrow \quad 2x^2 + 5x + 3 = 0$ 1

$\Rightarrow \quad (x + 1)(2x + 3) = 0$ $\frac{1}{2}$

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

**17.** Volume of earth dug out = $\pi \times 2 \times 2 \times 21 = 264 \text{ m}^3$ 1

Volume of embankment = $\pi (25 - 4) \times h = 66 \text{ h m}^3$ 1

$\therefore \quad 66h = 264$ $\frac{1}{2}$

$\Rightarrow \quad h = 4 \text{ m}$ $\frac{1}{2}$

**18.** Here $r + h = 37$ and $2\pi r(r + h) = 1628$ $\frac{1}{2}+\frac{1}{2}$

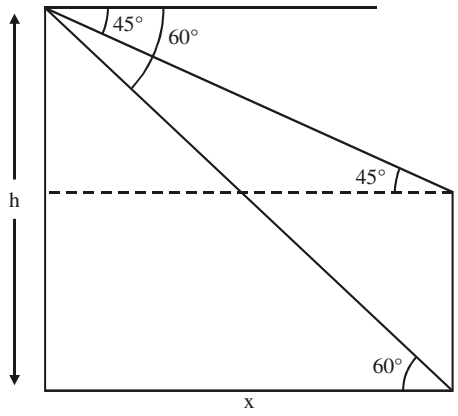
$\Rightarrow \quad 2\pi r = \frac{1628}{37}$

$\Rightarrow \quad r = 7 \text{ cm}$ $\frac{1}{2}$

and $h = 30 \text{ cm}$. $\frac{1}{2}$

Hence volume of cylinder = $\frac{22}{7}\times 7\times 7\times 30 = 4620 \text{ cm}^3$ 1

**19.**




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

$\tan 45° = \frac{h-50}{x} \Rightarrow x = h - 50$ $\frac{1}{2}$

$\tan 60° = \frac{h}{x} \Rightarrow x = \frac{h}{\sqrt{3}}$ $\frac{1}{2}$

Hence $h - 50 = \frac{h}{\sqrt{3}}$ $\frac{1}{2}$

$\Rightarrow h = 75 + 25\sqrt{3} = 118.25$ m. 1

**20.** (i) Favourable outcomes are (2, 2) (2, 3) (2, 5) (3, 2) (3, 3) (3, 5) (5, 2) (5, 3) (5, 5)

i.e. 9 outcomes. 1

P(a prime number on each die) = $\frac{9}{36}$ or $\frac{1}{4}$ $\frac{1}{2}$

(ii) Favourable outcomes are (3, 6) (4, 5) (5, 4) (6, 3) (5, 6) (6, 5)

i.e. 6 outcomes 1

P(a total of 9 or 11) = $\frac{6}{36}$ or $\frac{1}{6}$ $\frac{1}{2}$

## SECTION D

**21.** Let the usual speed of plane be x km/h.

$\therefore \quad \frac{1500}{x} - \frac{1500}{x+250} = \frac{1}{2}$ 2

$\Rightarrow \quad x^2 + 250x - 750000 = 0$

$(x + 1000)(x - 750) = 0 \Rightarrow x = 750$

Speed of plane = 750 km/h. 1

For writing value 1

**22.** For correct Given, To prove, construction and figure $\frac{1}{2} \times 4 = 2$

Correct proof 2

**23.** Construction of tangent 3

Length of tangent 1

**24.** $PT = \sqrt{169 - 25} = 12\text{cm}$ and TE = 8 cm $\frac{1}{2} + \frac{1}{2}$

Let PA = AE = x

$PA^2 = TE^2 + EA^2$ 1

$\Rightarrow (12 - x)^2 = 64 + x^2$

$\Rightarrow x = 3.3$ cm. 1

Thus AB = 6.6 cm. 1

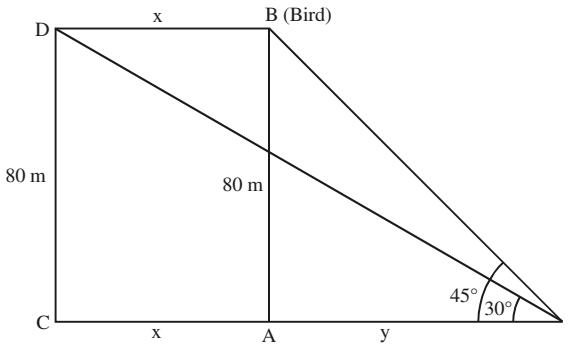
**25.** $a(x - b)(x - c) + b(x - a)(x - c) = 2c(x - a)(x - b)$ $1\frac{1}{2}$

$x^2(a + b - 2c) + x(-ab - ac - ab - bc + 2ac + 2bc) = 0$

$x^2(a + b - 2c) + x(-2ab + ac + bc) = 0$ $1\frac{1}{2}$

$x = \frac{ac + bc - 2ab}{a + b - 2c}$ 1

**26.**




Correct Figure 1

$\tan 45° = \frac{80}{y} \Rightarrow y = 80$ $\frac{1}{2}$

$\tan 30° = \frac{80}{x + y} \Rightarrow x + y = 80\sqrt{3}$ $\frac{1}{2}$

$\therefore x = 80(\sqrt{3} - 1) = 58.4$ m. 1

Hence speed of bird = $\frac{58.4}{2} = 29.2$ m/s. 1

**27.** Let total time be n minutes

Total distance convered by thief = (100 n) metres $\frac{1}{2}$

Total distance covered by policeman = 100 + 110 + 120 + ... + (n – 1) terms $\frac{1}{2}$

$\therefore \quad 100n = \frac{n - 1}{2}[200 + (n - 2)10]$ 1

$n^2 - 3n - 18 = 0$ $\frac{1}{2}$

$(n - 6)(n + 3) = 0$ $\frac{1}{2}$

$\Rightarrow \quad n = 6$ $\frac{1}{2}$

Policeman took 5 minutes to catch the thief. $\frac{1}{2}$

**28.** Area of the triangle $= \frac{1}{2}\left|t(t+2-t)+(t+2)(t-t+2)+(t+3)(t-2-t-2)\right|$ 2

$= \frac{1}{2}[2t+2t+4-4t-12]$ 1

$= 4$ sq. units

which is independent of t. 1

**29.** (i) Favourable outcomes are 1, 3, 5, 7 i.e. 4 outcomes. 1

$\therefore$ P(an odd number) $= \frac{4}{8}$ or $\frac{1}{2}$ $\frac{1}{2}$

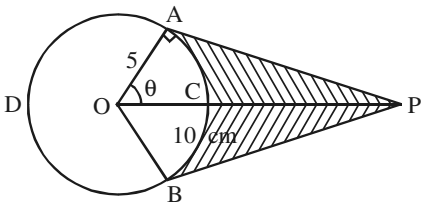
(ii) Favourable outcomes are 4, 5, 6, 7, 8 i.e. 5 outcomes 1

P(a number greater than 3) $= \frac{5}{8}$ $\frac{1}{2}$

(iii) Favarouble outcomes are 1, 2, 3...8

P(a number less than 9) $= \frac{8}{8} = 1$ 1

**30.**




$\cos\theta = \frac{1}{2} \Rightarrow \theta = 60°$ $\frac{1}{2}$

Reflex $\angle AOB = 240°$ $\frac{1}{2}$

$\therefore \quad \overset{\frown}{ADB} = \frac{2\times 3.14\times 5\times 240}{360} = 20.93$ cm 1

Hence length of elastic in contact = 20.93 cm

Now, AP $= 5\sqrt{3}$ cm

Area $(\Delta OAP + \Delta OBP) = 25\sqrt{3} = 43.25$ cm$^2$ $\frac{1}{2}$

Area of sector OACB $= \frac{25\times 3.14\times 120}{360} = 26.16$ cm$^2$ $\frac{1}{2}$

Shaded Area = 43.25 – 26.16 = 17.09 cm$^2$ 1

**31.** Here R = 20, r = 12, V = 12308.8

Therefore $12308.8 = \frac{1}{3} \times 3.14(400 + 240 + 144)h$ 1

$\Rightarrow$ h = 15 cm $\frac{1}{2}$

$l = \sqrt{(20-12)^2 + 15^2} = 17$ cm $\frac{1}{2}$

Total area of metal sheet used = CSA + base area

$= \pi[(20 + 12) \times 17 + 12 \times 12]$ 1

$= 2160.32$ cm$^2$ 1