## Class X Delhi Math Set-3 Section - A

1. The angle of depression of a car, standing on the ground, from the top of a 75 m high tower, is $30^{\circ}$. The distance of the car from the base of the tower (in m.) is:
(A) $25 \sqrt{ } 3$
(B) $50 \sqrt{ } 3$
(C) $75 \sqrt{ } 3$
(D) 150
Answer: (C)
2. The probability of getting an even number, when a die is thrown once, is:
(A) $1 / 2$
(B) $1 / 3$
(C) $1 / 6$
(D) $5 / 6$

Answer: (A)
3. A box contains 90 discs, numbered from 1 to 90 . If one disc is drawn at random from the box, the probability that it bears a prime-number less than 23 , is :
(A) 7/90
(B) $10 / 90$
(C) $4 / 45$
(D) $9 / 89$
Answer: (C)

4 In given Fig., a circle with centre $O$ is inscribed in a quadrilateral $A B C D$ such that, it touches the sides $B C, A B, A D$ and $C D$ at points $P, Q, R$ and $S$ respectively, If $A B=29 \mathrm{~cm}, A D=23 \mathrm{~cm},<B=90^{\circ}$ and $D S=5 \mathrm{~cm}$, then the radius of the circle (in cm.) is:

(A) 11
(B) 18
(C) 6
(D) 15
Answer: (A)
5. In given Fig. $P A$ and $P B$ are two tangents drawn from an external point $P$ to a circle with centre $C$ and radius 4 cm . If $\mathrm{PA} \perp \mathrm{PB}$, then the length of each tangent is:

(A) 3 cm
(B) 4 cm
(C) 5 cm
(D) 6 cm

Answer: (B)
6. In Fig. 3, the area of triangle $A B C$ (in sq. units) is:
(A) 15
(B) 10
(C) 7.5
(D) 2.5

Answer: (C)
7. If the difference between the circumference and the radius of a circle is 37 cm , then using $\pi=22 / 7$, the circumference (in cm ) of the circle is:

(A) 154
(B) 44
(C) 14
(D) 7

Answer: (B)
8. The common difference of the AP $1 / 3 q$, $(1-6 q) / 3 q,(1-12 q) / 3 q$ $\qquad$ is:
(A) $q$
(B) -q
(C) -2
(D) 2

Answer: (C)

## Class X Delhi Math Set-3 Section - B

9. Prove that the parallelogram circumscribing a circle is a rhombus.

Solution: Given that ABCD is a parallelogram circumscribing a circle with centre $O$.
Prove that: $A B C D$ is a rhombus.
Since, the length of the tangents drawn to a circle from an exterior point is equal length.

Therefore, $A P=A S, B P=B Q, C R=C Q$ and $D R=D S$.
$A P+B P+C R+D R=A S+B Q+C Q+D S$
$(A P+B P)+(C R+D R)=(A S+D S)+(B Q+C Q)$
Therefore, $A B+C D=A D+B C$ or $2 A B=2 B C$ (Since, $A B=D C$ and $A D=B C$ )
$\Rightarrow A B=B C=D C=A D$.

in
$A B C D$ is a llgm having all sides equals. Therefore, $A B C D$ is a rhombus.
10. Two circular pieces of equal radii and maximum area, touching each other are cut out from a rectangular card board of dimensions $14 \mathrm{~cm} \times 7 \mathrm{~cm}$. Find the area of the remaining card board. [Use $\pi=22 / 7$ ]
Solution: Given that ,two circular pieces of equal radii and maximum area touching each other are cut from the rectangular card board, therefore, the radius of each of each circular piece is $14 / 4=3.5 \mathrm{~cm}$.


Sum of area of two circular pieces $=2 \times \pi r^{2}=2 \times 22 / 7 \times 3.5 \times 3.5=77 \mathrm{~cm} 2$
Area of the remaining card board $=$ Area of the card board - Area of two circular pieces

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=[14 \times 7 \mathrm{~cm}-77] \mathrm{cm} 2=[98-77] \mathrm{cm} 2=21 \mathrm{~cm} 2
$$

11. In given fig., a circle inscribed in triangle $A B C$ touches its sides $A B, B C$ and $A C$ at points $D, E$ and $F$ respectively. If $A B=12 \mathrm{~cm}, B C=8 \mathrm{~cm}$ and $A C=10 \mathrm{~cm}$, then find the lengths of $A D, B E$ and $C F$.


Solution: Given that $A B=12 \mathrm{~cm}, B C=8 \mathrm{~cm}$ and $A C=10 \mathrm{~cm}$.
Let, $\mathrm{AD}=\mathrm{AF}=p \mathrm{~cm}, \mathrm{BD}=\mathrm{BE}=q \mathrm{~cm}$ and $\mathrm{CE}=\mathrm{CF}=r \mathrm{~cm}$
(Tangents drawn from an external point to the circle are equal in length)
$\Rightarrow 2(p+q+r)=A B+B C+A C=A D+D B+B E+E C+A F+F C=30 c m$
$\Rightarrow p+q+r=15$
$\mathrm{AB}=\mathrm{AD}+\mathrm{DB}=p+q=12 \mathrm{~cm}$
Therefore, $r=C F=15-12=3 \mathrm{~cm}$.
$\mathrm{AC}=\mathrm{AF}+\mathrm{FC}=p+r=10 \mathrm{~cm}$
Therefore, $q=B E=15-10=5 \mathrm{~cm}$.
Therefore, $p=\mathrm{AD}=p+q+r-r-q=15-3-5=7 \mathrm{~cm}$.

12. How many three - digit natural numbers are divisible by 7 ?

Solution: All the three-digit natural numbers that are divisible by 7 will be of the form 7 n .
Therefore, $100 \leq 7 \mathrm{n} \geq 999 \Rightarrow 14_{7}^{2} \leq 7 \mathrm{n} \geq 142_{7}^{5}$
Since, $n$ is an integer, therefore, there will be 142-14 = 128 three-digit natural numbers that will be divisible by 7 .
Therefore, there will be 128 three - digit natural numbers that will be divisible by 7 .
13. Solve the following quadratic equation for $x$ : $4 \sqrt{ } 3 x^{2}+5 x-2 \sqrt{ } 3=0$

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\begin{aligned}
& \text { Solution: } \\
& \qquad \begin{array}{l}
4 \sqrt{3} x^{2}+5 x-2 \sqrt{3}=0 \\
\Rightarrow 4 \sqrt{3} x^{2}+8 x-3 x-2 \sqrt{3}=0 \\
\Rightarrow 4 x(\sqrt{3} x+2)-\sqrt{3}(\sqrt{3} x+2)=0 \\
\Rightarrow(4 x-\sqrt{3})(\sqrt{3} x+2)=0 \\
\\
\therefore x=\frac{\sqrt{3}}{4} \text { or } x=-\frac{2}{\sqrt{3}}
\end{array}
\end{aligned}
$$

14. A card is drawn at random from a well shuffled pack of 52 playing cards. Find the probability that the drawn card is neither a king nor a queen.

Answer. Let $E$ denote the event that the drawn card is neither a king nor a queen.
Total number of possible cases $=52$.
Total number of cards that are king and those that are queen in the pack of playing cards $=4+4=8$.
Therefore, there are $52-8=44$ cards that are neither a king nor a queen.
Total number of favorable cases $=44$.
Required probability $=P(E)=$ Favorable outcome/ Total possible outcomes $=44 / 52=0.84$

