



If  $ax^2+bx+c=0$   
 $a) = -b/a$

6) If the ratio of the perimeter of  $\Delta AOB$  to the perimeter of  $\Delta COD$  would have been 1:4 then:

a)  $AB=2CD$

$\frac{AOB}{COD} = \frac{1}{4}$

$\Delta AOB \sim \Delta COD$

b)  $AB=4CD$

$\frac{AB}{CD} = \frac{1}{4}$

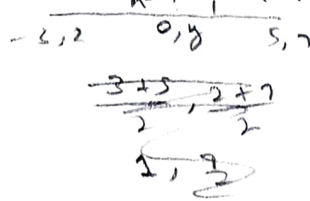
c)  $CD=2AB$

$4AB=CD$

d)  $CD=4AB$

7) The line segment joining the points  $P(-3,2)$  and  $Q(5,7)$  is divided by the y-axis in the ratio:

a) 3:1



b) 3:4

$\frac{5k-3}{k+1}, \frac{2+7k}{k+1} = y$

c) 3:2

d) 3:5

$5k-3=0$   
 $k = \frac{3}{5}$

8)  $\Delta ABC$  is right-angled at A, the value of  $\tan B \times \tan C$  is:

a) 1

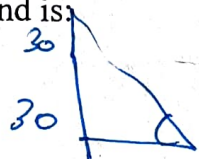
b) Zero

c)  $\tan B$

d)  $\tan C$

9) A kite is flying at a height of 30 m from the ground. The length of string from the kite to the ground is 60 m. Assuming that there is no slack in the string, the angle of elevation of the kite at the ground is:

a)  $45^\circ$



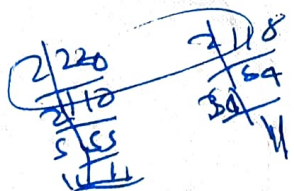
b)  $30^\circ$

c)  $60^\circ$

d)  $90^\circ$

10) The largest number which divides 224 and 118 leaving remainder 4 and 3 respectively is:

a) 15



b) 21

c) 5

d) 10

11) The quadratic equation  $2x^2 - \sqrt{5}x + 1 = 0$  has:

a) Two distinct real roots

b) Two equal real roots

c) No real roots

d) More than 2 real roots

12) The solution of the pair of equations  $x+y=a+b$  and  $ax-by=a^2-b^2$  is:

a)  $x=b, y=a$

b)  $x=-a, y=b$

c)  $x=a, y=b$

d)  $x=a, y=-b$

3) If  $ax^2+bx+c=0$  has equal roots then c is equal to:

a)  $\frac{-b}{2a}$

$D=0$   
 $b^2 - 4ac = 0$   
 $C = \frac{b^2}{-4a}$

b)  $\frac{b}{2a}$

c)  $\frac{-b^2}{2a}$

d)  $\frac{b^2}{2a}$

14) The next term of the A.P.:  $\sqrt{6}, \sqrt{24}, \sqrt[3]{54}$  is:

a)  $\sqrt{60}$

$\sqrt{6}, \sqrt[3]{24}, \sqrt[3]{54}$   
 $6 \times 4 \times 4$   
 $16$   
 $\times 6$   
 $96$

b)  $\sqrt{96}$

c)  $\sqrt{72}$

d)  $\sqrt{216}$

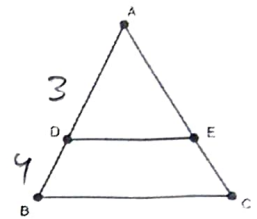
15) In the given figure, if  $DE \parallel BC$ ,  $AD=3$  cm,  $BD=4$  cm, the DE equals:

a) 7 cm

b) 6 cm

c) 4 cm

d) 3 cm



16) ABCD is a rectangle whose three vertices are  $B(4,0)$ ,  $C(4,3)$ ,  $D(0,3)$ , then length of the one of its diagonal is:

a) 5

b) 3

c) 4

d) 25

17) If  $1 + \sin^2 x = 3 \sin x \cos x$ , then values of  $\cot x$  are:

a) -1, 1

$\sin^2 + \cos^2 = 1$   
 $1 + \sin^2 x = 3 \sin x \cos x$

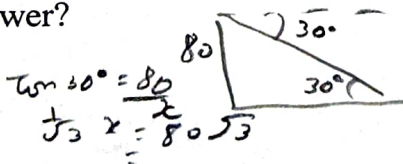
b) 0, 1

c) 1, 2

d) -1, -1

18) From a tower 80m high, the angle of depression of a bus is  $30^\circ$ . How far is the bus from the tower?

a) 40 m



c) 46.2m

b) 138.4 m

d) 160m

$\frac{80}{\tan 30^\circ}$   
 $\frac{80}{\frac{1}{\sqrt{3}}}$   
 $80\sqrt{3}$   
 $\approx 138.4$

**Assertion-and-Reason based questions**

Each question consists of two statements: Assertion (A) and Reason (R). For selecting the correct answer use the following code:

a) Both Assertion (A) and Reason (R) are the true and Reason (R) is a correct explanation of Assertion (A).

b) Both Assertion (A) and Reason (R) are true but Reason (R) is not a correct explanation of Assertion (A).

c) Assertion (A) is true and Reason (R) is false.

d) Assertion (A) is false and Reason (R) is true.

19) **Assertion(A):** Polynomials having -3 and 5 as its zeroes are infinite in number.

**Reason(R):** A polynomial whose sum of zeroes and product of zeroes are -5 and 6 respectively is  $x^2+5x+6$ . (B)

20) **Assertion(A):**  $\sqrt{3} + \sqrt{5}$  is an irrational number.

**Reason(R):** Sum of any two irrational numbers is always irrational. (C)

### Section-B

21) Given that  $\sqrt{2}$  is an irrational number, prove that  $5+3\sqrt{2}$  is an irrational number.

22) Find the x-coordinate of the point which lies on the line represented by  $5x-y-7=0$  and whose y- coordinate is 13.

(23) Find the value of k for which the quadratic equation  $2kx^2-40x+25=0$  has real and equal roots.

OR

Solve for x:  $\frac{5}{2}x^2 + \frac{2}{5} = 1 - 2x$

24) In a school, the duration of a period in junior section is 40 minutes and senior section is 1 hour. If the first bell for each section rings at 9:00 am, when will the two bells ring together again.

25) If  $\theta$  is an acute angle and  $\sin\theta = \cos\theta$ , find the value of  $\tan^2\theta + \cot^2\theta - 2$ .

OR

Prove that:  $\sec A(1-\sin A)(\sec A + \tan A) = 1$

### Section-C

26) If the  $p^{\text{th}}$  term of an A.P. is q and  $q^{\text{th}}$  term is p, prove that its  $n^{\text{th}}$  term is  $(p+q-n)$ .

27) Point P divides the line segment joining the points A(2,1) and B(5,-8) such that  $\frac{AP}{AB} = \frac{1}{3}$ . If P lies on the line  $2x - y + k = 0$ , find the value of k. -10

OR

If A (-2,1), B(a,0), C(4, b) and D(1,2) are the vertices of a parallelogram ABCD, find the values of a and b. Hence, find the lengths of its sides.

- 28) If the sum of the squares of the zeroes of  $6x^2+x+k$  is  $\frac{25}{36}$ . Find the value of k. -2
- 29) If the roots of the equation  $(c^2-ab)x^2 - 2(a^2-bc)x + b^2-ac=0$  in x are equal, then show that either  $a=0$  or  $a^3+b^3+c^3=3abc$

30) If  $\cos \theta + \sin \theta = \sqrt{2} \cos \theta$ , show that  $\cos \theta - \sin \theta = \sqrt{2} \sin \theta$

31) If in  $\Delta ACB = 90^\circ$  and  $CD \perp AB$ , prove that  $CD^2 = BD \times AD$ .

$\angle C = 90^\circ$

OR

ABCD is a trapezium in which  $AB \parallel CD$  and its diagonals intersect each other at point

O. Show that  $\frac{AO}{BO} = \frac{CO}{DO}$

### Section-D

32) If  $\alpha$  and  $\beta$  are the zeroes of the quadratic polynomial  $f(x) = x^2 - x - 2$ , find a polynomial where zeroes are  $(2\alpha - 1)$  and  $(2\beta - 1)$ .  $x^2 - 9$

33) Prove that:  $\frac{(1+\cot \theta + \tan \theta)(\sin \theta - \cos \theta)}{(\sec^3 \theta - \operatorname{cosec}^3 \theta)} = \sin^2 \theta \cos^2 \theta$

OR

Prove that:  $\frac{1}{(\sec \theta - \tan \theta)} - \frac{1}{\cos \theta} = \frac{1}{\cos \theta} - \frac{1}{(\sec \theta + \tan \theta)}$

34) The monthly incomes of A and B are in the ratio 8:7 and their expenditures are in the ratio 19:16. If each saves ₹ 5000 per month, find the monthly income of each.

OR

A chemist has one solution which is 50% acid and a second solution which is 25% acid. How much of each should be mixed to make 10 liters of a 40% acid solution.

35) If AD and PM are medians of triangles ABC and PQR, respectively where 6, 4

$\Delta ABC \sim \Delta PQR$ , prove that  $\frac{AB}{PQ} = \frac{AD}{PM}$

### Section-E

36) Your friend Veer wants to participate in a 200m race. He can currently run that distance in 51 seconds and with each day of practice it takes him 2 seconds less. He wants to do in 31 seconds to win it.

Answer the following:

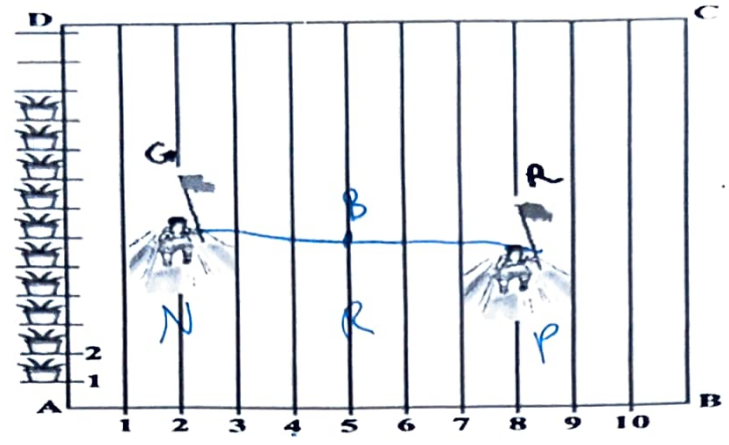
i) Write terms which are in A.P. for the given situation.

ii) What is the minimum number of days he needs to practice till his goal is achieved? \\\

iii) If nth term of an AP is given by  $a_n = 2n + 3$  then, find common difference of the AP. 2

37) In order to conduct Sports Day activities in your School, lines have been drawn with chalk powder at a distance of 1 m each, in a rectangular shaped ground ABCD, 100 flower pots have been placed at a distance of 1 m from each other along AD, as shown

in given figure below. Niharika runs  $\frac{1}{4}$  th the distance AD on the 2nd line and posts a green flag. Preet runs  $\frac{1}{5}$ th distance AD on the eighth line and posts a red flag.

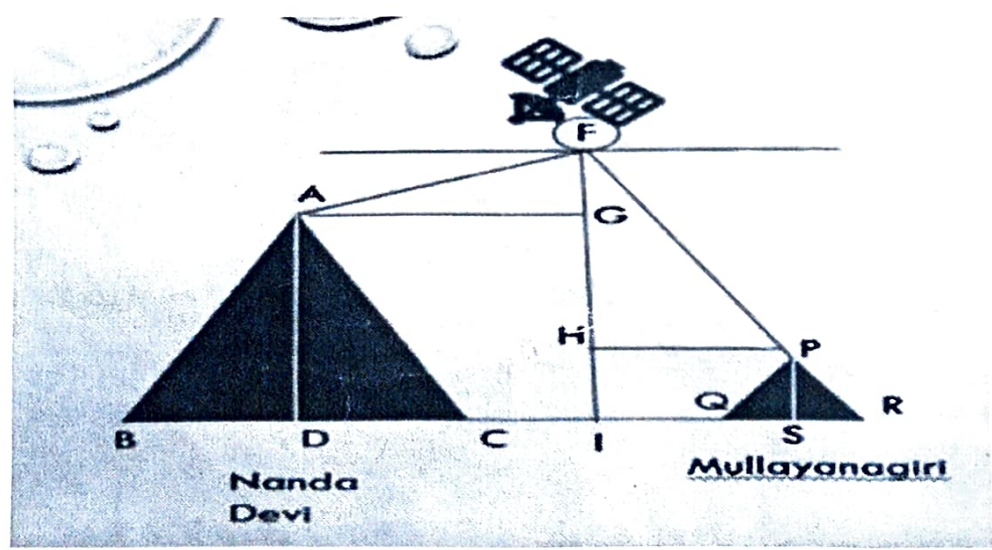


7.816 km  
1.930 km

Answer the following:

- a) Find the position of green flag and red flag. (2.5, 2) (20, 8)
- b) If Rashmi has to post a blue flag exactly halfway between the line segment joining the two flags, where should she post her flag? ( $\frac{45}{2}, 5$ )
- c) What is the distance between both the flags?  $\sqrt{61}$

38) A satellite flying at height  $h$  is watching the top of the two tallest mountains in Uttarakhand and Karnataka, them being Nanda devi (height 7,816m) and Mullayanagiri (height 1,930 m). The angles of depression from the satellite, to the top of Nanda devi and Mullayanagiri are  $30^\circ$  and  $60^\circ$  respectively. If the distance between the peaks of two mountains is 1937 km, and the satellite is vertically above the midpoint of the distance between the two mountains.



Answer the following:

- i) Find the distance of the satellite from the top of Nanda Devi.
- ii) Find the distance of the satellite from the top of Mullayangiri.
- iii) Find the angle of elevation if a man is standing at a distance of 7816m from Nanda Devi. 45°