SUBJECTIVE MOCK TEST | MATHEMATICS | SOLUTION

CLASS – X | SET - 1

(SECTION – A)

1.(B)

2.(B) The number of zeroes is 1 as the graph given in the question intersects the x-axis at one point only.

3.(A) The number of solutions of two linear equations representing coincident lines are because two linear equations representing coincident lines has infinitely many solutions.

4.(C) If a quadratic equation , has two equal roots, then its discriminant value will be equal to zero i.e.,

For equal roots,

5.(C) in A.P.

6.(A) Distance between and

7.(C) (–4, 2)

8.(C) In triangles *APQ* and *ATS*,

[Vertically opposite angles] [Alternate angles]

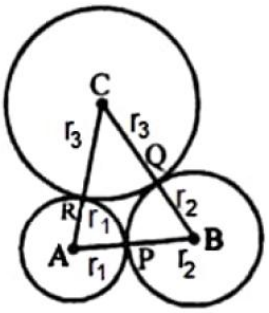
[AA similarity]

And

Therefore, $x = 3$, $y = 4$

9.(C) In the given figure, three circles with centre *A*, *B* and *C* are drawn touching each other externally

Let Be the radii of three circles respectively



… (i)

…(ii)

…(iii)

Adding …(iv)

Now, subtracting (ii) from (iv) respectively we get

Hence, radius of the circle with centre

10.(C) Given: *PA* and *PB* are two tangents a circle and

Since and , Then and

In,

[redacted]

(radius)

(common)

(lengths of tangents drawn from external points)

(SSS congruence)

So,

So,

In

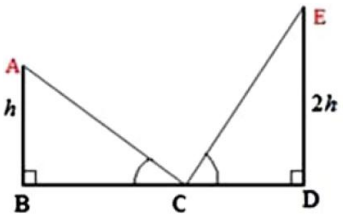
Hence, the value of is 50°.

11.(A) Given:

Squaring both sides, we get

12.(B)

13.(D)



Let the height of the building = AB = h meters, then

Height of the tower = ED = $2h$ meters

According to question, then and

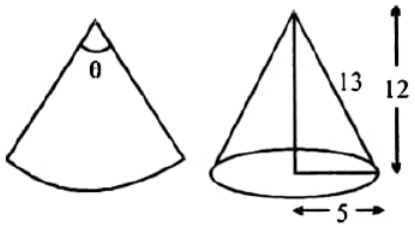
Now, in triangle *ABC*, …(i)

Now, in triangle *EDC*,

…(ii)

Multiplying equation (i) and (ii), we get

14.(C)



Slant height = 13

As,

15.(A) Area of a sector of a circle with radius *r* and making an angle of at the centre

16.(C) Total number of digits from 1 to 9(*n*) = 9
Numbers which are odd (m) = 1, 3, 5, 7, 9 = 5

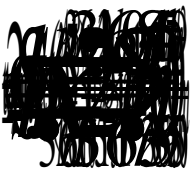
Probability

17.(C) Assuming a non-leap year
Ram can have the birthday on any day of the 365 days of the year
Shyam has a different birthday if his birthday is on any of the remaining 364 days of the year

Therefore *P*(Ram and Shyam have different birthdays) and so, *P* (Ram and Shyam have birthdays on the same day)

= 1 – *P*(Ram and Shyam have different birthdays)

18.(D) Mode = 3 median –2 mean = 3(30) – 2(32) = 90 – 64 = 26



19.(C) A is true but *R* is false

20.(B) For and to form an AP

So, both assertion and reason are correct but reason does not explain assertion.

(SECTION – B)

21. Let us assume that is rational. Then, there exist positive co-primes *a* and *b* such that

.

We observe that is a rational number.

It shows that is a rational number.

This contradicts the fact that is an irrational number

This contradiction has raised because we assumed that is a rational number

Hence, our assumption is wrong ,and is an irrational number.

22. It is given that $AB = 10$ cm, $AC = 6$ *cm* and $BC = 12$ *cm*

In ,, *AD* is the bisector of *A*, meeting side *BC* at *D*

We have to find *BD* and *DC*

Since *AD* is bisector

So

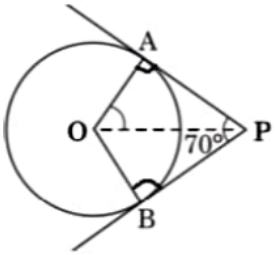
Let $BD = x$ *cm*

Then,

Now

Hence, and

23.



PA and *PB* are tangents to the circle.

We know that the tangent to a circle is perpendicular to the radius through the point of contact.

Thus,

In quadrilateral

(Sum of all interior angles of quadrilateral is 360°)

In ,

AP = *BP* (Tangents from a point outside the circle are equal in length)

OA = *OB* (Radii of the same circle)

OP = *OP* (Common side)

(SSS congruence criterion)

24. We have,

L.H.S

[redacted]

L.H.S

L.H.S

L.H.S

L.H.S

Hence proved

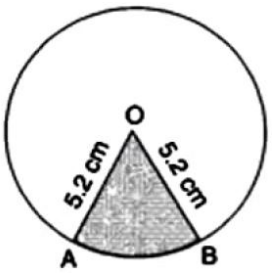
OR

We have

25. Here, and

Area between two consecutive ribs of the umbrella

OR



Let *OAB* be the given sector.

It is given that Perimeter of sector

Area of sector

26. Given numbers are 156, 208 and 260.

Here, 260 > 208 > 156

Thus, HCF of 156, 208 and 260 is 52.

Hence, the minimum number of buses

The number of buses is 12.

(SECTION – C)

27. Let

Since –1 is a zero of $p(x)$. Therefore,

Thus,

For finding zeros of $p(x)$, we put,

Put $x - 3 = 0$ and $x + 1 = 0$, we get,

Thus, $x = 3, -1$

Thus, the other zero is 3.

28. Let the present age of the father be x years and the sum of the present age of his two children be y years.

Then, according to the question,

$x = 3y$

$$x - 3y = 0 \quad \text{...(1)}$$

and, $x + 5 = 2(y + 5 + 5)$

$x + 5 = 2(y + 10)$

$x + 5 = 2y + 20$

$$x - 2y - 15 = 0 \quad \text{...(2)}$$

$x = 45, y = 15$

By solving the equations (1) and (2)

OR

The given equations are

…(i)

…(ii)

From equation (i), we obtain:

…(iii)

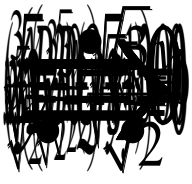
Substituting this value in equation (ii), we obtain:

Substituting the value of y in equation (iii), we obtain

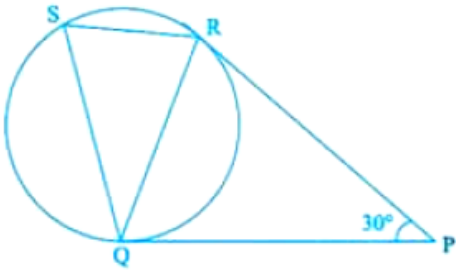
$x = 0$

Hence the solution of given equation is (0,0).

29. In the given figure, we are given that, tangents PQ and PR are drawn toa circle such that .



A chord *RS* is draw parallel to tangent *PQ*. We have to find the .



In APRQ, PQ and PR are tangents from an external point P to circle.

Therefore, *PR* = *PQ*

[opp. to equal sides in are equal]

[Int. of]

Therefore,

Tangent *PQ* || *SR* [Given]

Therefore, [Alternate segment of circle]

PQ is tangent at *Q* and *QR* is chord at *Q*.

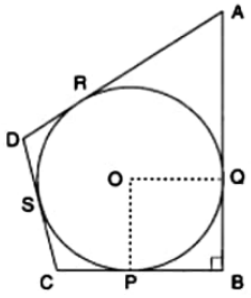
Therefore, [in alternate segment of circle]

In ,

[Angle sum property of a triangle]

OR

Given, a circle is inscribed in a quadrilateral *ABCD*

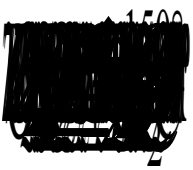


[Radius is perpendicular to the tangent]

and [Radii of a circle]

OPBQ is a square.

Now, *RD* = *DS*



$RD = 5\ cm$

$AR = AD - RD$

$= 23 - 5 = 18\ cm$

Also, $AR = AQ$

$AQ = 18\ cm$

Now, $AB = AQ + BQ$

$29 = 18 + r$

$r = 11\ cm$.

30. Here,

Squaring both sides, we get

…(i)

Now

(using(i)

31. Following table shows the given data & assumed mean deviation method to calculate the mean:

Class Interval	**Frequency**	**Mid value**	**Deviation**	
65 - 68	2	66.5	–9	–18
68 – 71	4	69.5	–6	–24
71 – 74	3	72.5	–3	–9
74 – 77	8	75.5 = *A*	0	0
77 – 80	7	78.5	3	21
80 – 83	4	81.5	6	24
83 – 86	2	84.5	9	18

Let, assumed mean (A) = 75.5 …(1)

Now, from table:

and …(2)

Now,

Mean

[from (1) & (2)]

Thus, the mean of heartbeats per minute for these patients is 75.9

32. If the present age of sister be x, then, by the first condition of the question, we have, present age of the girl = $2x$.

By the second condition of the question, we have,

Since age can't be negative, therefore $x = 6$

So, Age of sister = 6 and Age of girl = 2(6) = 12

OR

Here $x = -2$ is the root of the equation

then,

or, $p = 2$

Roots of the equation are equal then,

or

or

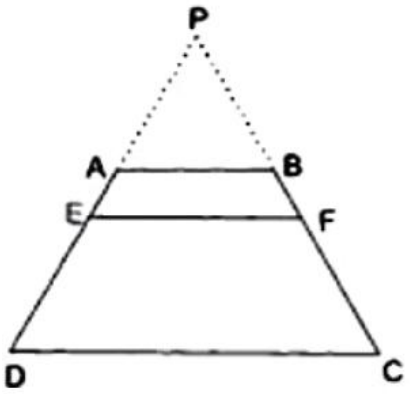
or,

or,

Hence, roots =

33. Given: According to the question, We have, in the given figure.

To prove:



Construction: Produce *DA* and *CB* to meet at *P*(say).

Proof: In , we have

[By Basic proportionality theorem]

[Adding 1 on both side]

…(1)

In , we have,

[By Basic Proportionality Theorem] ...(2)

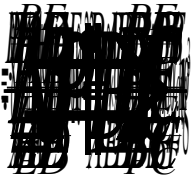
Therefore, on dividing equation (i) by equation (ii), we get

(SECTION – D)

34. Radius of lower cylinder = 14 *cm*

Volume of pole

Mass of the pole



OR

Total volume = volume of cuboid + 1/2 × volume of cylinder.

length = 15 *m*, breadth =7 *m* and height = 8 *m*

Volume of cuboidal part

Clearly,

r = Radius of half-cylinder = (Width of the cuboid) =

and, *h* = Height (length) of half-cylinder = Length of cuboid = 15 *m*

Volume of half-cylinder

Volume of air inside the shed when there is no people or machinery

Now, Total space occupied by 20 workers

Total space occupied by the machinery

Volume of the air inside the shed when there are machine and workers inside it

Hence, volume of air when there are machinery and workers is

35. Let the missing frequencies are *a* and *b*.

Class Interval	**Frequency**	**Cumulative frequency**
0 – 5	12	12
5 – 10	*a*	12 + *a*
10 – 15	12	24 + *a*
15 – 20	15	39 + *a*
20 – 25	*b*	39 + *a* + *b*
25 – 30	6	45 + *a* + *b*
30 – 35	6	51 + *a* + *b*
35 – 40	4	55 + *a* + *b* = 70

Then, 55 + *a* + *b* = 70

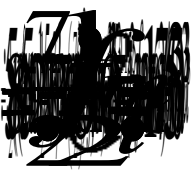
a + *b* = 15 ...(1)

Median is 16, which lies in 15 – 20

So, The median class is 15 – 20

Therefore, = 15, *h* = 5, *N* = 70, *f* = 15 and *cf* = 24 + *a*

Median is 16, which lies in the class 15 - 20. Hence, median class is 15 – 20.



Median = 16

Median

$3 = 11 - a$

$a = 8, b = 7$

36. (i) A.P. for the number of squares in each row is 1, 3, 5, 7, 9 …

(ii) A.P. for the number of triangles in each row is 2, 6, 10, 14 …

(iii) Area of each square

Number of squares in 15 rows

Shaded area

OR

37. (i) Distance of charu from *y*-axis = 8

(ii)

Distance between Anishka and Bhawna

(iii)

OR

Yes, because

(SECTION – E)

38. (i) Given height of tree = 80 *m*, *P* is the initial position of bird and *Q* is position of bird after 2 sec the distance between observer and the bottom of the tree.

In

(ii) The speed of the bird

In

Speed of bird

Speed of the bird

(iii) The distance between second position of bird and observer

In

OR

The distance between initial position of bird and observer.

In

SUBJECTIVE MOCK TEST | MATHEMATICS | SOLUTION

CLASS – X | SET - 2

(SECTION – A)

1.(D)

HCF

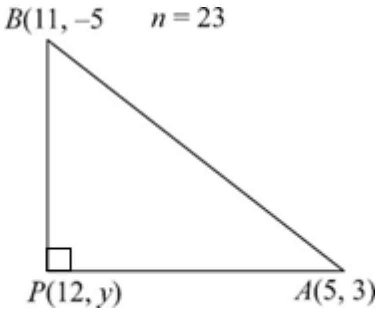
2.(C)

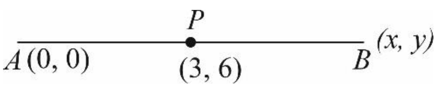
3.(C) No solution

4.(C)

5.(A)

6.(D)



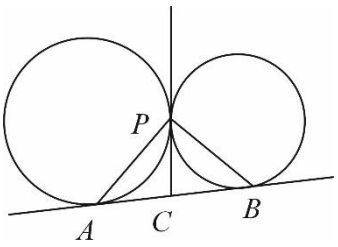
7.(B) 

8.(D) Isosceles and similar

9.(C) 80°

10.(C) and

In



11.(C)

12.(A)

13.(D)

14.(C) Area of sector sq. units

15.(D) Slant height of cone

Radius of sector = slant height of cone = 13*cm*

16.(D) Nos. divisible by 2 and 3 both

6, 12, 18, 24

p(number divisible by 2 and 3 both)

17.(C) 0

18.(A) Mean

19.(D) A is false but R is true.

20.(D) AP is 10, 20, 30,,…… 100 times

A is false but R is true

(SECTION – B)

21. LCM

= 120 seconds

No. of times it will ring in 30 minutes

22. In

given

By converse of

and

(corresponding angles)

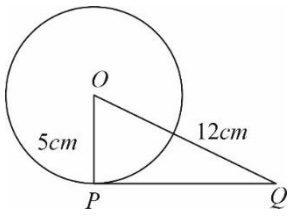
given

and

is an isosceles .

23.

(radius is perpendicular to the tangent).



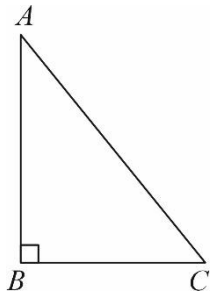
24.

OR

Let in set

units and units

units



25. in 1 minute

in 56 minutes

Area of sector

OR

Area of sector

(SECTION – C)

26.

Hence the no. of animals went in each trip is 35.

27.

Sum of zeroes of new polynomial

Product of zeroes of new polynomial

Required polynomial =

One of the required polynomial is

28.

…(1)

…(2)

OR

Considering

….(1)

Now considering

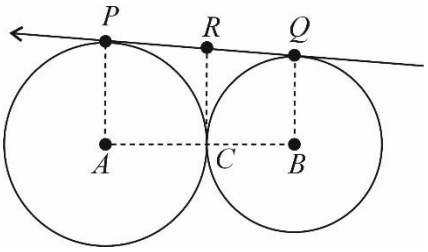
…(2)

Solving equations (1) & (2)

29.

Height (in m)	**No. of village**		**di**		
0 – 200	142	100	–700	–7	–994
200 – 600	265	400	–400	–4	–1060
600 – 1000	560	800	0	0	0
1000 – 1400	271	1200	400	4	1084
1400 – 1800	89	1600	800	8	712
1800 – 2200	16	2000	1200	12	192

30.



Construction

Draw common tangents *RC*

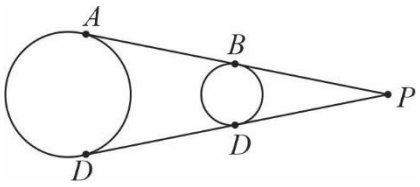
Proof*:* (length of tangents)

Similarly,

is the midpoint of

the common tangent *RC* bisects the tangent *PQ*.

Or



Construction: Produce *AB* and *CD* such that they intersect at point *P*.

For larger circle, (i) (length of tangents)

Similarly for smaller circle, …(ii)

By subtracting (ii) from (i) we get

31.

RHS.

(SECTION – D)

32.

33. (given)

(By CPCT) …(i)

(given)

…(ii)

Using (i) and (ii) we get

By converse of BPT

and corresponding angles

In and

(common)

(proved above)

By AA similarity rule

34.

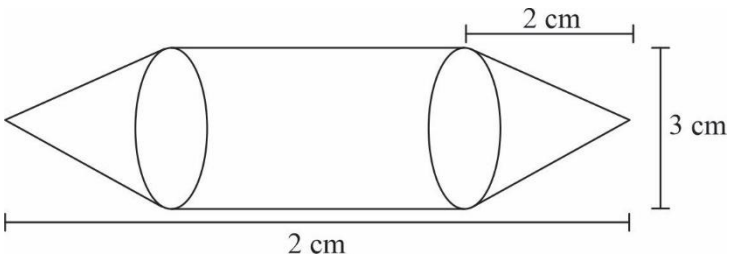
Classes	*Frequency*	*xi*	*di*	*fi*	*fiui*
10 – 20	4	15	–30	–3	–12
20 – 30	8	25	–20	–2	–16
30 – 40	10	35	–10	–1	–10
40 – 50	12	45	0	0	0
50 – 60	10	55	10	1	10
60 – 70	4	65	20	2	8
70 – 80	2	75	30	3	6
	$\sum fi = 50$				$\sum fiui = 14$

Model class is 40 – 50

Mode

= 40 + 5 = 45

35.



For conical part

Volume of 2 cones

Curved surface area of 2 cones

For cylindrical part,

Volume of cylinder

Curved surface area of cylinder

Volume of air

Area to be painted

Cost of painting = 12.50 × 99 = Rs. 1237.50

OR

Diameter of wire = 6 mm = 0.6 cm.

r = radius of wire

Height of cylinder = 18 cm

R = radius of cylinder

Number of rotations

Length of wire = Circumference of base of cylinder × Number of rotations

= 46.20 m

Volume of wire

Weight of wire = Volume of wire × density of wire = 1306.8 × 8.8 g = 11499.84 g = 11.49984 kg = 11.5 kg (Approx)

(SECTION – E)

36. AP is 3, 5, 7,…….

(i)

(rejected) or

No. of rows = 18

(ii)

OR

(iii)

37. Coordinates of Aaksh (2, 3)
Coordinates of Neena (3, 6)
Coordinates of Pinu (5, 2)
Coordinates of Karan (6, 5)

(i) distance between Neena and Karan

(ii) Coordinates of seat of Aakash (2, 3)

OR

Distance between Prinu and Karan

(iii) Coordinates of midpoint between Akash and Binu

38. (i)

(ii) In

OR

(ii)

(iii)