केवल मूल्यांकनकर्ता के उपयोग हेतु!

माध्यमिक शिक्षा मण्डल, मध्यप्रदेश, भोपाल

32 पृष्ठीय

केवल परीक्षक द्वारा भरा जावे। प्रश्न क्रमांक के सम्मुख प्राप्तांकों की प्रविष्टी करें।

प्रश्न क्रमांक	पृष्ठ क्रमांक	ांक (अंकों में)	प्रश्न क्रमांक	पृष्ठ क्रमांक	ांक (अ
1			17		
2			18		
3			19		
4			20		
5			21		
6			22		
7			23		
8			24		
9			25		
10			26		
11			27		
12			28		
13					
14					
15			कुल प्राप्तांक शब्दों में		कुल प्राप्त
16					

परीक्षक एवं उपमुख्य परीक्षक द्वारा भरा जावे

परीक्षक एवं उपमुख्य परीक्षक द्वारा भरा जावे

प्रमाणित किया जाता है कि अन्दर के पृष्ठों के अनुरूप मुख्य पृष्ठ पर अंकों की प्रविष्टी एवं अंकों का योग सही है।

निर्धारित मुद्राः नाम, पदनाम, मोबाईल नम्बर, परीक्षक क्रमांक एवं पदांकित संस्था के नाम की मुद्रा लगाएं।

उप मुख्य परीक्षक के हस्ताक्षर एवं निर्धारित मुद्रा	परीक्षक के हस्ताक्षर एवं निर्धारित मुद्रा
G S RAJPUT ID-000618	KASHIRAM RAJAK Govt. Excellence Chichli V.No.- 001248

② योग पूर्व पृष्ठ + पृष्ठ 2 के अंक = 12

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Question no. 1 True / False

Ans (i) - False.
Ans (ii) - True.
Ans (iii) - False.
Ans (iv) - False.
Ans (v) - True.
Ans (vi) - True.

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Question no. 2 Match the column

(i) → $9\sec^2 A - 9\tan^2 A$ ⇒ 9
(ii) → $\cos 0^\circ$ ⇒ 1
(iii) → $\sin 0^\circ$ ⇒ 0
(iv) → Area of sector of angle θ ⇒ $\frac{\theta}{360} \times \pi r^2$
(v) → Curved surface area of hemisphere ⇒ $2\pi r^2$
(vi) → Total surface area of hemisphere ⇒ $3\pi r^2$

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Question no. 3 Answer in one ~~world~~ word

Ans (i) → The standard form of a quadratic equation is as under :-
$ax^2 + bx + c = 0$, where $a \neq 0$.

Ans (ii) → The any one condition of similarity of two triangle is :-
Two triangles are similar if ~~their~~ the corresponding angles are equal .

Ans (iii) → The distance between origin (0,0) & point (x_1, y_1) is $\sqrt{(x_1)^2+(y_1)^2}$ units .

Ans (iv) → If shadow and height of the pole are equal then the angle of elevation of sun will be 45°.

Ans (v) → The formula of the length of an arc of a sector of angle 'θ' and radius 'r' is → $\frac{\theta}{360} \times 2\pi r$

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Ans (vi) → We know that class mark = $\frac{\text{Upper limit + Lower limit}}{2}$

so, class mark of 20 - 40 will be $\frac{20+40}{2} = 30$ ans.

Question no. 4 Choose the correct option

Ans (i) - (a) 2
Ans (ii) - (d) infinitely many solutions
Ans (iii) - (b) $b^2 - 4ac = 0$
Ans (iv) - (c) 20
Ans (v) - (a) $\sqrt{8}$
Ans (vi) - (d) infinite

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Question no. 5 Fill in the blanks

Ans (i) - irrational

Ans (ii) - cubic

Ans (iii) - -1 .

Ans (iv) - similar .

Ans (v) - secant line .

Ans (vi) - 1

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~~Question no. 6~~ OR

Given → Points (a, b) & (-a, -b)

To Find → distance between given points

Calculation → Let the given points be P (a, b) & Q (-a, -b)

We know that,

Distance between two points $= \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

so,

$PQ = \sqrt{(-a-a)^2 + (-b-b)^2}$

$PQ = \sqrt{(-2a)^2 + (-2b)^2}$

$PQ = \sqrt{4a^2 + 4b^2}$

$PQ =$

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Question no. 7 OR

To Find the value of $\frac{2\tan 30^\circ}{1-\tan^2 30^\circ}$ — (1)

we know that,

$\tan 30^\circ = \frac{1}{\sqrt{3}}$

putting value of tan 30° into (1)

$$\frac{2\times\frac{1}{\sqrt{3}}}{1-\left(\frac{1}{\sqrt{3}}\right)^2} = \frac{\frac{2}{\sqrt{3}}}{1-\frac{1}{3}} = \frac{\frac{2}{\sqrt{3}}}{\frac{3-1}{3}} = \frac{\frac{2}{\sqrt{3}}}{\frac{2}{3}}$$

$$= \frac{2}{\sqrt{3}} \div \frac{2}{3} = \frac{\cancel{2}}{\sqrt{3}} \times \frac{3}{\cancel{2}} = \frac{3}{\sqrt{3}}$$

$$= \frac{3}{\sqrt{3}} \times \frac{\sqrt{3}}{\sqrt{3}} = \frac{\cancel{3}\sqrt{3}}{\cancel{3}} = \sqrt{3} \text{ ans}$$

So, the value of $\frac{2\tan 30^\circ}{1-\tan^2 30^\circ} = \sqrt{3}$

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Question no. 8

Given, Radius of circle (r) = 14 cm
Angle subtended by arc (θ) = 45°

We know that, area of sector = $\frac{\theta}{360°} \times \pi r^2$

area of sector = $\frac{45°}{360°} \times \frac{22}{7} \times 14^2$ [putting values]

area of sector = $\frac{1}{8} \times \frac{22}{7} \times 14 \times 14$ = $\frac{22 \times 14}{4}$ = 77 cm²

$\boxed{\text{So the area of sector = 77 cm}^2 \text{ ans}}$

Question no. 9 OR

Experiment - throwing a die once
Let the event of getting a prime number be E
now, Total no. of possible outcomes = 06 {1, 2, 3, 4, 5, 6}
No. of Outcomes favourable to E = 03 {2, 3, 5}

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we know that, probability = $\frac{\text{no. of Favourable outcomes}}{\text{Total possible outcomes}}$

so $P(E) = \frac{03}{06}$

$P(E) = \frac{1}{2}$

so, the probability of getting a prime no. on throwing a die once is $\frac{1}{2}$. ans

$\boxed{\text{Question no. 10}}$ OR

Experiment - Drawing a card from well shuffled deck of 52 cards.

Let the event of getting a red face cards be E

now, Total no. of possible outcomes = No. of cards = 52

Outcomes Favourable to E = No. of red face card = 6

we know that,

Probability = $\frac{\text{No. of favourable outcomes}}{\text{Total possible outcomes}}$

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so, $P(E) = \frac{\cancel{6}\,3}{\cancel{52}\,26} = \frac{3}{26}$

so, the probability of getting a red face card from a well shuffled deck of 52 cards $= \frac{3}{26}$ ans.

Question no. 11 OR

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To express 148 as a product of primes, we have to use prime factorization method.

Prime factorization of 148 ⇒

$$\begin{array}{r|l} 2 & 148 \\ 2 & 74 \\ 37 & 37 \\ & 1 \end{array}$$

So, we got,

$148 = 2 \times 2 \times 37$

$148 = 2^2 \times 37$ ans

148 as a product of primes will be $2^2 \times 37$. ans

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Question no. 12

Fundamental theorem of Arithmetic states that " Every composite number can be expressed as product of primes, and this factorization is unique apart from order in which prime factors occur ".

Exa. → 12 is a composite number & hence it can be written as product of ~~pin~~ primes, according to this theorem
$12 = 2 \times 2 \times 3 = 2^2 \times 3$,
Also, this factorization will be unique.

Question no. 13

We know that ~~graph~~ number of times a graph of polynomial intersects the x-axis is equal to the number of zeroes it has.
Here, the graph of $y=P(x)$ is intersecting x-axis at 3 points so it has 3 zeroes.
Means. P(x) polynomial has 3 zeroes.

ans.

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Question no. 14

Given, - Polynomial $4u^2 + 8u$

To Find - Zeroes of $4u^2 + 8u$

Calculation - Let the given polynomial be $P(x)$

means, $P(x) = 4u^2 + 8u$

also, zero of $P(x) = 0$

so, $4u^2 + 8u = 0$

$4u(u + 2) = 0$ [Taking $4u$ common]

this gives → $4u = 0$ & $u + 2 = 0$

$u = 0$ & $u = -2$

so, the zeroes of polynomial $4u^2 + 8u$ are 0 & -2.

ans.

Question no. 15

Given - linear equations → $x + 2y = 8$ - (i)

$x - y = 8$ - (ii)

To Find - solutions of given equations

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Calculation → Solving equation (i) & (ii) by elimination method of ~~adding~~ substracting

$$x + 2y = 8$$
$$(-)\ x - y = 8$$
$$3y = 0$$

$$\frac{3y}{3} = \frac{0}{3} \quad [\text{dividing both sides by } 3)$$

$$y = 0$$

now putting value of y in equation - (i)

$$x + 2y = 8$$
$$\cancel{x = 2x} \quad x + 2 \times (0) = 8$$
$$x + 0 = 8$$
$$x = 8$$

so on solving the given equations, solutions are $x = 8$ & $y = 0$.

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Question no. 16

Given → A.P. ⇒ 2, 7, 12 ----

To Find → 10^{th} term of A.P.

Calculation →

Given A.P. is 2, 7, 12 ---

so first term (a) = 2

common difference (d) = 7 - 2 = 5

We know that,

$a_n = a + (n-1)d$

~~so, fi tenth term or a_5 will be~~

~~$a_5 = 2 + (5-1)$~~

so, tenth term or a_{10} will be

$a_{10} = 2 + (10-1) 5$ [putting values]

$a_{10} = 2 + 9 \times 5$

$a_{10} = 2 + 45$

$a_{10} = 47$

so the 10^{th} term of given A.P. 2, 7, 12 ---

will be 47 ans.

(15)

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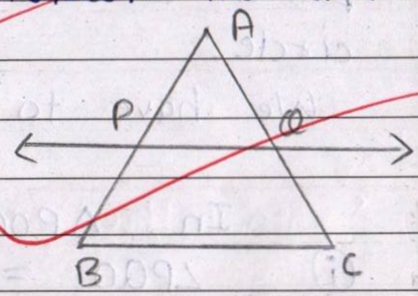
Question no. 17

Basic Proportionality Theorem

It states that " If a line drawn parallel to any one side of a triangle to intersect the other two sides in distinct points, then the two sides will be divided in same ratio".

Exa. Let ABC be a triangle where, line l is drawn parallel to BC to intersect AB at P & AC at Q then according to this theorem,

$$\frac{AP}{PB} = \frac{AQ}{QC}$$



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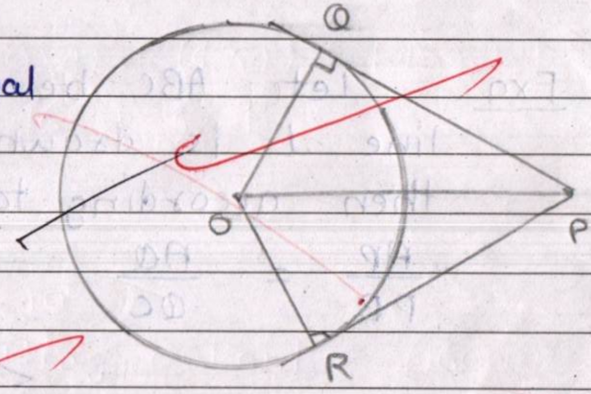
Question no. 18

Given → Tangents drawn from an external point to circle.

To Proof → The length of tangents from an external point to circle are equal. ~~it~~

Proof → Let the given circle with centre O. & P is an external point & PQ & PR are tangents to circle.



We have to prove, PQ = PR

In $\triangle POQ$ & $\triangle POR$

(i) $\angle PQO = \angle PRO = 90°$ [Tangent at any point of circle is perpendicular to radius through point of contact]

(ii) OQ = ~~4~~OR [both radii]

(iii) PO = PO [common side]

so, $\triangle POQ$ & POR are congruent by RHS congruence criteria [from i, ii & iii]

$\triangle POQ \cong \triangle POR$

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so, $PQ = PR$ [CPCT] but these are the tangents drawn from external point, Hence proved that tangents drawn from external point to a circle are equal in length.

Question no. 19

Given → 2 cubes each of volume $64\,cm^3$ are joined end to end.

To Find → Surface area of resultant cuboid

Calculation → Let the side of each cube be "x" m.

We know that, volume of cube $= a^3$

given that volume of each cube is $64\,m^3$

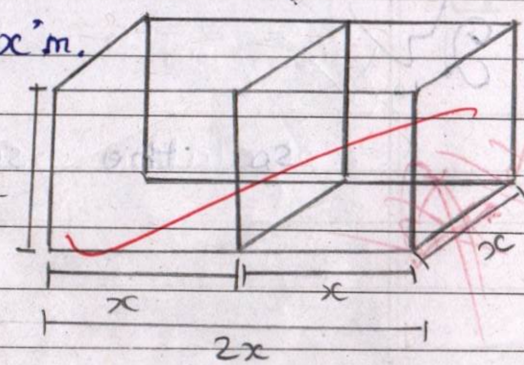
so,

$x^3 = 64\,m^3$

$x = \sqrt[3]{64\,m^3}$

$x = 4\,m$

so the side of cube is 4 m.



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2 cubes are joined end to end.
Now the dimensions of resulting cuboid are

(l) length $= x + x = 2x = 2 \times 4 = 8m$
(b) breadth $= x = 4m$
(h) Height $= x = 4m$

We know that surface area of cuboid $= 2(lb + bh + hl)$
now, putting the values of length, breadth & height.

surface area of cuboid $= 2[(8 \times 4) + (4 \times 4) + (4 \times 8)]$
$= 2[32 + 16 + 32]$
$= 2[80]$
$= 2 \times 80$
$= \cancel{160}\ 160\ m^2$

so the surface area of resulting cuboid $= 160\ m^2$ - ans

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Question no. 20

Given → equation ⇒ $2x^2 - 5x + 3 = 0$

To Find → Roots of give equation by factorization

Calculation → Finding the roots of $2x^2 - 5x + 3 = 0$ by factorization

so,

$2x^2 - 5x + 3 = 0$ [$2x^2 - 2x - 3x + 3 = 0$

$\cancel{2x^2 -}$ $2x(x-1) - 3(x-1) = 0$]

$(2x-3)(x-1) = 0$

it gives $2x - 3 = 0$ & $x - 1 = 0$

$2x = 3$ & $x = 1$

$x = \frac{3}{2}$

So the roots of eq. $\cancel{2x^2 +}$ $2x^2 - 5x + 3 = 0$ are $\frac{3}{2}$ & 1

ans

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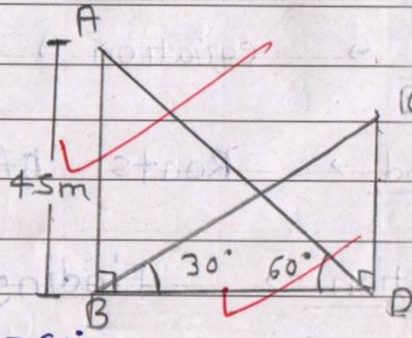
Question no. 21 OR

Let AB is the given tower & CD is the given building.



Given → Height of tower = AB = 45 m

angle of elevation of tower from foot of building = $\angle ADB = 60°$

angle of elevation of building from foot of tower = $\angle CBD = 30°$

To Find → Height of building [CD]

Calculation → As tower & building stand vertically

so, in right angled ΔABD

$$\frac{AB}{BD} = \tan 60°$$

$$\frac{45}{BD} = \sqrt{3}$$ [$\tan 60° = \sqrt{3}$ & AB = 45 m]

$$BD = \frac{45}{\sqrt{3}}$$

[Multiplying $\sqrt{3}$ on Numerator & Denominator]

$$BD = \frac{45\sqrt{3}}{3}$$

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BD = $15\sqrt{3}$ m

Now, in right angled triangle CDB

$$\frac{CD}{BD} = \tan 30^\circ$$

$$\frac{CD}{15\sqrt{3}} = \frac{1}{\sqrt{3}} \qquad \left[\tan 30^\circ = \frac{1}{\sqrt{3}} \;\&\; BD = 15\sqrt{3}\text{ m}\right]$$

$$CD = \frac{15\sqrt{3}}{\sqrt{3}}$$

CD = 15 m

so the height of building is 15 m

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Question no. 22

Family size	No. of Families
1 - 3	7
3 - 5	8
5 - 7	3
7 - 9	2
9 - 11	1

In the given frequency table, Maximum frequency is 8 & the class corresponding to frequency 8 is 3-5. so 3-5 is modal class

now, l (lower limit of modal class) = 3
f_1 (frequency of modal class) = 8
f_0 (frequency of class preceeding the modal class) = 7
f_2 (frequency of class succeeding the modal class) = 3
h (class size) = 2

now, we know that,

$$\text{mode} = l + \left[\frac{f_1 - f_0}{2f_1 - f_0 - f_2} \right] \times h$$

putting values in the above formula

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$$\text{mode} = 3 + \left[\frac{8-7}{(2\times8)-7-3}\right]\times 2$$

$$\text{mode} = 3 + \left[\frac{1}{16-10}\right]\times 2$$

$$\text{mode} = 3 + \frac{1}{\cancel{6}\,3}\times\cancel{2}$$

$$\text{mode} = 3 + \frac{1}{3}$$

$$\text{mode} = \frac{9+1}{3}$$

$$\text{mode} = \frac{10}{3} = 3.33$$

so the mode of given data is 3.33 (approx.)
means the modal value of family size of 21 household is 3.33 -ans (approx.)

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Question no. 23 OR

Given → Linear equations :-

$x+y=5$ —(i)

$2x-3y=4$ —(ii)

To Find → Solutions

Calculation → Multiplying the eq (i) by 2 in order to make the coefficient of both equations same.

$2(x+y=5)$

$2x+2y=10$ — (iii)

now solving eq (ii) & (iii) by elimination method (substraction)

$\cancel{2x}-3y=4$

$\cancel{2x}+2y=10$

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$-5y=-6$

$\frac{\cancel{-5}y}{\cancel{-5}}=\frac{-6}{-5}$ [Multiplying both sides by −5]

$y=\frac{6}{5}$

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now putting the value of y in eq (ii)

$$2x - 3y = 4$$

$$2x - 3 \times \frac{6}{5} = 4$$

$$2x - \frac{18}{5} = 4$$

$$2x = 4 + \frac{18}{5}$$ [Transposing $-\frac{18}{5}$ to RHS]

$$2x = \frac{20+18}{5}$$

$$2x = \frac{38}{5}$$

$$\frac{\cancel{2}x}{\cancel{2}} = \frac{38}{5} \div 2$$ [Dividing both sides by 2]

$$x = \frac{\cancel{38}^{19}}{5} \times \frac{1}{\cancel{2}}$$

$$x = \frac{19}{5}$$

So the on solving the equations $x+y = 5$ & $2x-3y=4$ we got $x = \frac{19}{5}$ & $y = \frac{6}{5}$ ans

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Question no. 6

Given → Points A(6, 5) & B(-4, 3).
To Find → A point equidistant from A & B.

Calculation → Let a point C (x, y) is equidistant from A(6, 5) & B(-4, 3)

then,

AC = BC

By applying distance formula $= \sqrt{(x_2-x_1)^2+(y_2-y_1)^2}$
we got

$$\sqrt{(x-6)^2+(y-5)^2} = \sqrt{[x-(-4)]^2+(y-3)^2}$$

$$\sqrt{x^2+36-12x+y^2+25-10y} = \sqrt{x^2+16+8x+y^2+9-6y}$$

[by $(a+b)^2 = a^2+b^2+2ab$
$(a-b)^2 = a^2+b^2-2ab$]

$$\left(\sqrt{x^2+y^2-12x-10y+25+36}\right)^2 = \left(\sqrt{x^2+y^2+8x-6y+16+9}\right)^2$$

[Squaring both sides]

$$x^2+y^2-12x-10y+61 = x^2+y^2+8x-6y+25$$

$$\cancel{x^2}-\cancel{x^2}+\cancel{y^2}-\cancel{y^2}-12x-8x-10y+6y = 25-61 \quad \text{[Transposing]}$$

$$-20x-4y = -36$$

$-4(5$

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Question no. 6

Given → points $A(6,5)$ & $B(-4,3)$

To Find → A point on y-axis which is equidistant from A & B

Calculation → Let point $C(0,y)$ is a point on y-axis which is equidistant from A & B.

so $AC = BC$

by distance formula $= \sqrt{(x_2-x_1)^2 + (y_2-y_1)^2}$

$$\sqrt{(6-0)^2 + (5-y)^2} = \sqrt{(-4-0)^2 + (3-y)^2}$$

$$\sqrt{36 + 25 + y^2 - 10y} = \sqrt{16 + 9 + y^2 - 6y}$$

[By using $(a-b)^2 = a^2+b^2-2ab$
$(a+b)^2 = a^2+b^2+2ab$]

$$\left(\sqrt{36+25+y^2-10y}\right)^2 = \left(\sqrt{16+9+y^2-6y}\right)^2$$

[Squaring both sides]

$$36+25-16-9 \cancel{+y^2} \cancel{-y^2} = -6y + 10y$$

[Transposing]

$$36 = 4y$$

$$\frac{\cancel{36}^{9}}{\cancel{4}} = \frac{\cancel{4}y}{\cancel{4}}$$ [Dividing both sides by 4]

$$y = 9$$

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so the point on y-axis which ~~di~~ is equidistant from A(6,5) & B(-4,3) is (0,9) ans

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