QB365 QUESTION BANK SOFTWARE

QB365 MODEL HALF YEARLY QUESTION WITH ANSWER KEY 2024

8th Standard

Maths

Time : 03:00:00 Hrs

Total Marks : 100

I. CHOOSE THE CORRECT ANSWER 5 x 1 = 5

1) $\sqrt{128} - \sqrt{98} + \sqrt{18} =$

(a) $\sqrt{2}$ (b) $\sqrt{8}$ (c) $\sqrt{48}$ (d) $\sqrt{32}$

2) If the area of a square is $36x^4y^2$ then, its side is_____

(a) $6x^4y^2$ (b) $8x^2y^2$ (c) $6x^2y^2$ **(d) $6x^2y$**

3) If $x^2 - y^2 = 16$ and $(x + y) = 8$ then $(x - y)$ is _____

(a) 8 (b) 3 **(c) 2** (d) 1

4) The area of a rectangle of length 21 cm and diagonal 29 cm is _____cm^2.

(a) 609 (b) 580 **(c) 420** (d) 210

5) Common prime factors of 30 and 250 are

(a) 2 x 5 (b) 3 x 5 (c) 2 x 3 x 5 (d) 5 x 5

6) The sum which amounts to Rs.2662 at 10% p.a in 3 years compounded yearly is_____.

(a) Rs.2000 (b) Rs.1800 (c) Rs.1500 (d) Rs.2500

7) Sum of a number and its half is 30 then the number is_____.

(a) 15 **(b) 20** (c) 25 (d) 40

II. FILL IN THE BLANKS: 5 x 1 = 5

8) The number of perfect square numbers between 300 and 500 is_____

5

9) $(-2)^{-7}$= _____

1/128

10) The radius of a circle of diameter 24 cm is _____.

12 cm

11) The intersecting point of the line x = 4 and y = − 4 is_____.

(4,-4)

12) If the sides of a triangle are in the ratio 5: 12: 13 then, it is _____.

right angled triangle

13) The compound interest on Rs.5000 at 12% p.a for 2 years compounded annually is _____.

1272

14) A alone can do a piece of work in 35 days. If B is 40% more efficient than A, then B will finish the work in _____days.

5

15) $27y^3 \div 3y =$ _____

$(p + 2)^2 = p^2 + 2(P)(2) + 2^2 = p^2 + 4p + 4$

III. SOLVE ANY 15 OF THE FOLLOWING: 12 x 2 = 24

16) Simplify: $(3^2)^3 \times (2 \times 3^5)^{-2} \times (18)^2$

Answer : $(3^2)^3 \times (2 \times 3^5)^{-2} \times (2 \times 3 \times 3)^2$
$= 36 \times 2^{-2} \times 3^{-10} \times (2 \times 3^2)^2$
$= 36 \times 2^{-2} \times 3^{-10} \times 2^2 \times 3^4$
$= 2^2 \times 2^{-2} \times 3^6 \times 3^4 \times 3^{-10}$
$= 2^{2-2} \times 3^{6+4-10}$
$= 2^0 \times 3^0$
$= 1 \times 1 = 1$

17) Solve for x

$$\frac{5^5 \times 5^{-4} \times 5^x}{5^{12}} = 5^{-5}$$

Answer : $\frac{5^5 \times 5^{-4} \times 5^x}{5^{12}} = 5^{-5}$

$5^5 \times 5^{-4} \times 5^x \times 5^{-12} = 5^{-5}$
$5^{5-4-12+x} = 5^{-5}$
$5^{-11+x} = 5^{-5}$
The bases are equal
Equate the exponents
$-11 + x = -5$
$x = -5 + 11 = 6$
$x = 6$

18) Find x: (i) $-3(4x + 9) = 21$ (ii) $20 - 2(5 - p) = 8$ (iii) $(7x - 5) - 4(2 + 5x) = 10(2 - x)$

Answer : (i) $x = -4$
(ii) $p = -1$
(iii) $x = -11$

19) The sum of three consecutive odd numbers is 75. Find the numbers.

Answer : 27

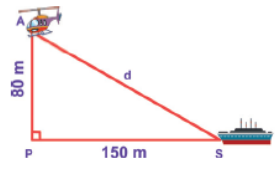
20) At present, Thenmozhi's age is 5 years more than that of Murali's age. Five years ago, the ratio of Thenmozhi's age to Murali's age was 3:2. Find their present ages.

Answer : Murali's age is 15 years old, Thenmozhi's age is 20 years old

21) Find the quadrants without plotting the points on a graph sheet.
$(-7,2)$, $(8,0)$, $(0,10)$, $(-9,50)$.

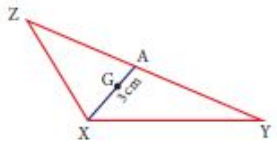
Answer : (3, - 4) lies in the IV quadrant
(5, 7) lies in the I quadrant
(2,0) lies on the X axis
(- 3, - 5) lies in the III quadrant
(4, - 3) lies in the IV quadrant
(- 7,2) lies in the II quadrant
(- 8, 0) lies on the X axis
(0, 10) lies on the Y axis
(- 9, 50) lies in the II quadrant

22) Find the distance between the helicopter and the ship.



Answer : From the figure
$d^2 = 80^2 + 150^2$
$= 6400 + 22500$
$d^2 = 28900$
$d = 170$
The distance between the helicopter and the ship is 170 m.

23) In the given figure, A is the midpoint of YZ and G is the centroid of the triangle XYZ. If the length of GA is 3 cm, find XA.



Answer : Since G is the centroid of the triangle XYZ
So,XG : GA = 2 : 1
$\frac{XG}{GA} = \frac{2}{1}$
$\frac{XG}{3} = \frac{2}{1}(\text{ given } GA = 3)$
XG = 6
XA = XG + GA
= 6 + 3 = 9cm

24) Write in scientific notation:
(i) 1642.398 (ii) 0.0123

Answer : (i) Scientific notation, 1.083 × 1012 cubic km.
(ii) Scientific notation 1.6×10^{-24} kg.

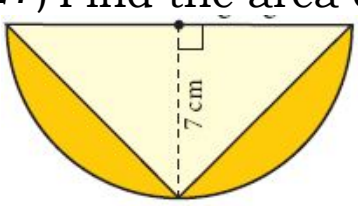
25) State Pythagoras theorem.

Answer : 535.71 cm^2

26) Find the length of the arc whose central angle is 45^0 and radius is 16 cm.

Answer : Length of arc = $\frac{\theta^o}{360^o} \times 2\pi r$ units
Given central angle $\theta = 60^0$
Radius of the sector r = 42 cm
$l = \frac{60^o}{360^o} \times 2 \times \frac{22}{7} \times 42$ cm = 44 cm
∴ Length of the arc = 44 cm

27) Find the area of the shaded part in the following figures. (π = 3.14)



Answer : From the figure, radius = 7 cm
diameter = 14 cm
Area of the shaded part = Area of the semicircle - Area of the triangle
$= \frac{1}{2}\pi r^2 - \frac{1}{2}bh$
$= \frac{1}{2}3.14 \times 7 \times 7 - \frac{1}{2} \times 14 \times 7$
= 76.93 - 49 = 27.93 cm^2

28) Find the area of a sector whose length of the arc is 48 m and radius is 10 m.

Answer : Length of the arc of the sector l = 50 mm
Radius r = 14mm
Area of the sector = $\frac{lr}{2}$ sq. units
= $\frac{50 \times 14}{2}$ mm^2 = 50 x 7 mm^2 = 350 mm^2
Area of the sector = 350mm^2

29) Expand (2n − 1)(2n + 3)

Answer : $(x + a)(x + b) = x^2(a + b)x + ab$
$(2n + (-1)(2n + 3) = (2n)^2 + (-1 + 3)2n + (-1)(3)$
$= 2^2n^2 + 2(2n) - 3 = 4n^2 + 4n - 3$

30) Factorise: $c^2 - 4c - 12$

Answer :

Product	Sum
-4	-12
-6 + 2	(-6) x 2

$\therefore c^2 - 4c - 12 = c^2 + 2c - 6c - 12$
$= c(c - 6) + 2(c - 6)$
$= (c + 2)(c - 6)$

31) Find the compound interest on Rs. 3200 at 2.5% p.a for 2 years, compounded annually.

Answer : P = Rs. 3200, r = 2.5% n = 2years

$$\text{C.I} = P\left(1 + \frac{r}{100}\right)^n - P$$
$$= 3200\left(1 + \frac{2.5}{100}\right)^2 - 3200$$
$$= 3200\left(\frac{102.5}{100}\right)^2 - 3200$$
$$= 32 \times \frac{1025}{100} \times \frac{1025}{100} - 3200$$
$$= 32 \times \frac{41}{4} \times \frac{41}{4} - 3200$$
$$= 2 \times 41 \times 41 - 3200$$
$= 3362 - 3200$
$= 162$

32) A and B together can do a piece of work in 16 days. A alone can do it 48 days. How long will B take to complete the work?

Answer : (A + C)'s 1 day work = $\frac{1}{6}$

A's 1 day work = $\frac{1}{12}$

C's 1 day work = $\frac{1}{6} - \frac{1}{12} = \frac{2-1}{12} = \frac{1}{12}$

(B + C)'s 1 day work = $\frac{1}{3}$

B's Iday work = $\frac{1}{3} - \frac{1}{12} = \frac{4-1}{12} = \frac{3}{12} = \frac{1}{4}$

B alone can complete the work in 4 hours.

33) A is thrice as fast as B. If B can do a piece of work in 24 days, then find the number of days they will take to complete the work together

Answer : A is thrice as fast as B.

B takes 24 days to finish the work

$\therefore$ A takes $\frac{1}{3} \times 24 = 8$ days to finish the work.

A's 1 day's work $= \frac{1}{8}$

B's 1 day's work $= \frac{1}{24}$

$\therefore$ (A + B) 's 1 day's work $= \frac{1}{8} + \frac{1}{24}$

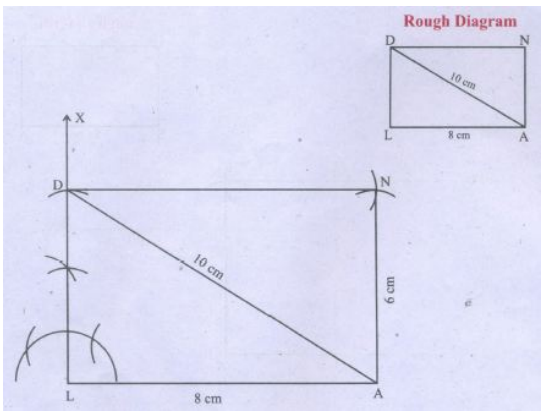
$= \frac{3+1}{24}$

$= \frac{4}{24} = \frac{1}{6}$

Both A and B will take 6 days to complete the work together

34) Check whether the given sides are sides of a right angled triangle using Pythagoras theorem. 12, 13, 15

Answer :



STEPS:

(i) Draw a line segment LA = 8 cm.

(ii) At L, Construct LD $\perp$ LA

(iii) With A as centre, draw an arc of radius 10 cm and let it cut LX at D..

(iv) With A as centre and 6 cm as radius draw an arc. Also with D as centre 8 cm as radius draw another arc let them cut at N.

(v) Join DN and AN.

(vi) LAND is the required rectangle

Calculation of area

Area of rectangle HAND = I x b sq units.

= 8 x 6 = 48 cm^2.

IV. SOLVE ANY 8 OF THE FOLLOWING: 2 x 3 = 6

35) Find the square root by prime factorisation method

(i) 1156

(ii) 4761

(iii) 9025

Answer :

2	1156
2	578
17	289
17	17
	1

$\sqrt{1156} = 2 \times 2 \times 17 \times 17$

$= 2^2 \text{ x } 17^2$

$= (2 \times 17)^2$

$\sqrt{1156} = \sqrt{(2 \times 17)^2}$

$= 2 \times 17$

$= 34$

$\sqrt{1156} = 34$

(ii) 4761

3	4761
3	1587
23	529
23	23
	1

$\sqrt{4761} = 3 \times 3 \times 23 \times 23$

$= 3^2 \text{ x } 23^2$

$\sqrt{4761} = \sqrt{(3 \times 23)^2}$

$= 3 \times 23$

$= 69$

$\sqrt{4761} = 69$

(iii) 9025

5	9025
5	1805
19	361
19	19
	1

$\sqrt{9025} = 5 \times 5 \times 19 \times 19$

$= 5^2 \times 19^2$

$= (5 \times 19)^2$

$\sqrt{9025} = \sqrt{(5 \times 19)^2}$

$= 5 \times 19$

$= 95$

$\sqrt{9025} = 95$

V. GEOMETRY 7 x 5 = 35

36) Verify the associative property for addition and multiplication of the rational numbers $\frac{-7}{9}, \frac{5}{6}, \frac{-4}{3}$

Answer : Let a = $\frac{-10}{11}, b = \frac{5}{6}$ and c = $\frac{-4}{3}$ be the given rational numbers

$(a+b)+c = \left(\frac{-10}{11} + \frac{5}{6}\right) + \left(\frac{-4}{3}\right) = \left(\frac{(-10\times6)+(5\times11)}{66}\right) + \left(\frac{-4}{3}\right)$

$= \frac{-66+55}{66} + \left(\frac{-4}{3}\right)$

$= \left(\frac{-5}{66}\right) + \left(\frac{-4}{3}\right) = \frac{-5+(-4\times22)}{66}$

$= \frac{-5+(-88)}{66} = \frac{-93}{66}$

$(a+b)+c = \frac{-31}{22}$ .....(1)

Also $a+(b+c) = \frac{-10}{11} + \left(\frac{5}{6} + \left(\frac{-4}{3}\right)\right) = \frac{-10}{11} + \left(\frac{5+(-4\times2)}{6}\right)$

$= \frac{-10}{11} + \left(\frac{5+(-8)}{6}\right) = \frac{-10}{11} + \left(\frac{-3}{6}\right)$

$= \frac{(-10\times6)+(-3)\times-11}{66} = \frac{-60+(-33)}{66} = \frac{-93}{66}$

$a+(b+c) = \frac{-31}{22}$ .....(2)

From (1)and (2), (a + b) + c = a + (b + c) is true for rational numbers.

Now (a x b) x c= $\left(\frac{-10}{11}\times\frac{5}{6}\right)\times\frac{-4}{3} = \frac{-50}{66}\times\left(\frac{-4}{3}\right) = \frac{-50\times\left(-4^{2}\right)}{\cancel{66}^{33}\times3}$

(a x b) x c = $\frac{100}{99}$ .....(1)

$a\times(b\times c) = \frac{-10}{11}\times\left(\frac{5}{6}\times\left(\frac{-4}{3}\right)\right) = \frac{-10}{11}\times\left(\frac{-20}{18}\right)$

$= \frac{-10}{11}\times\left(\frac{-10}{9}\right)$

$a\times(b\times c) = \frac{100}{99}$ .....(2)

From (1) and (2) a x (b x c) = (a x b) x c is true for rational numbers.

Thus associative property is true for addition and multiplication of rational numbers.

37) Find the perimeter and area of the given Figure. $\left(\pi = \frac{22}{7}\right)$

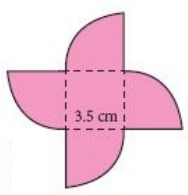


Fig. 2.27

Answer : Radius of a circular quadrant, r = 3.5 cm and side of a square, a = 3.5 cm.
The given figure is formed by the joining of 4 quadrants of a circle with each side of a square. The boundary of the given figure consists of 4 arcs and 4 radii.
(i) Perimeter of the given combined shape
= 4 x length of the arcs of the quadrant of a circle + 4 x radius

$= \left(4\times\frac{1}{4}\times2\pi r\right) + 4r$

$= \left(4\times\frac{1}{4}\times2\times3.5\right) + (1\times3.5)$

= 22 + 14 = 36 cm (approximately)

(ii) Area of the given combined shape
= area of the square + 4 x area of the quadrants of the circle

$a^2 = \left(4\times\frac{1}{4}\times\pi r^2\right)$

$= (3.5\times3.5) + \left(\frac{22}{7}\times3.5\times3.5\right)$

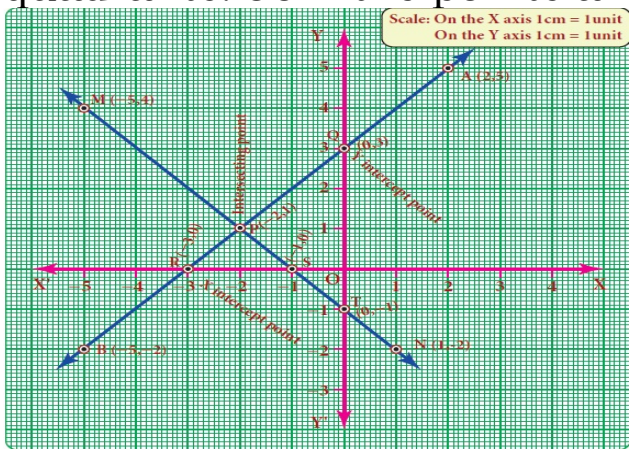
A = 12.25 + 38.5 = 50.75 cm^2 (approximately)

38) Factorise: $4x^2y + 8xy$

Answer : We have,$4x^2$ y + 8xy
This can be written as = (2 x 2 X x X x y)+ (2 X 2 X x X y)
Taking out the common factor 2,2,x,y,we get
= 2 x 2 X x X y(x + 2)
= 4xy (x + 2)
= 4xy (x + 2)

39) Draw straight lines by joining the points A(2, 5) B(−5,−2) M(−5, 4) N(1,−2) also find the point of intersection

Answer : Plot the first pair of points A and B in I and III quadrants. Join the points and extend it to get AB straight line. Plot the second pair of points M and N in II and IV quadrants. Join the points and extend it to get MN straight line.



Now, both lines are intersect at P(−2,1)

(i) The line AB intersect the coordinate axis, ie) x-axis at R(−3,0) and y-axis at Q(0,3)

(ii) The line MN intersect the coordinate axis, ie) x-axis at S(−1,0) and y-axis at T(0,−1)

40) Draw the graph of x = 5

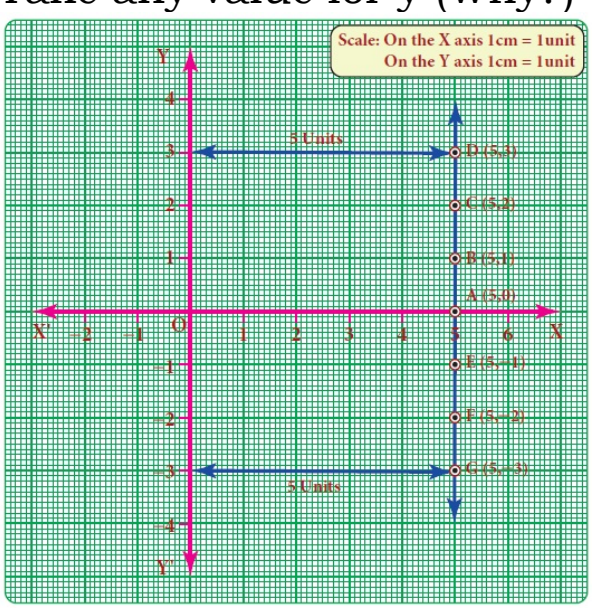
Answer : x = 5 means that x-coordinate is always 5 for whatever value of y-coordinate. So we may

give any value for y-coordinate and this is tabulated as follows

x	5	5	5	5	5
y	-2	-1	0	1	2

x = 5 is given (fixed)

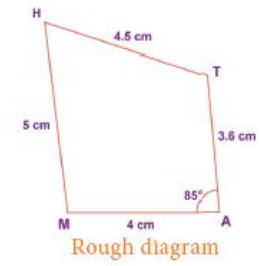
Take any value for y (Why?)



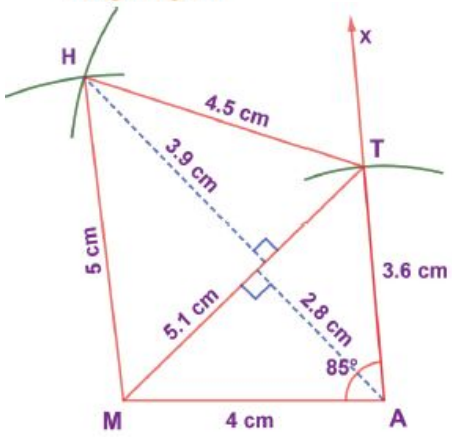
The points are (5,−2) (5,−2) (5,0) (5,2) (5,3). Plot the points in the graph and join them.We get a straight line parallel to Y axis at a distance of 5 units from the Y axis.

41) Construct a quadrilateral MATH with MA = 4 cm, AT = 3.6 cm, TH = 4.5 cm, MH = 5 cm and ∠A = 85°. Also find its area.

Answer : Given:
MA = 4 cm, AT = 3.6 cm,
TH = 4.5 cm, MH = 5 cm and ∠A = 85°



Rough diagram



Steps:
1. Draw a line segment MA = 4 cm.
2. Make ∠A = 85°.
3. With A as centre, draw an arc of radius 3.6 cm. Let it cut the ray AX at T.
4. With M and T as centres, draw arcs of radii 5 cm and 4.5 cm respectively and let them cut at H.
5. Join MH and TH.
6. MATH is the required quadrilateral.

Calculation of Area:

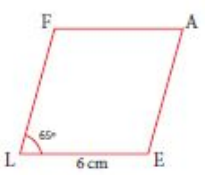
Area of the quadrilateral MATH = $\frac{1}{2}$ × d × (h_1+ h_2) sq.units

= $\frac{1}{2}$ x 5.1 x (3.9 + 2.8)

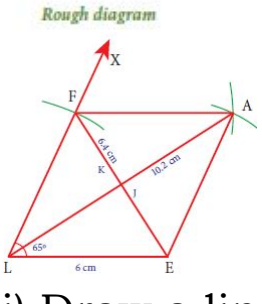
= 2.55 x 6.7 = 17.09 cm^2

42) Construct a rhombus LEAF with LE = 6 cm and ∠L = 65°. Also find its area

Answer : Given: KE = 6 cm and ∠L = 65°



Rough diagram



(i) Draw a line segment LE = 6 cm.
(ii) At L on LE, make ∠ELX = 65°
(iii) With L as centre draw an arc of radius 6 cm. Let it cut LX at F.
(iv) With E and F as centres, draw arcs of radius 6 cm each and let them cut at A.
(v) Join EA and AF.
(vi) LEAF is the required rhombus

Calculation of area:

Area of rhombus LEAF = $\frac{1}{2} \times d_1 \times d_2 sq.units$

= $\frac{1}{2} \times 6.4 \times 10.2 = 32.64\ sq.cm$

43) What is the square root of cube root of 46656?

Answer :

2	46656
2	23328
2	11664
2	5832
2	2916
2	1458
3	729
3	243
3	81
3	27
3	9
3	3
	1

$\sqrt[3]{46656} = \sqrt[3]{2^6 \times 3^6} = \left(2^6 \times 3^6\right)^{1/3}$

$= 2^2 \times 3^2$

Square root of $2^2 \times 3^2$ is $\sqrt{2^2 \times 3^2}$

$= \left(2^2 \times 3^2\right)^{1/6}$

$= 2 \times 3 = 6$

The square root of cube root of 46656 is 6.