Bihar STET Maths Questions with solution

Q1. What is the smallest number that must be added to 1780 to make it a perfect square?
(a) 39
(b) 49
(c) 59
(d) 69

Q2. If $(x - 3)$ is a factor of $(x^2 + 4px - 11p)$, then what is the value of p ?
(a) – 9
(b) – 3
(c) – 1
(d) 1

Q3. The least number of four digits which is a perfect square is :
(a) 1204
(b) 1024
(c) 1402
(d) 1420

Q4. Consider the following statements :
1. Every integer is a rational number.
2. Every rational number is a real number.
Which of the above statements is/are correct?
(a) 1 only
(b) 2 only
(c) Both 1 and 2
(d) Neither 1 nor 2

Q5. The sum of the squares of two numbers is 97 and the square of their difference is 25. The product of the two numbers is :
(a) 45
(b) 36
(c) 54
(d) 63

Q6. The value of $5\frac{1}{6}+\left[3\frac{1}{6}+\left\{17\times\left(4\frac{4}{5}\div 2\frac{2}{50}\right)\right\}\right]$ is equal to:
(a) 48.33
(b) 30
(c) 45.50
(d) 54

Q7. In ΔABC, AB=9cm, BC=12cm and AC=15cm. What is the value of sinA+cosC+tanC?
(a) 131/60
(b) 61/60
(c) 11/60
(d) 141/60

Q8. In a triangle PQR, Point S lies on PQ and point T and U lie on QR such that SU is parallel to PR and ST is parallel to PU. If QT = 4cm, UR = 3cm, then find the length (in cm) of TU.
(a) 3cm
(b) 2cm
(c) 5cm
(d) 7cm

Q9. Rajesh and Radhika can do a work in 20 days and 25 days respectively. They started doing the work together but after 6 days Radhika had to leave. Then Rajesh working with a new partner Ritika and both completed the remaining work in 4 days. If Ritika works alone then in how many days, she can do 50% of the same work?
(a) 5 days
(b) 6.65days
(c) 7.69 days
(d) 9 days

Q10. If one of the angles of the triangle is 78^0, then the angle between the bisector of the other two interior angle is:
(a) 130^0
(b) 145^0
(c) 120^0
(d) 129^0

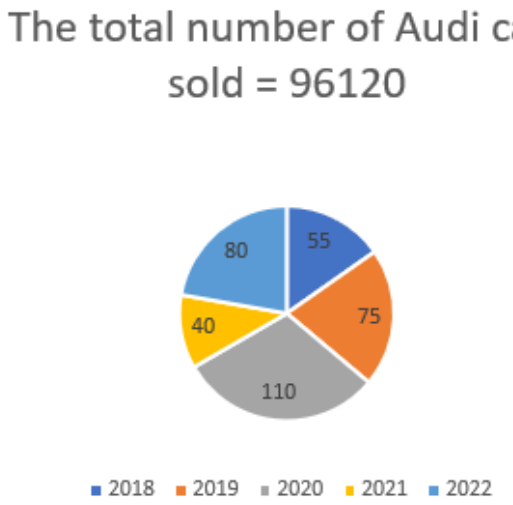
Q11. A rhombus of side 34cm has one angle 60^0. What is the length of the larger diagonal?
(a) $34\sqrt{3}$ cm
(b) $26\sqrt{3}$ cm
(c) 28 cm
(d) 34 cm

Q12. If the $\sqrt{x} + \frac{1}{\sqrt{x}} = \sqrt{5}$, *the the value of* $x^6 + \frac{1}{x^6}$ *will be:*
(a) 526
(b)253
(c) 322
(d)309

Q13. A set of Samsung phone is sold for Rs 1764 after giving two equal successive discounts on the marked price of Rs 3136. What was the percentage discount offered?
(a) 26%
(b) 30.25%
(c) 15.75%
(d) 25%

Q14. Sushil and Sangeeta have decided to invest in two different schemes each Rs 16000. Sangeeta will earn compound interest 15% per annum, compounded annually. Whereas Sushil will earn 18% simple interest per annum. Who will receive more interest after the 2 years and by how much?
(a) Sushil, Rs 600
(b) Sushil, Rs 650
(c) Sangeeta, Rs 759
(d) Sangeeta, Rs 850

Q15. Study the given pie chart and answer the question that follows.
The pie chart shows the distribution (degree-wise) of number Audi cars sold by a shopkeeper during the five years.



How many Audi cars are sold during the year of 2020?
(a) 28,500
(b) 24,565
(c) 22,299
(d) 29,370

Q16. In a ΔPQR, right angle at Q, T is a point on PR such that QT is an angle bisector of Q. If PT = 9cm and TR = 12cm then find the perimeter of triangle PRQ.
(a) 50.4cm
(b) 61cm
(c) 23cm
(d) 45cm

Q17. In the month of March 2021, the average daily income of Ghanshyam was Rs 616. The Average income of first and last 17 days was Rs 700 and Rs 580 respectively. What would be the average income for the 15th, 16th and 17th March?
(a) Rs. 658
(b) Rs. 879
(c) Rs. 888
(d) Rs. 690

Q18. The distance between Delhi to Jaipur is 375km. A person starts running at a uniform speed of 80km/h from Delhi to Jaipur, at the same time another person also starts running from Jaipur to Delhi. Both the person will meet each other after two and half hours later, then what would be the speed of the latter person in km/h?
(a) 66km/hr.
(b) 56km/hr.
(c) 70km/hr.
(d) 49km/hr.

Q19. If Two chords PQ and RS of a circle intersect at O. If SO = 8cm, RO = 9cm and PQ = 17cm, then what is the length (in cm) of the smaller side in PQ?
(a) 6cm
(b) 7.5cm
(c) 9cm
(d) 8cm

Q20. Vijay is four times efficient than Ajay. If Vijay takes 36 days less than the Ajay to complete a work. In how many days the work gets completed if Vijay and Ajay work together?

(a) $11\frac{3}{5}$ days

(b) $9\frac{3}{5}$ days

(c) $9\frac{3}{7}$ days

(d) $11\frac{2}{5}$ days

Q21. A circle touches all the four sides of a quadrilateral PQRS whose sides are PQ = 12.6cm, QR = 16cm and RS = 6.4cm. The length of side SP, in cm, is:

(a) 3cm

(b) 4cm

(c) 3.5cm

(d) 5cm

Q22. $2\tan\theta = 4\sin\theta, 0^0 < \theta < 90^0$, then find the value of $2\sin^2 2\theta + 3\cos^2 3\theta$?

(a) 5

(b) 6

(c) 3.5

(d) 4.5

Q23. If $x - \frac{1}{x} = 2$, then what is the value of $\frac{x^8+\frac{1}{x^8}+x^4+\frac{1}{x^4}}{x^2+\frac{1}{x^2}}$?

(a) 199

(b)195

(c) 198

(d) 187

Q24. In ΔABC, ∠B= 90° and D is the midponit of BC. if $AB=3\sqrt{15}cm$, and AC=15cm, then the lenght of AD is:

(a) √156.5 cm

(b) √157.5 cm

(c) 13cm

(d) 12cm

Q25. A man, a woman and a child working together can do a piece of work in 99 days. The ratio of their efficiencies is 3 : 2 : 1. In how many days 4men, 5women and 6 children working together can do the same work?

(a) $20\frac{3}{14}$ days

(b) $21\frac{3}{14}$ days

(c) $16\frac{2}{7}$ days

(d) 15days

Q26. The area of a circular park is 7546 m^2. There is 3.5m wide path around the park. What is the area (in m^2) of the path?

(a) 1212.5 m^2

(b) 1123 m^2

(c) 1116.5 m^2

(d) 1233.5m^2

Q27. In ΔABC right angle at B, $\sin A = \frac{15}{25}$, *find the value of* $\frac{tanA}{sinC+cosC}$ =?

(a) 14/21

(b) 7/21

(c) 3/28

(d) 15/28

Q28. ΔPQR ~ΔXYZ and the area of ΔPQR is 18. 49m^2 and the area of ΔXYZ is 73.96m^2. if QR = 6m, then the lenght of YZ is:

(a) 10m

(b) 11m

(c) 12m

(d) 8m

Q29. Equation $x^2 - 17x + 66 = 0$ has

(a) Rational roots

(b) Real roots

(c) No real roots

(d) None of these

Q30. If $x^4 + \frac{1}{x^4} = 839,\ x > 1$, what is the value of $\left(x - \frac{1}{x}\right)$?

(a) 3

(b) 3√3

(c) 2√3

(d) 3.5

Solutions

S1. Ans.(d)

Sol.

$42^2 = 1764$
$43^2 = 1849$
Number to be added= $1849 - 1780$
$= 69$

S2. Ans.(a)

Sol.

$x - 3 = 0$
$\Rightarrow x = 3$
$f(x) = x^2 + 4px - 11p$
$f(3) = 3^2 + 4 \times 3 \times p - 11 \times p$
$\Rightarrow 9 + 12p - 11p = 0$
$\Rightarrow p = -9$

S3. Ans.(b)

Sol.

$31^2 = 961$
$32^2 = 1024$

S4. Ans.(c)

Sol.

Statement 1:

Since, every integer p can be written in the form $\frac{p}{1}$.

Therefore, Every integer is a rational number.

Statement 2:

All rational numbers are free from imaginary part.

Therefore, Every rational number is a real number.

S5. Ans.(b)

Sol.

$x^2 + y^2 = 97$
$(x - y)^2 = 25$
$\Rightarrow x^2 + y^2 - 2xy = 25$
$\Rightarrow 97 - 2xy = 25$
$\Rightarrow 2xy = 72$
$\Rightarrow xy = 36$

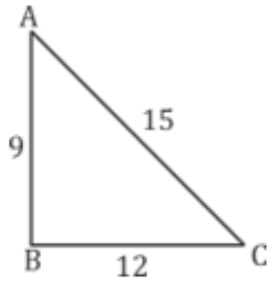
S6. Ans.(a)

Sol.

$\Rightarrow 5\frac{1}{6} + \left[3\frac{1}{6} + \left\{17 \times \left(4\frac{4}{5} \div 2\frac{2}{50}\right)\right\}\right]$
$\Rightarrow \frac{31}{6} + \left[\frac{19}{6} + \left\{17 \times \left(\frac{24}{5} \times \frac{50}{102}\right)\right\}\right]$
$\Rightarrow \frac{31}{6} + \left[\frac{19}{6} + \left\{17 \times \frac{40}{17}\right\}\right]$
$\Rightarrow \frac{31}{6} + \left[\frac{19}{6} + 40\right]$
$\Rightarrow \frac{31}{6} + \left[\frac{259}{6}\right]$
$= \frac{31 + 259}{6} = \frac{290}{6} = 48.33$

S7. Ans.(d)

Sol.



9, 12 and 15 makes triplet so the give value shows it is a right angle triangle.

Now,

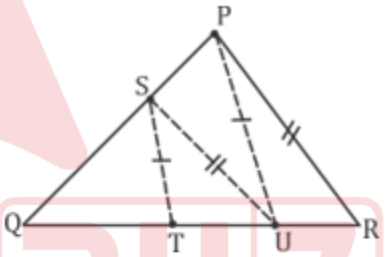
sin A + cosC + tan C

$\Rightarrow \frac{12}{15} + \frac{12}{15} + \frac{9}{12} = \frac{141}{60}$

S8. Ans.(b)

Sol.

Let TU be x cm



In Δ PQR SU || PR

$\frac{QS}{PQ} = \frac{QU}{RQ}$ --------- (i)

In Δ OPU

$\frac{QS}{PQ} = \frac{QT}{QU}$ --------- (ii)

On solving equation (i) and (ii)

$\frac{QU}{RQ} = \frac{QT}{QU}$

$(QU)^2 = QT \times RQ$
$(4 + x)^2 = 28 + 4x$
$16 + x^2 + 8x = 28 + 4x$
$x^2 + 4x - 12 = 0$
$x^2 + 6x - 2x - 12 = 0$
$x(x + 6) - 2(x + 6) = 0$
$(x - 2)(x + 6) = 0$
$x = 2, -6$
$x \neq -6$, So $x = 2$

Then,

Length of TU = 2cm.

S9. Ans.(c)

Sol.

Let the total work = LCM of (20 and 25) = 100 units

Rajesh efficiency = 5 unit/day

Radhika efficiency = 4 units/day

Rajesh and Radhika work together 6 days, then completed work = 9 × 6 = 54 units.

If remaining work completed in 4 days, then

efficiency of Rajesh and Ritika together $= \frac{46}{4}$

= 11.5 units/day

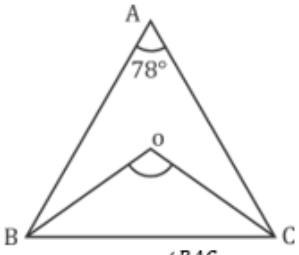
Ritika efficiency alone = 11.5 – 5

= 6.5 unit/day

50% work completed by Ritika in days = $\frac{50\ units}{6.5}$ =

S10. Ans.(d)

Sol.



$\angle BOC = 90 + \frac{\angle BAC}{2}$

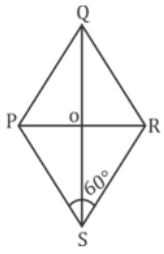
$= 90° + \frac{78°}{2}$

$= 90° + 39°$

$= 129°$

S11. Ans.(a)

Sol.



Diagonals of Rhombus are angle bisectors $\frac{\angle PSR}{2} = \angle PSO = \angle OSR = \frac{60°}{2} = 30°$

In right angled triangle ROS

$\Rightarrow \angle ORS = 60°$

$\Rightarrow \cos 30° = \frac{OS}{SR}$

$\frac{\sqrt{3}}{2} = \frac{OS}{34}$

$OS = 17\sqrt{3}$

$QS = 34\sqrt{3}$

And another diagonal is 34,

So larger diagonal = $34\sqrt{3}$

S12. Ans.(c)

Sol.

$\sqrt{x} + \frac{1}{\sqrt{x}} = \sqrt{5}$

Squaring both sides

$x + \frac{1}{x} = 5 - 2 = 3$

Now, Cube both sides

$x^3 + \frac{1}{x^3} = 27 - 3 \times 3 = 18$

Again, Square both sides

$x^6 + \frac{1}{x^6} = 322$

S13. Ans.(d)

Sol.

Let the discount percent be x

Selling price = Marked price × $\frac{(100-D)}{100}$

$1764 = 3136 \times \left(\frac{100-D\%}{100}\right)^2$

$\frac{1764}{3136} = \left(\frac{100-D\%}{100}\right)^2$

$\frac{441}{784} = \left(\frac{100-D}{100}\right)^2$

$\frac{21}{28} = \frac{100-D}{100}$

$\frac{3}{4} = \frac{100-D}{100}$

D = 25%

S14. Ans.(a)

Sol.

Interest received by Sangeeta

$CI = P\left(1 + \frac{r}{100}\right)^t - P$

$= 16000\left(1 + \frac{15}{100}\right)^2 - 16000$

$= 16000\left(\frac{23}{20}\right)^2 - 16000$

$= 16000\left(\frac{529-400}{400}\right) = 5160$

Interest received by Sushil = SI = $\frac{P \times t \times r}{100}$

$= \frac{16000 \times 2 \times 18}{100} = 5760$

More Interest Received by Sushil = 5760 – 5160 = 600

S15. Ans.(d)

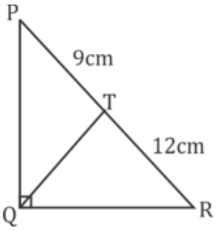
Sol.

No. of cars sold during the year of 2020 = $96120 \times \frac{110}{360}$

= 29,370

S16. Ans.(a)

Sol.



By Angle Bisector theorem

$\frac{PT}{TR} = \frac{PQ}{QR} = \frac{9}{12} = \frac{3}{4}$

$\frac{PQ}{QR} = \frac{3}{4}$

From the triplet of the right angle triangle

PQ = 3x QR = 4x and PR = 5x

PR = PT + TR = 9 + 12 = 21

5x → 21

x → 4.2 cm

The Perimeter of triangle = PQ + QR + PR

= 3x + 4x + 5x = 12x

12 × 4.2 = 50.4 cm

S17. Ans.(c)

Sol.

Total income Ghanshyam in the month of 2021 = 616 × 31 = 19096

Total income of first and last 17 days income = 700 × 17 + 580 × 17

= 11900 + 9,860

= 21,760

The average income of the 15th, 16th and 17th March = $\frac{21760-19096}{3}$

= $\frac{2664}{3}$

= 888

S18. Ans.(c)

Sol.

Distance covered by 1st person in $2\frac{1}{2}$ hr. = 80 × $\frac{5}{2}$ = 200 km.

Remaining Distance = 375 – 200

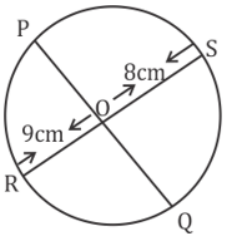
= 175 km

The 175 km will be covered by 2nd person in $2\frac{1}{2}$ hr. then, speed

= $\frac{175}{5}$ × 2 = 35 × 2 = 70 km/h.

S19. Ans.(d)

Sol.



Let the Length of smaller among PO and OQ be = x.

then other would be = 17 - x

Now,

RO × OS = PO × OQ

9 × 8 = x × (17 - x)

72 = x × (17 - x)

= 8 (17 - 8)

72 = 8 × 9

The small length Among PO and OQ is 8 cm.

S20. Ans.(b)

Sol.

Efficiency = $\frac{1}{time}$ [When work is same]

	Vijay		Ajay
Ratio of efficiency =	4	:	1
Ratio of Time	= 1	:	4

Difference of time = (4 - 1) = 3 unit

3 unit → 36

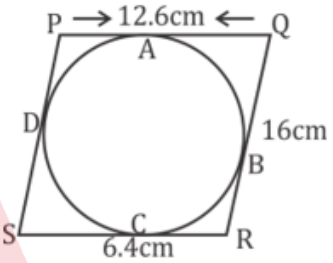
1 unit → 12

Total work = 12 × 4 = 48

Required Time = $\frac{48}{5} = 9\frac{3}{5}$ days

S21. Ans.(a)

Sol.



PA = PD ..... (i)

AQ = QB ..... (ii)

RC = BR ..... (iii)

CS = DS ..... (iv)

Adding all equations

PA + AQ + RC + CS = PD + QB + BR + DS

PQ + SR = QR + PS

12.6 + 6.4 = 16 + PS

PS = 3 cm.

S22. Ans.(d)

Sol.

2 tan θ = 4 sin θ

$\frac{\sin\theta}{\cos\theta}$ = 2 sin θ

cos θ = $\frac{1}{2}$, θ = 60°

Now,

$\Rightarrow 2\sin^2 2\theta + 3\cos^2 3\theta$

$\Rightarrow 2 . \sin^2 120° + 3\cos^2 180°$

$\Rightarrow 2 . \sin^2 (90 + 30°) + 3\cos^2 (90° + 90°)$

$\Rightarrow 2 . \cos^2 30 + 3\sin^2 90°$

$\Rightarrow 2 \times \left(\frac{\sqrt{3}}{2}\right)^2 + 3 \times (1)^2$

$\Rightarrow 2 \times \frac{3}{4} + 3$

$\Rightarrow 4.5$

S23. Ans.(c)

Sol.

$x - \frac{1}{x} = 2$

By squaring both side

$x^2 + \frac{1}{x^2} = 6$

Again, Squaring both side.

$x^4 + \frac{1}{x^4} = 34$

Again, Squaring both side.

$x^8 + \frac{1}{x^8} = 1154$

Now,

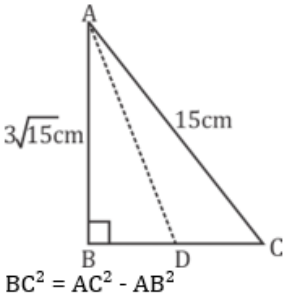
$\Rightarrow \frac{x^8 + \frac{1}{x^8} + x^4 + \frac{1}{x^4}}{x^2 + \frac{1}{x^2}}$

$\Rightarrow \frac{1154 + 34}{6}$

$\Rightarrow 198$

S24. Ans.(b)

Sol.



$BC^2 = AC^2 - AB^2$

$= (15)^2 - (3\sqrt{15})^2$

$= 225 - 135$

$BC = 3\sqrt{10}$

Now,

$BD = \frac{3\sqrt{10}}{2}$ (Because of mid-point D On BC)

$AD^2 = AB^2 + BD^2$

$= (3\sqrt{15})^2 + \left(\frac{3\sqrt{10}}{2}\right)^2$

$= 135 + \frac{90}{4}$

$= 135 + 22.5$

$= 157.5$ cm

$AD = \sqrt{157.5}$ cm

S25. Ans.(b)

Sol.

Total work = (m + w + c) × 99

= (3 + 2 + 1) × 99

= 594 units

Work done is one day

= (4m + 5w + 6c)

= (4 × 3 + 5 × 2 + 6 × 1)

= 28 unit

Number of days = $\frac{594}{28} = 21\frac{3}{14}$ days

S26. Ans.(c)

Sol.

Area of circle park = πr^2

$7546\ m^2 = \frac{22}{7} \times r^2$

r = 49 m

The wide path = 3.5

Now,

Radius of the circular park = (49 + 3.5) = 52.5

Now,

Area of path = $\pi R^2 - \pi r^2$

$= \frac{22}{7}(52.5^2 - 49^2)$

$\Rightarrow \frac{22}{7}(2756.25 - 2401)$

$= \frac{22}{7} \times 355.25 = 1116.5$

S27. Ans.(d)

Sol.

$\text{Sin}A = \frac{15}{25} = \frac{Perpendicular}{hypotenous}, base = \sqrt{25^2 - 15^2} = 20$

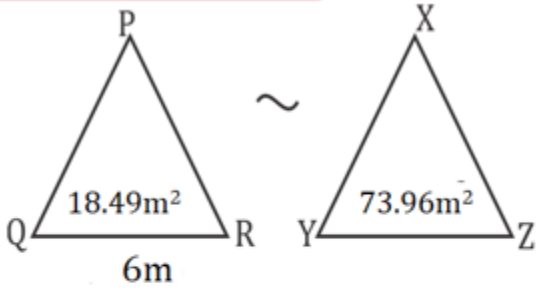
Now,

$\frac{tanA}{sinC + cosC} = \frac{\frac{15}{20}}{\frac{20}{25} + \frac{15}{25}}$

$= \frac{\frac{15}{20}}{\frac{20+15}{25}} = \frac{15}{20} \times \frac{25}{35} = \frac{15}{28}$

S28. Ans.(c)

Sol.



$\frac{Area\ of\ \Delta PQR}{Area\ of\ \Delta xyz} = \left(\frac{QR}{yz}\right)^2$

$\frac{18.49}{73.96} = \left(\frac{6}{yz}\right)^2$

$\frac{4.3}{8.6} = \frac{6}{yz}$

YZ = 12m

S29. Ans.(b)

Sol. Given

$x^2 - 17x + 66 = 0$

Since $b^2 - 4ac = (-17)^2 - 4 \times 1 \times 66 = 289 - 264 = 25 > 0$

Hence equation have real roots.

S30. Ans.(b)

Sol.

$x^4 + \frac{1}{x^4} = 839$

Adding 2 both sides

$x^2 + \frac{1}{x^2} = 29$

Now,

Subtracting 2 both sides

$\left(x - \frac{1}{x}\right)^2 = 27$

$x - \frac{1}{x} = 3\sqrt{3}$