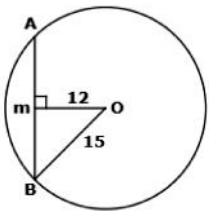
MATH PRACTICE SET – 5 BY ALOK SIR

1.



Let AB is the chord and 0 is the centre of circle.
OM = 12 cm and OB = 15 cm (Given)
In ΔBOM, $BM^2 = OB^2 - OM^2 = 15^2 - 12^2 = 81$
=> BM = 9 cm

2. **From option (1)**
$x^4 - 2x^3 + 3x^2 - 4x - 4$ is divisible by x – 2 if it gives 0 for x = 2
$x^4 - 2x^3 + 3x^2 - 4x - 4 = (2)^4 - 2(2)^3 + 3(2)^2 - 4(2) - 4$
= 16 – 16 +12 – 8 – 4 = 0
So, option (1) is the answer.

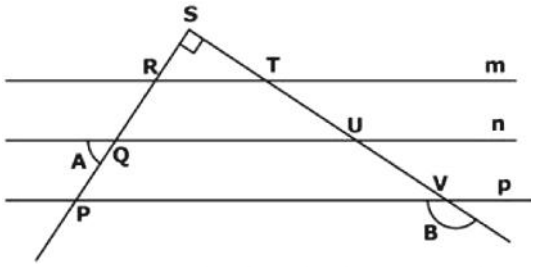
3. **Total SP = 5400 × 1.15 = Rs 6210**
SP of 1/3rd of rice = 1800 × 0.95 = Rs 1710
CP of remaining rice = 5400 × 2/3 = Rs 3600
SP of remaining rice = 6210 – 1710 = Rs 4500
Profit % = (4500 – 3600)73600 × 100 = 25%

4. **Net price after two successive discounts = 20000 × 0.85 × 0.80 = 13600**
Net cost price = 13600 × 1.08 = 14688
Selling price = 14688 × 1.12 = 16450.56

5. **In the following figure m||n||p. Find the value of B in terms of A.**

A. 90 + A B. 90 – A C. 90 + 2A D. 180 – A

5.



In triangle SQU, $\angle Q = A, \angle S = 90$. Hence $\angle SUQ = 90 - A$
$\angle QUV = 180 - \angle SUQ = 90 + A$ (Linear pair)
Now, n||p. So $\angle B = 90 + A$

6. **Let the number to be added be a**
Hence, (2 + a)/(18 + a) = (3/11)
Or, 22 + 11 a = 54 + 3a
Or, 8a = 32
Or, a = 4

7. **$3\cos^2 A + 7\sin^2 A = 4$**
Or, $3\cos^2 A + 3\sin^2 A + 4\sin^2 A = 4$;
Or, $3(\cos^2 A + \sin^2 A) + 4\sin^2 A = 4$
Or, $3(1) + 4\sin^2 A = 4$
Or, $4\sin^2 A = 4 - 3$
Or, $\sin^2 A = 1/4$
Or, $\sin A = \sqrt{1/4} = 1/2$
So, A = 30° Thus, cot 30°= $\sqrt{3}$.

8. **Side of square = $\sqrt{121}$ = 11 cm**
Length of wire = circumference of circle.
$44 = 2\pi r$ or r = (44 × 7)/(2 × 22) = 7 cm
Hence, area of circle = $pr^2 = 22/7 \times 7 \times 7 = 154\ cm^2$

9. **Given, a – b + 4 = 0**
=> b = a + 4
(x – a)(x – b) = 1
=> (x – a) (x – a – 4) = 1
=> x – a – 4 = 1/(x – a)
=> (x – a) – 4 = 1/(x – a)
=> (x – a) – 1/(x – a) = 4
Squaring both sides:
=> $(x - a)^2 + 1/(x - a)^2 - 2 = 16$
=> $(x - a)^2 + 1/(x - a)^2 = 18$

10. **$\cos\theta/(1 - \sin\theta) - \sin\theta/\cos\theta$**
$= \cos^2\theta - \sin\theta(1 - \sin\theta)/((1 - \sin\theta)\cos\theta)$
$= (\cos^2\theta + \sin^2\theta - \sin\theta)/((1 - \sin\theta)\cos\theta)$
$= 1/\cos\theta = 1/A$

11. **Since (44 – 38) = 6, (55 – 49) = 6, (64 – 58) = 6**
The required number = LCM of (44, 55, 64) – 6 = 3520 – 6 = 3514

12. **$1 + \cot^2 36 - \text{cosec}^2 54 + \sec^2 36 - \sec^2 54$**
$\text{cosec}^2 36 - \text{cosec}^2 54 + \text{cosec}^2 54 - \text{cosec}^2 36 = 0$

13. **Option 2**
Gas bill paid by Mohit for the given period = 3287
Gas bill paid by Mohan for the given period = 3695
Required percentage = [(3695 – 3287)/3695]*100 = 11.04%

14. **Option 4**
Amount paid by Manoj in the month of March on utility bills = 1771
Amount paid by Manoj in the month of May on utility bills = 1824
Required difference = 53

15. **Option 3**
February = [(495 – 487)/495]*100 = 1.61%
March = [(502 – 487)/487]*100 = 3.08%
April = [(502 – 489)/502]*100 = 2.58%
May = [(489 – 485)/489]*100 = 0.82%

16. **Option 3**
Telephone bill paid by all the three person in January = 1568
Telephone bill paid by all the three person February = 1610
Telephone bill paid by all the three person March = 1566
Telephone bill paid by all the three person April = 1796
Telephone bill paid by all the three person May = 1881

17. **Work done by A in a day = 1/10**

Work done by B in a day = 1 /10 × 4/10 = 1 /25

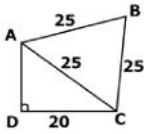
Work done by C in a day = 1/10 × 5/10 = 1/20

Work done by B and C in 5 days = 5 × (1/25 +1 /20) = 9/20

Remaining work = 11/20

Time taken by A to finish the remaining work = 11 /20 × 10 = 11 /2 days

Total time = 5+11/2 = 21/2 = 10.5 days

18. 

Area of the ABCD = Area of ΔACD + Area of ΔABC

By applying Pythagoras theorem, AD = $\sqrt{(625-400)}$ = 15 cm

Area of ΔACD = 1/2 × 15 × 20 = 150 sq. cm

Area of ΔABC = $\sqrt{3}/4 \times 25^2$ = 0.433 × 625 = 270.625 sq.cm

Therefore, area of quadrilateral ABCD = 420.63 sq cm

19. **a + 1/a + 2 = 0**

=> $a^2 + 1 + 2a = 0$

=> $(a + 1)^2 = 0$

=> a= – 1

Now $a^{36} - 1/a^{49}$

= 1 – (– 1) = 2

20. **∠A = 39°, ∠B=75°.**

∠C = 66°

∠E = 24°

EF = EG, hence $2x + 24° = 180°$

=> $x = 78°$

21. **Total age of five member of a family = 24*5 = 120**

Total age of the four members at the time of the birth of the youngest member = 120 – 8*5 = 80yr

Hence, required average age = 80/4 = 20yrs

22. **Let sum = P and original rate = R.**

Then, [(P × (R + 2) × 3)/100] – [(P × R × 3)/100] = 420

=> 3PR + 6P – 3PR = 42000

=> 6P = 42000

=> P = 7000

23. **Lead in 4 kg = 2 kg**

Tin in 4 kg = 2 kg

Lead in 5 kg = 5/6 kg

Tin in 5 kg = 25/6 kg

Lead in mixture = 2 + 5/6 = 17/6

Tin in mixture = 2 + 25/6 = 37/6

Required ratio = 17 : 37

24. **Speed of boat = 10 km/h**

Let the speed of flow of river = x km/h

Upstream speed = (10 – x) km/h

Downstream speed = (10 + x) km/h

So, 91/(10 – x) + 91/(10+x) = 20

$91 = 100 - x^2$

$x^2 = 9$

x = 3 km/hr

25. **45% of (x – y) = 30% of (x + y)**

=> 45/100 (x – y)= 30/100(x+y)

=> 3(x – y) = 2(x + y)

=> 3x – 3y = 2x + 2y

=> x = 5y

Let A% of x = y

Required percentage = (y/x × 100)% = (y/5y × 100)% = 20 %