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Class: X
Subject: Math
Topic: ASK1510UT05
No. of Questions: 30

Q1. If the expression $(x^2 - x + c)$ when divided by $(x + 1)$ leaves remainder 3, then the value of c is –
(a) 0
(b) 1
(c) 2
(d) 3

Sol. (b)
$f(x) = x^2 - x + c$, divisor = $(x + 1)$
Now, $f(-1) = 3\ implies\ (-1)^2 - (-1) + c = 3$
$\therefore c = 1$

Q2. If $(x + 1)\ and\ (x - 2)$ are the factors of the expression $(2x^3 - px^2 + x + q)$, then the values of p and q are given by –
(a) $p = 5, q = 2$
(b) $p = 7, q = 8$
(c) $p = 7, q = 10$
(d) $p = 15, q = 12$

Sol. (c)
$f(x) = 2x^3 - px^2 + x + q$
$f(-1) = -2 - p - 1 + q = 0$
Or $p - q = 3$ .....(1)
$f(2) = 16 - 4p + 2 + q = 0$
Or $4p - q = +18$ .....(2)
Solving (1) and (2) we have $p = 7, q = 10$

Q3. The value of k for which the polynomial $2x^3 - x^2 + 3x - k$ is divisible by (x – 1) is –
(a) 1
(b) 2
(c) 3
(d) 4

Sol. (d)
$f(x) = 2x^3 - x^2 + 3x - k$
Divisor $(x - 1)$
$\therefore f(1) = 0 \Longrightarrow 2 - 1 + 3 - k = 0\ or\ k = 4$

Q4. If $\left(\frac{-3}{4}\right) = 0$; then for $f(x)$, which of the following is a factor?
(a) $3x - 4$
(b) $4x + 3$
(c) $-3x + 4$
(d) $4x - 3$

Sol. (b)

Q5. The quotient when $3x^4 - 5x^3 + 10x^2 + 11x - 61$ divided by $(x - 3)$ is
(a) $3x^3 + 4x^2 + 22x + 77$
(b) $77x^3 + 22x^2 + 4x + 3$
(c) $3x^2 + 4x^3 + 22x + 77$
(d) None of these

Sol. (a)
$f(x) = 3x^4 - 5x^4 + 10x^2 + 11x - 61.$
It is divided by $(x - 3)$

3	3	−5	10	11	−61
		9	12	66	231
	3	4	22	77	170

Q6. If $a^3 - 3a^2b + 3ab^2 - b^3$ is divided by $(a - b)$, then the remainder is
(a) $a^2 - ab + b^2$
(b) $a^2 + ab + b^2$
(c) 1
(d) 0

Sol. (d)

Q7. The remainder when $f(x) = 3x^4 + 2x^3 - \frac{x^2}{3} - \frac{x}{9} + \frac{2}{27}$ is
Divided by $g(x) = x + \frac{2}{3}$ is:
(a) – 1
(b) 1
(c) 0
(d) –2

Sol. (c)

Q8. $(3p-5)x^2+(2p-9)x+6$ then the value of p is
(a) 1
(b) 2
(c) 3
(d) 4
Sol. (d)

Q9. A, ß, γ are the zeroes of the cubic polynomial x^3-2x^2+qx-6 is 4, then a is equal to –
(a) 3/2
(b) –3/2
(c) 2/3
(d) –2/3
Sol. (b)

Q10. X's salary is half that of Y's. If X got a 50% rise in his salary and Y got 25% rise in his salry, then the percentage increases in combined salaries of both is –
(a) 30
(b) $33\frac{1}{3}$
(c) $37\frac{1}{2}$
(d) 75
Sol. (b)
96 % of C. P. = Rs 240
$\therefore 110\%$ of C. P. $Rs\frac{240}{960}\times 1100 = Rs.275$

Q11. The points $(7,2)\ and\ (-1,0)$ lie on a line –
(a) $7y=3x-7$
(b) $4y=x+1$
(c) $y=7x+7$
(d) $x=4y+1$
Sol. (b)
The point satisfy the line $4y=x+1$

Q12. A motor boat takes 2 hours to travel a distance 9 km. down the current and it takes 6 hours to travel the same distance against the current. The speed of the boat in still water and that of the current (in km/hour) respectively are –
(a) 3, 1, 5
(b) 3, 2
(c) 3.5, 2.5
(d) 3, 1
Sol. (a)
Downrate $= 9\ \div 24.5\ km/hr$

Uprate $= 9 \div 6 = 1.5\ km/hr$
Speed of the boat $= (4.5 + 1.5) \div 2 = 3\ km/hr$
Speed of the current $= (4.5 - 1.5) \div = 1.5\ km/hr$

Q13. The 2 digit number which becomes (5/6)th of itself when its digits are reversed. The difference in the digit of the number being 1 is
(a) 45
(b) 54
(c) 36
(d) None of these

Sol. (b)
If the two digits are x and y, then the number is 10x+y.
Now $\frac{5}{6}(10x + y) = 10y + x$. Solving
We get $44x + 55y \implies \frac{x}{y} = \frac{5}{4}$
Also $x - y = 1$. Solving them, we get x = 5 and y = 4.
Therefore, number is 54.

Q14. x & y are 2 different digits. If the sum of the two digit numbers formed by using both digits is a perfect square, then value of $x + y$ is
(a) 10
(b) 11
(c) 12
(d) 13

Sol. (b)
The numbers that can be formed are xy and yx. Hence
$(10x + y) + (10y + x)$ $11(x + y)$. If this is a perfect square then $x + y = 11$.

Q15. If $3x + 4y : x + 2y = 9$, then $3x + 5y : 3x - y$ is equal to –
(a) 4 : 1
(b) 1 : 4
(c) 7 : 1
(d) 1 : 7

Sol. (c)
$\frac{3x+4y}{x+2y} = \frac{9}{4}$
Hence, $12x + 6y = 9x + 18y$ or $3x = 2y$
$\therefore x = \frac{2}{3}y$. Substitute $x = \frac{2}{3}y$ in the required expression.

Q16. a, b, c, (a > c) are the three digits, from left to right of a three digit number. If the number with these digits reversed is subtracted from the original number, the resulting number has the digit 4 in its unit's place. The other two digits from left to right are –

(a) 5 and 4
(b) 5 and 9
(c) 4 and 5
(d) 9 and 5

Sol. (b)

$a > c$ hence $10 + c - a = 4$

Middle digit is reduced by 1, hence $10 + (b - 1) - b = 9$

Hundred's digits now give $(a - 1 - c)$

From $10 + c - a = 4, a - c - 6$

$\therefore a - c - 1 = 5$

Q17. A man can row a boat in still water at the rate of 6 km per hour. If the stream flows at the rate of 2 km/hour, he takes half the time going downstream than going upstream the same distance. His average speed for upstream and down stream trip is –

(a) 6 km/hour
(b) 16/3 km/hour
(c) Insufficient data to arrive at the answer
(d) None of the above

Sol. (b)

Upstream speed = 4 km/hr and time = x hrs.

Downstream $= 8\ km/hr$ and time taken $= x2/hrs.$

Hence, average speed $= \frac{4x+8\times x/2}{x+x/2} = \frac{16}{3}\ km/hr.$

Q18. A boat travels with a speed of 15 km/h in still water. In a river flowing at 5 km/hr, the boat travels some distance downstream and then returns. The ration of average speed to the speed in still water is –

(a) 8 : 3
(b) 3 : 8
(c) 8 : 9
(d) 9 : 8

Sol. (c)

Let distance $= d,$

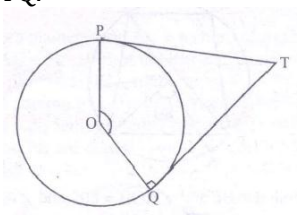
Time taken upstream $= \frac{d}{15-5} = \frac{d}{10}$

Time taken downstream $= \frac{d}{15+5} = \frac{d}{20}$

$= \frac{2d}{\frac{d}{10}+\frac{d}{20}} = \frac{2x\times 20}{3d} = \frac{40}{3}\ km/hr$

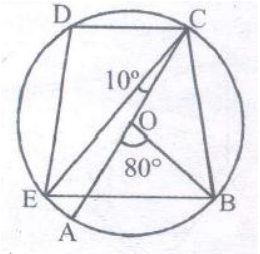
Ratio $= \frac{40}{3} : 15 = 40 : 45 = 8 : 9$

Q19. In figure, if TP and TQ are two tangents to a circle with centre O so that $\angle POQ = 110°$, then find $\angle PTQ$.



Sol. $\angle PTQ = 70°$

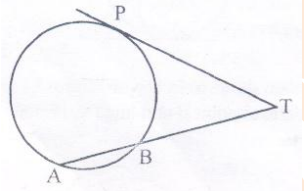
Q20. If the radius of the circle is 2 cm, what is the measure of AC? The diagram shows a circle where AC is the diameter and O is the centre.



Sol. $\angle AOB + \angle BOC = 180° \Longrightarrow \angle BOC = 180° - 80° = 100°$

$\angle BEC = \frac{1}{2}\angle BOC = 50°$

Q21. In the figure given below, PT is a tangent to the circle. Find PT if AT = 16 cm and AB = 12 cm.



Sol. Given AT = 16 cm and AB = 12 cm.

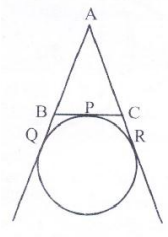
We know that

$$PT^2 = TA \times TB$$

$\Longrightarrow PT^2 = 16 \times 4 \Longrightarrow PT = \sqrt{64} = 8\ cm.$

Hence, PT is of 8 cm.

Q22. In the adjoining figure, a circle touches the side BC of ΔABC at P and touches AB and AC produced at Q and R respectively. If AQ = 5 cm, find the perimeter of ΔABC.



Sol. 10 cm

AQ $= \frac{1}{2}$ (perimeter of ΔABC)

$\Longrightarrow$ perimeter of ΔBAC = 2AQ$= (2 \times 5)cm = 10\ cm.$]

Q23. Two chords AB and CD of a circle intersect at E such that AE = 2.4 cm., BE = 3.2 cm and CE = 16 cm. The length of of DE is –

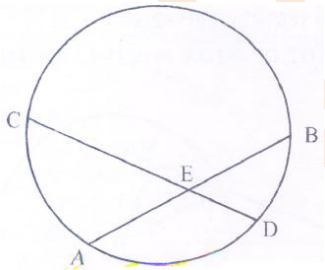
(a) 1.6 cm.
(b) 3.2 cm.
(c) 4.8 cm.
(d) 6.4 cm.

Sol. (c)

Apply the rule, $AE \times EB = CE \times ED$

$\Longrightarrow 2.4 \times 3.2 = 1.6 \times ED$

$\therefore$ ED $= 4.8$ cm.



Q24. ACB is a tangent to a circle at C. CD and CE are chords such that $\angle$ACE $>$ $\angle$ACD. If $\angle$ACD $= \angle$BCE $= 50°$, then –

(a) CE = CD
(b) ED is not parallel to AB
(c) ED passes through the centre of the circle
(d) ΔCDE is a right-angled triangle

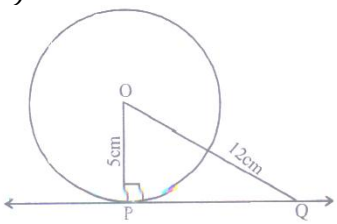
Sol. (a)

Q25. The locus of the middle points of equal chords of a circle with centre at O is –
(a) A straight line
(b) A circle with centre different from O
(c) A circle with centre at O
(d) A circle intersecting the given circle at the end of the chord.

Sol. (d)
The mid point of the equal chords are equidistant from the centre of the circle. The locus of such points is a circle with same centre O.

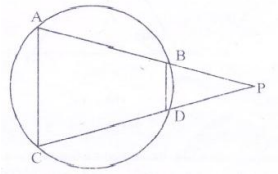
Q26. A tangent PQ at a point P of a circle of radius 5 cm meets a line through the centre O at a point Q so that OQ = 12 cm. Length of P is
(a) 12 cm
(b) 13 cm
(c) 8.5 cm
(d) $\sqrt{119}\ cm$

Sol. (d)



Hint. OP⊥ PQ because tangent is perpendicular to radius through that point. In ΔOPQ, ∠OPQ = 90°. By Pythagoras theorem,
$PQ^2 = OQ^2 - OP^2 = 12^2 - 5^2 = 119$.

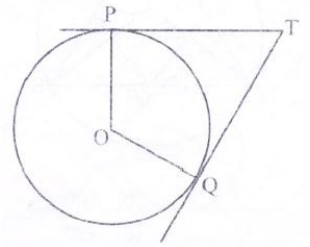
Q27. In the figure below (not to scale), AB = CD and $\overline{AB}$ and $\overline{CD}$ are produced to meet at the point p.



If ∠BAC = 70°, then ∠P is
(a) 30°
(b) 40°
(c) 45°
(d) 50°

Sol. (b)
Exterior angle of a cyclic quadrilateral is equal to its interior opposite angle.
∠BAC = ∠DCA and proceed.

Q28. In the adjoining figure, TP and TQ are the two tangents to a circle with centre O. If $\angle POQ = 110°$, then $\angle PTQ$ is



(a) 60°
(b) 70°
(c) 80°
(d) 90°

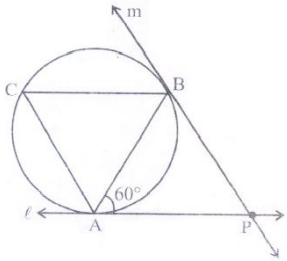
Sol. (b)

Hint. $OP \perp PT, OQ \perp QT$.

In quad. OPTQ, $\angle POQ + \angle OPT + \angle PTQ + \angle OQT = 360°$

$\Rightarrow 110° + 90° + \angle PTQ + 90° = 360° \Rightarrow \angle PTQ = 70°$

Q29. In the diagram below, if ℓ and are two tangents and AB is a chord making an angle of 60° with the tangent ℓ, then the angle between ℓ and m is



(a) 45°
(b) 30°
(c) 60°
(d) 90°

Sol. (c)

Tangents drawn to a circle from an external point are equal.

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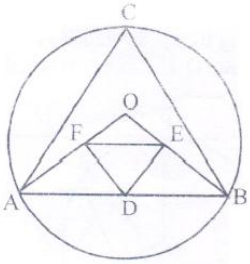
Q30. In the diagram, O is the centre of the circle and D, E and F are mid points of AB, BO and OA respectively. If $\angle DEF = 30°$, then $\angle ACB$ is



(a) 30°
(b) 60°
(c) 90°
(d) 120°

Sol. (b)

(i) ADEF is a parallelogram.

(ii) $\angle FAD = 30°$ and
$\angle OAD = \angle OBA$
(angles opposite to equal sides)