**JNV**

**PERIODIC WRITTEN TEST :2 SESSION 2019-20**

**MATHEMATICS**

**Class : X**

|  |  |
| --- | --- |
| Roll No:X | Time: |
| Date : | MM :49 |

|  |  |  |
| --- | --- | --- |
| 1 | Is x = –2 a solution of the equation x2 – 2x + 8 = 0? | 1 |
|  |  |  |
|  | ANS:     x2 – 2x + 8 = 0 When x = – 2, LHS = (–2)2 – 2(–2) + 8 = 4 + 4 + 8 = 16 ≠ 0 C:\fake\image1.png  x = –2 is not a solution of the given equation. |  |
|  |  |  |
| 2 | Find the 10th term of the AP 2, 7, 12, ... | 1 |
|  |  |  |
|  | ANS:     Here a = 2; d = 7 – 2 = 5. So, a10 = a + 9d = 2 + 9 × 5 = 47 |  |
|  |  |  |
| 3 | The nth term of an AP is 7 – 4n. Find its common difference. | 1 |
|  |  |  |
|  | ANS:     an = 7 – 4n C:\fake\image2.pnga1 = 7 – 4 × 1 = 3 a2 = 7 – 4 × 2 = –1 and a3 = 7 – 4 × 3 = –5 C:\fake\image3.png  Common difference = a2 – a1 = –1 – 3 = –4. |  |
|  |  |  |
| 4 | In ΔABC, right angled at B, AB = 5 cm and sin C = C:\fake\image4.png. Determine the length of side AC.  C:\fake\image5.png | 1 |
|  |  |  |
|  | ANS:     sin C = C:\fake\image6.pngC:\fake\image7.png  C:\fake\image8.png= C:\fake\image9.png C:\fake\image10.png  AC = 10 cm |  |
|  |  |  |
| 5 | If sin θ = cos θ, find the value of θ. | 1 |
|  |  |  |
|  | ANS:     sin θ = cos θ C:\fake\image11.png  C:\fake\image12.png= 1  C:\fake\image13.png  tan θ = 1 (Also tan 45° = 1) C:\fake\image14.png  tan θ = tan 45°  C:\fake\image15.png  θ = 45° |  |
|  |  |  |
| 6 | Find the length of the tangent drawn from a point whose distance from the centre of a circle is 25 cm. Given that radius of the circle is 7 cm. | 1 |
|  |  |  |
|  | ANS:   |  |  | | --- | --- | | Let O is the centre of the circle and P is a point such that OP = 25 cm and PQ is the tangent to the circle. OQ = radius = 7 cm In C:\fake\image16.pngOQP, we have C:\fake\image17.pngQ = 90° OP2 = OQ2 + PQ2 C:\fake\image18.png  (25)2 = 72 + PQ2  C:\fake\image19.png  PQ2 = 625 – 49 = 576 C:\fake\image20.png  PQ = 24 cm Hence, the length of the tangent = 24 cm | C:\fake\image21.png | |  |
|  |  |  |
| 7 | In the given figure, find C:\fake\image22.pngQSR. C:\fake\image23.png | 1 |
|  |  |  |
|  | ANS:     Given: PQ and PR are tangents to a circle with centre O and C:\fake\image24.pngQPR = 50°. To find: C:\fake\image25.pngQSR Sol. C:\fake\image26.pngQOR + C:\fake\image27.pngQPR = 180° C:\fake\image28.png  C:\fake\image29.pngQOR + 50° = 180° C:\fake\image30.png  C:\fake\image31.pngQOR = 130° C:\fake\image32.png  C:\fake\image33.pngQSR = C:\fake\image34.pngC:\fake\image35.pngQOR [Degree measure theorem] C:\fake\image36.png  C:\fake\image37.pngQSR = C:\fake\image38.png× 130° = 65° |  |
|  |  |  |

|  |  |  |
| --- | --- | --- |
| 8 | Find the value of p so that the quadratic equation px(x – 3) + 9 = 0 has two equal roots. | 2 |
|  |  |  |
|  | ANS:     px(x – 3) + 9 = 0 C:\fake\image39.pngpx2 – 3px + 9 = 0. Here, a = p, b = –3p, c = 9 For equal roots D = 0 C:\fake\image40.pngD = b2 – 4ac C:\fake\image41.png(– 3p)2 – 4 × p × 9 = 0 C:\fake\image42.png9p2 – 36p = 0 C:\fake\image43.png9p(p – 4) = 0 C:\fake\image44.png9p = 0 or p – 4 = 0 C:\fake\image45.pngp = 0 or p = 4 but p ≠ 0 [C:\fake\image46.png In quadratic equation a ≠ 0] |  |
|  |  |  |
| 9 | Find 10th term from end of the AP 4, 9, 14, .... , 254. | 2 |
|  |  |  |
|  | ANS:     10th term from end of AP 4, 9, 14, ..., 254 is 10th term of the AP 254, 249, 244, ... 14, 9, 4 Here a = 254 d = 249 – 254 = –5 C:\fake\image47.png  a10 = a + 9d C:\fake\image48.pnga10 = 254 + 9 × (–5) = 209 |  |
|  |  |  |
| 10 | Find the sum: –5 + (–8) + (–11) + ... + (–230). | 2 |
|  |  |  |
|  | ANS:     Here a = – 5, d = (– 8) – (– 5) = – 3 an = l = –230 Now an = a + (n – 1)d C:\fake\image49.png  a + (n – 1)d = – 230 C:\fake\image50.png– 5 + (n – 1)(– 3) = – 230 C:\fake\image51.png(n – 1)(–3) = –225 C:\fake\image52.png(n –1) = C:\fake\image53.png= 75 C:\fake\image54.png  n = 76 Sn = C:\fake\image55.png(a + l) = C:\fake\image56.png(– 5 – 230) = 38(– 235) = – 8930 |  |
|  |  |  |
| 11 | If 3 tan θ = 4, find the value of C:\fake\image57.png. | 2 |
|  |  |  |
|  | ANS:     3 tan θ = 4  C:\fake\image58.png  tan θ = C:\fake\image59.png Now given expression is C:\fake\image60.png Dividing numerator and denominator by cos θ, we get C:\fake\image61.png= C:\fake\image62.png Putting tan θ = C:\fake\image63.pngwe get, C:\fake\image64.png |  |
|  |  |  |
| 12 | In figure, O is the centre of the circle, PQ is a tangent to the circle at A. If C:\fake\image65.pngPAB = 58°, find C:\fake\image66.pngABQ and C:\fake\image67.pngAQB.  C:\fake\image68.png | 2 |
|  |  |  |
|  | ANS:   |  |  | | --- | --- | | Join OA. OA ⊥ PAQ. C:\fake\image69.png  C:\fake\image70.pngOAP = 90° C:\fake\image71.pngC:\fake\image72.png1 + 58° = 90° C:\fake\image73.pngC:\fake\image74.png1 = 90° – 58° = 32° In ∆BOA, OA = OB. Now C:\fake\image75.png1 = C:\fake\image76.pngABQ C:\fake\image77.pngC:\fake\image78.pngABQ = 32° C:\fake\image79.pngPAB + C:\fake\image80.pngBAQ = 180° C:\fake\image81.pngC:\fake\image82.pngBAQ = 180° – 58° = 122° In ∆ABQ, C:\fake\image83.pngABQ + C:\fake\image84.pngBAQ + C:\fake\image85.pngAQB = 180° C:\fake\image86.pngC:\fake\image87.pngAQB = 180° – 122° – 32° = 26° | C:\fake\image88.png | |  |
|  |  |  |
| 13 | Construct a triangle of sides 5 cm, 6 cm and 7 cm and then a triangle similar to it whose sides are C:\fake\image89.pngof the corresponding sides of it. | 3 |
|  |  |  |
|  | ANS:   |  |  | | --- | --- | | Steps of Construction: (i) Draw a triangle ABC with BC = 6 cm, AC = 7 cm and AB = 5 cm. (ii) Draw a ray BX so that it makes an acute angle with BC on the opposite side of the vertex A. Locate 4 points on BX as B1, B2, B3 and B4 such that BB1 = B1B2 = B2B3 = B3B4. (iii) Join B4C and draw a line through B3 parallel to B4C to intersect BC at C′. (iv) Draw a line C′A′ parallel to CA as in given figure. (v) C:\fake\image90.pngA′BC′ is the required triangle. C:\fake\image91.png |  | |  |
|  |  |  |

|  |  |  |
| --- | --- | --- |
| 14 | Using quadratic formula solve the following quadratic equation: 13x2 + 9 (x + 1) – (2x + 3) (x + 2) = 6 | 3 |
|  |  |  |
|  | ANS:     13x2 + 9 (x + 1) – (2x + 3) (x + 2) = 6 C:\fake\image92.png13x2 + 9x + 9 – (2x2 + 4x + 3x + 6) = 6 C:\fake\image93.png11x2 + 2x – 3 = 0 Here a = 11, b = 2, c = –3 D = (2)2 – 4 × 11 × (–3) = 4 + 132 = 136 > 0 C:\fake\image94.pngx = C:\fake\image95.png |  |
|  |  |  |
| 15 | How many terms of the AP 3, 5, 7, ... must be taken so that the sum is 120? | 3 |
|  |  |  |
|  | ANS:     Let the sum of n terms be 120. Given AP is 3, 5, 7, ... Here a = 3, d = 2 and Sn = 120. Using Sn = C:\fake\image96.png{2a + (n – 1) d}, we get 120 = C:\fake\image97.png{6 + (n – 1) 2} C:\fake\image98.png120 = n(n + 2) C:\fake\image99.pngn2 + 2n – 120 = 0 C:\fake\image100.png(n + 12)(n – 10) = 0 C:\fake\image101.pngEither n + 12 = 0 or n – 10 = 0 C:\fake\image102.pngn = –12 (rejected) C:\fake\image103.png  n = 10 C:\fake\image104.png  10 terms must be taken to make sum 120. |  |
|  |  |  |
| 16 | If sec θ = C:\fake\image105.pngverify that C:\fake\image106.png | 3 |
|  |  |  |
|  | ANS:   |  |  | | --- | --- | | If ABC is a triangle, right-angled at B and C:\fake\image107.pngA = θ, then sec θ = C:\fake\image108.png C:\fake\image109.png  AC = 5k and AB = 4k Since, AC2 = AB2 + BC2 C:\fake\image110.png  (5k)2 = (4k)2 + BC2 C:\fake\image111.png  BC2 = 25k2 – 16k2 = 9k2  C:\fake\image112.png  BC = C:\fake\image113.png= 3k Now, C:\fake\image114.pngAlso, C:\fake\image115.png  Hence verified. | C:\fake\image116.png | |  |
|  |  |  |
| 17 | Evaluate : C:\fake\image117.png | 3 |
|  |  |  |
|  | ANS:     C:\fake\image118.png C:\fake\image119.png |  |
|  |  |  |
| 18 | In figure, two equal circles, with centres O and O′, touch each other at X. OO′ produced meets the circle with centre O′ at A. AC is tangent to the circle with centre O, at the point C. O′D is perpendicular to AC. Find the value of C:\fake\image120.png.  C:\fake\image121.png | 3 |
|  |  |  |
|  | ANS:   |  |  | | --- | --- | | AC is tangent C:\fake\image122.png  CO C:\fake\image123.pngAC Also O′D C:\fake\image124.pngAC C:\fake\image125.png  O′D || OC Now OX = XO′ = O′A C:\fake\image126.png  AO = 3AO  C:\fake\image127.png  C:\fake\image128.png  ...(i) In C:\fake\image129.pngAO′D, C:\fake\image130.pngAOC C:\fake\image131.pngADO = C:\fake\image132.pngACO [each 90°]; C:\fake\image133.pngA = C:\fake\image134.pngA C:\fake\image135.png  C:\fake\image136.pngAO′D ~ C:\fake\image137.pngAOC C:\fake\image138.png  C:\fake\image139.png C:\fake\image140.png  C:\fake\image141.png  [Using (i)] | C:\fake\image142.png | |  |
|  |  |  |
| 19 | Construct tangents to a circle of radius 3 cm from a point on concentric circle of radius 5 cm and measure its length. | 3 |
|  |  |  |
|  | ANS:   |  |  | | --- | --- | | Steps of Construction: (i) With O as centre a circle of radius 3 cm is drawn. (ii) With same centre O another circle of radius 5 cm is drawn. (iii) A point P is taken on outer circle and OP is joined. (iv) Perpendicular bisector of OP is drawn intersecting OP at Q. (v) With Q as centre and OQ as radius a circle is drawn intersecting the smaller circle at A and B. (vi) PA and PB is joined. (vii) PA and PB are the required tangents. Length of tangent = 4 cm. | C:\fake\image143.png | |  |
|  |  |  |

|  |  |  |
| --- | --- | --- |
| 20 | Solve the following for x : C:\fake\image144.png | 4 |
|  |  |  |
|  | ANS:     C:\fake\image145.png C:\fake\image146.png  C:\fake\image147.png  C:\fake\image148.png  C:\fake\image149.png C:\fake\image150.png  C:\fake\image151.png  C:\fake\image152.png  4x2 + 2bx + 4ax = –2ab C:\fake\image153.png  4x2 + 2bx + 4ax + 2ab = 0 C:\fake\image154.png2x(2x + b) + 2a(2x + b) = 0 C:\fake\image155.png(2x + b) (2x + 2a) = 0 C:\fake\image156.pngx = – C:\fake\image157.pngor x = – a |  |
|  |  |  |
| 21 | If the pth terms of an AP is C:\fake\image158.pngand the qth term is C:\fake\image159.pngshow that the sum of pq terms is C:\fake\image160.png(pq + 1). | 4 |
|  |  |  |
|  | ANS:     Tp = a + (p – 1)d C:\fake\image161.pngC:\fake\image162.png= a + (p – 1)d ...(i) Tq = a + (q – 1)d C:\fake\image163.pngC:\fake\image164.png= a + (q – 1)d ...(ii) Subtracting (ii) from (i), we get C:\fake\image165.png= (p – q)d C:\fake\image166.pngd = C:\fake\image167.png Putting d = C:\fake\image168.pngin (i), we have C:\fake\image169.png= a + C:\fake\image170.pngC:\fake\image171.pnga = C:\fake\image172.png C:\fake\image173.png  Spq = C:\fake\image174.png[2a + (pq – 1)d] or, Spq = C:\fake\image175.png= C:\fake\image176.png(pq + 1) |  |
|  |  |  |
| 22 | In figure, OP is equal to diameter of the circle. Prove that C:\fake\image177.pngAPB is an equilateral triangle. C:\fake\image178.png | 4 |
|  |  |  |
|  | ANS:     C:\fake\image179.png In right C:\fake\image180.pngOAP, sin (C:\fake\image181.pngAPO) = C:\fake\image182.png C:\fake\image183.png  C:\fake\image184.pngAPO = 30° Similarly, C:\fake\image185.pngBPO = 30° C:\fake\image186.pngC:\fake\image187.pngAPO + C:\fake\image188.pngBPO = 30° + 30° = 60° C:\fake\image189.pngC:\fake\image190.pngAPB = 60° Also in C:\fake\image191.pngAPB, AP = BP [Tangents from exterior point A] C:\fake\image192.pngC:\fake\image193.pngBAP = C:\fake\image194.pngABP [Angles opposite to equal sides] and C:\fake\image195.pngBAP + C:\fake\image196.pngABP + C:\fake\image197.pngAPB = 180° C:\fake\image198.png2C:\fake\image199.pngBAP + 60° = 180° C:\fake\image200.png2C:\fake\image201.pngBAP = 120° C:\fake\image202.pngC:\fake\image203.pngBAP = 60° C:\fake\image204.pngEach angle of, C:\fake\image205.pngAPB is 60°. Hence, C:\fake\image206.pngAPB is an equilateral triangle. |  |
|  |  |  |