

ST. ARNOLD'S CENTRAL SCHOOL, PUNE
FINAL EXAMINATION, 2017-18
SUBJECT- MATHEMATICS

STD: IX

M.M:80

General Instructions:

- All questions are compulsory.
- The question paper consists of 30 questions divided into four sections A, B, C and D.
- Section A contains 6 questions of 1 mark each. Section B contains 6 questions of 2 marks each. Section C contains 10 questions of 3 marks each. Section D contains 8 questions of 4 marks each.
- There is no overall choice. However, an internal choice has been provided in four questions of 3 marks each and three questions of 4 marks each. You have to attempt only one of the alternatives in all such questions.
- Use of calculators is not permitted.

SECTION - A

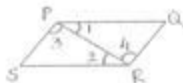
Question numbers 1 to 6 carry 1 mark each.

- AD is the median of $\triangle ABC$. If the area of $\triangle ADC = 15\text{cm}^2$, then find $\text{ar}(\triangle ABC)$. (1)
- Factorise : $20x^2 - 9x + 1$ (1)
- P is a point on the x-axis at a distance of 8 units from the y-axis to its right. Find the co-ordinates of point P. (1)
- Two adjacent angles of a parallelogram are $2x+30^\circ$ and $3x-30^\circ$. Find the value of x. (1)
- The length of a chord in a circle of diameter 10cm is 6cm. Find the distance of the chord from its centre. (1)
- The area of an equilateral triangle is $27\sqrt{3}\text{ cm}^2$. Find its perimeter. (1)

SECTION - B

Question numbers 7 to 12 carry 2 marks each.

- If $\frac{1}{7} = 0.142857$, find the value of $\frac{3}{7} + \frac{5}{7}$. (2)
- Two pens and three pencils together cost Rs. 20. Represent this statement as a linear equation in two variables. Also verify if (4, 2) is a solution of the equation formed. (2)
- In the given figure, it is given that $\angle 1 = \angle 4$ and $\angle 3 = \angle 2$. By which Euclid's axiom, it can be shown that if $\angle 2 = \angle 4$, then $\angle 1 = \angle 3$? (2)



- Construct an angle of measure 30° (using compass). (2)
- The surface area of a sphere is 2464cm^2 . Find the radius of the sphere. (2)

12. If the median of the data 11, 12, 14, 18, $x+2$, $x+4$, 30, 32, 35 and 41 arranged in ascending order is 24, find x . (2)

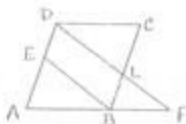
SECTION - C

Question numbers 13 to 22 carry 3 marks each.

13. If $2^x = 3^y = 6^z$, then prove that $\frac{1}{x} + \frac{1}{y} + \frac{1}{z} = 0$. (3)
14. XY is a line parallel to side BC of a triangle ABC. If BE \parallel AC and CF \parallel AB meet XY at E and F respectively, show that $\text{ar}(\text{ABE}) = \text{ar}(\text{ACF})$. (3)

OR

In the given figure, ABCD is a parallelogram and E is the mid-point of AD. A line through D is drawn parallel to EB, which meets AB produced at F and BC at L. Prove that $\text{ar}(\text{DCL}) = \text{ar}(\text{BFL})$.



15. Evaluate $x^4 + \frac{1}{x^4}$, if $x + \frac{1}{x} = 6$. (3)

OR

Simplify: $3\sqrt{45} - \sqrt{125} + \sqrt{200} - \sqrt{50}$

16. What must be added to $x^3 - 3x^2 - 12x + 19$, so that the result is exactly divisible by $x^2 + x - 6$? (3)
17. Factorise: $(2x - 3y)^3 + (3y - 4z)^3 + (4z - 2x)^3$ (3)

OR

Factorise: $x^3 - 3x^2 - 9x - 5$

18. The radii of two circular cylinders are in the ratio 2:3 and their heights are in the ratio 5:4. Calculate the ratio of their volumes. (3)

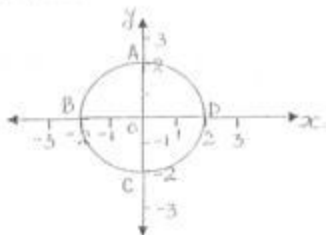
OR

Find the cost of digging a cuboidal pit 8m long, 6m broad and 3m deep at the rate of Rs. 30 per m^3 .

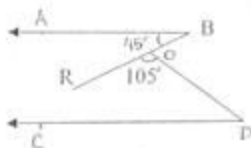
19. ABCD is a trapezium in which $AB \parallel CD$ and $AD = BC$. Show that (3)
- $\angle A = \angle B$
 - $\triangle ABC \cong \triangle BAD$

20. Kamla has a piece of land which is in the shape of a rhombus. She wants her one daughter and one son to work on the land and produce different crops. She divided the land in two equal parts. If the perimeter of the land is 400m and one of the diagonals is 160m, how much area each of them will get for their crops? (3)

21. A circle with centre O and radius r is drawn. Write co-ordinates of points where it meets the axes. Also write the equation of AC and BD. Find its radius also. (3)



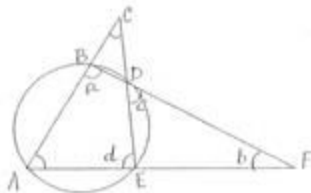
22. In the figure, $AB \parallel CD$. If $\angle ABR = 45^\circ$ and $\angle ROD = 105^\circ$, then find $\angle ODC$. (3)



SECTION - D

Question numbers 23 to 30 carry 4 marks each.

23. The polynomials $p(x) = 4x^3 - 2x^2 + px + 5$ and $q(x) = x^3 + 6x^2 + p$ leave the remainders a and b respectively, when divided by $(x+2)$. Find the value of p if $a + b = 0$. (4)
24. Shade the triangle formed by the graphs of $2x - y = 4$, $x + y = 2$ and the y -axis. Write the co-ordinates of vertices of the triangle. (4)
25. Construct $\triangle HIJ$ in which $IJ = 5.2\text{cm}$, sum of other two sides is 9cm and $\angle I = 60^\circ$. (4)
26. In the given figure, find the values of a , b , c and d . Given $\angle BCD = 43^\circ$ and $\angle BAE = 62^\circ$. (4)



OR

In $\triangle ABC$, if $\angle A = 60^\circ$ and bisectors of $\angle B$ and $\angle C$ meet AC and AB at P and Q respectively and intersect each other at I , prove that $APIQ$ is a cyclic quadrilateral.

27. Show that in a right angled triangle, the hypotenuse is the longest side.
In $\triangle PQR$, $\angle P = 50^\circ$, $\angle Q = 60^\circ$, write the sides of the triangle in ascending order. (4)

OR

ABC and DBC are two isosceles triangle on the same base BC such that A and D lies on the opposite sides of BC. Show that AD is the perpendicular bisector of BC.

28. Find the mean salary of 50 workers of a factory from the following data. (4)

Salary (in Rs.)	2500	3000	4500	5000	6500	7500
Number of workers	10	7	11	12	4	6

OR

The following table gives the distribution of students of two sections according to the marks obtained by them.

Section A		Section B	
Marks	Frequency	Marks	Frequency
0-10	3	0-10	5
10-20	9	10-20	19
20-30	17	20-30	15
30-40	12	30-40	10
40-50	9	40-50	1

Represent the marks of the students of both the sections on the same graph by two frequency polygons. From the two polygons, compare the performance of the two sections:

29. The ages of workers of a factory are as follows: (4)

Age(in years)	10-20	20-30	30-40	40-50	50-60	60 and above
Number of workers	5	40	26	15	8	6

If a worker is selected at random, find the probability that the worker is:

- 30 years or more.
 - below 50 years.
 - having age from 10 to 19 years.
 - more than 40 years but less than 50 years.
30. The Resident Welfare Association helped the Government in organising a camp for people to enrol themselves for aadhar card. They set up their makeshift office in a conical structure having radius 14m and slant height 30m. (4)
- Calculate the area of canvas needed for it.
 - Find the cost of cloth at the rate of Rs. 10 per $5m^2$.
 - Which value is depicted by the RWA?