



**RAMAGYA SCHOOL, NOIDA**  
X/MATHS/2017-18  
OLYMPIAD PRACTICE WORKSHEET

**Section-1 - Logical Reasoning (Application based questions)**

1. In an election between two candidates, 75% of the voters cast their votes, out of which 2% of the voters were declared in-valid. A candidate got 9261 votes which were 75% of the total valid votes. The total number of voters enrolled in that election was:  
(a) 16000      (b) 16400      (c) 16800      (d) 18000
2. A cistern has three pipes A, B and C. Pipes A and B can fill it in 3 and 4 hours, respectively, while pipe C can empty the completely filled cistern in 1 hour. If the pipes are opened in order at 3 pm, 4 pm and 5 pm, respectively, at what time will the cistern be empty?  
(a) 6:15 pm      (b) 7:12 pm      (c) 8:12 pm      (d) 8:35 pm
3. 50 men or 80 women can finish a job in 50 days. A contractor deploys 40 men and 48 women for this work, but after every duration of 10 days, 5 men and 8 women are removed till the work is completed. The work is completed in?  
(a) 45 days      (b) 50 days      (c) 54 days      (d) 62 days
4. Excluding stoppages the speed of the bus is 54 kmph. Including stoppages it is 45 kmph. For how many minutes does the bus stop per hour:  
(a) 25      (b) 15      (c) 20      (d) 10

**Section-2: Mathematical Reasoning**  
**Concept based questions:**

5. In circular measure, the value of the angle  $11^{\circ} 15'$  is  
(a)  $\frac{\pi^c}{16}$       (b)  $\frac{\pi^c}{8}$       (c)  $\frac{\pi^c}{4}$       (d)  $\frac{\pi^c}{12}$
6. If  $\tan \theta = \frac{3}{4}$  and  $\theta$  is acute then the value of  $\operatorname{cosec} \theta$  is  
(a)  $\frac{4}{5}$       (b)  $\frac{5}{3}$       (c)  $\frac{1}{2}$       (d) 2
7. The value of  $\operatorname{cosec}^2 18^{\circ} - \frac{1}{\cot^2 72^{\circ}}$  is  
(a)  $\frac{1}{\sqrt{3}}$       (b)  $\frac{\sqrt{2}}{3}$       (c)  $\frac{1}{2}$       (d) 1
8. If  $x \sin 45^{\circ} = y \operatorname{cosec} 30^{\circ}$ , then  $\frac{x^4}{y^4}$  is  
(a)  $4^3$       (b)  $6^3$       (c)  $2^3$       (d)  $8^3$
9. In  $\triangle ABC$  and  $\triangle DEF$ ,  $AB=DE$  and  $BC=EF$ , then one can infer that  $\triangle ABC \cong \triangle DEF$ , when  
(a)  $\angle BAC = \angle EDF$       (b)  $\angle ACB = \angle EDF$       (c)  $\angle ACB = \angle DFE$       (d)  $\angle ABC = \angle DEF$
10. In  $\triangle PQR$ , S and T are points on sides PR and PQ respectively such that  $\angle PQR = \angle PST$ . If  $PT=5$  cm,  $PS=3$  cm and  $TQ=3$  cm, then the length of SR is  
(a) 5 cm      (b) 6 cm      (c)  $\frac{31}{3}$  cm      (d)  $\frac{41}{3}$  cm

### Value based questions:

11. In  $\triangle ABC$ , D and E are points on AB and AC respectively, such that,  $DE \parallel BC$  and DE divides the  $\triangle ABC$  into two parts of equal areas. Then ratio of AD and BD is

- (a) 1:1            (b)  $1:\sqrt{2} - 1$             (c)  $1:\sqrt{2}$             (d)  $1:\sqrt{2} + 1$

12. If  $\tan \theta = \frac{4}{3}$ , then the value of  $\frac{3 \sin \theta + 2 \cos \theta}{3 \sin \theta - 2 \cos \theta}$  is

- (a) 0.5            (b) -0.5            (c) 3            (d) -3

13. The simplified value of  $(\sec A - \cos A)^2 + (\operatorname{cosec} A - \sin A)^2 - (\cot A - \tan A)^2$  is

- (a) 0            (b) 2            (c) 1            (d)  $\frac{1}{2}$

14. If  $\tan \theta = 1$ , then the value of  $\frac{(8 \sin \theta + 5 \cos \theta)}{(\sin^3 \theta - 2 \cos^3 \theta + 7 \cos \theta)}$  is

- (a) 2            (b) 3            (c)  $\frac{4}{5}$             (d)  $\frac{5}{2}$

15. The perimeter of two similar triangles  $\triangle ABC$  and  $\triangle PQR$  are 36 cm and 24 cm respectively. If  $PQ = 10$  cm, then AB is

- (a) 15 cm            (b) 12 cm            (c) 14 cm            (d) 16 cm

### HOTS:

16. The product  $\cos 1^\circ \cos 2^\circ \cos 3^\circ \cos 4^\circ \dots \dots \dots \cos 100^\circ$  is equal to

- (a) -1            (b) 1            (c) 0            (d)  $\frac{1}{2}$

17. If  $\sin \theta + \operatorname{cosec} \theta = 2$ , then the value of  $(\sin^{100} \theta + \operatorname{cosec}^{100} \theta)$  is

- (a) 100            (b) 1            (c) 2            (d) 3

18. If  $\tan 2\theta \cdot \tan 4\theta = 1$ , then  $\tan 3\theta$  is

- (a) 0            (b) 1            (c)  $\frac{1}{\sqrt{3}}$             (d)  $\sqrt{3}$

19. The medians CD and BE of a triangle ABC intersect each other at O. The ratio of  $\triangle ODE : \triangle ABC$  is equal to:

- (a) 12:1            (b) 4:3            (c) 3:4            (d) 1:12

20. In  $\triangle ABC$ , the straight line parallel to the side BC meets AB and AC at points P and Q respectively. If  $AP = QC$ , the length of AB is 12 units and the length of AQ is 2 units, then the length of CQ is (in units):

- (a) 4            (b) 6            (c) 8            (d) 10