1. Simplify the following:

$$\sqrt[3]{40} - 2\sqrt[3]{135}$$

(a) $-4(\sqrt[3]{5})$

(b) $-5(\sqrt[3]{4})$

(c) $4(\sqrt[3]{5})$

(d) $5(\sqrt[3]{4})$

2. Arrange the following in the ascending order of magnitudes:

$$\sqrt[4]{3},\ \sqrt[6]{10},\ \sqrt[12]{25}$$

(a) $\sqrt[4]{3} > \sqrt[12]{25} > \sqrt[6]{10}$

(b) $\sqrt[4]{3} < \sqrt[12]{25} < \sqrt[6]{10}$

(c) $\sqrt[12]{25} > \sqrt[4]{3} > \sqrt[6]{10}$

(d) $\sqrt[12]{25} < \sqrt[4]{3} < \sqrt[6]{10}$

3. Find the base of a parallelogram if its area is 40 cm^2 and altitude is 15 cm.

(a) 3/5 cm

(b) 3/8 cm

(c) 8/3 cm

(d) 5/3 cm

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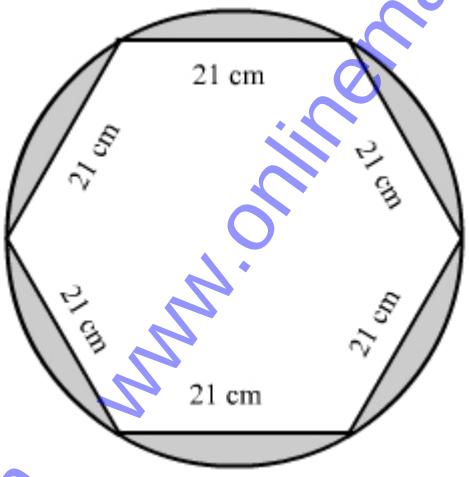
4. Find the area of the shaded region in the following figure:



(a) 340.28 cm^2

(c) 240.28 cm^2

(b) 640.28 cm^2

(d) 540.28 cm^2

5. Perform the calculation and write the answer of the following in scientific notation.

$$(3000000)^3$$

(a) 0.0027×10^{19}

(c) 0.27×10^{19}

(b) 0.027×10^{19}

(d) 2.7×10^{19}

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6. Change the following from logarithmic form to exponential form

$$\log_{25} 5 = \frac{1}{2}$$

(a) $(25)^{1/2} = 5$

(b) $(25)^{-1/2} = 5$

(c) $(5)^{1/2} = 25$

(d) $(5)^{-1/2} = 25$

7. Find the value of the following:

$$\log_3 4 \times \log_4 5 \times \log_5 6 \times \log_6 7 \times \log_7 8 \times \log_8 9$$

(a) 4

(b) 2

(c) 5

(d) 1

8. Obtain the set builder representation for the following set.

$$\left\{1, \frac{1}{2}, \frac{1}{3}, \frac{1}{4}, \frac{1}{5}, \frac{1}{6}, \frac{1}{7}\right\}$$

(a) {x / x=1/n, n∈N and n≤7}

(b) {x / x=1/(2n), n∈N and n≤7}

(c) y = {x / x=n, n∈N and n≤7}

(d) y = {x / x=2n, n∈N and n≤7}

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9. During Summer Vacation, 35 students of class XII attended computer classes. 25 students coaching classes for entrance examinations and 15 attended both. Find how many students attended neither if the class strength was 50.

(a) 1

(c) 5

(b) 3

(d) 2

10. If the coefficient of x^2 in the product $(x^3 - px^2 + 9x - 1)(2x^3 - 3x^2 - x + 2)$ is 12, find the value of p.

(a) -2

(c) -9

(b) -5

(d) -6

11. If $(x + p)(x + q) = x^2 - 5x - 300$, find the value of $p^2 + q^2$

(a) 325

(c) 525

(b) 425

(d) 625

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12. If $(x + a)(x + b)(x + c) \equiv x^3-6x^2+11x-6$, find the value of $a^2+b^2+c^2$

(a) 7

(c) 13

(b) 14

(d) 6

13. Resolve in to factors: $4x^2+12xy+9y^2$

(a) $(3x-2y)^2$

(c) $(2x+3y)^2$

(b) $(2x-3y)^2$

(d) $(3x+2y)^2$

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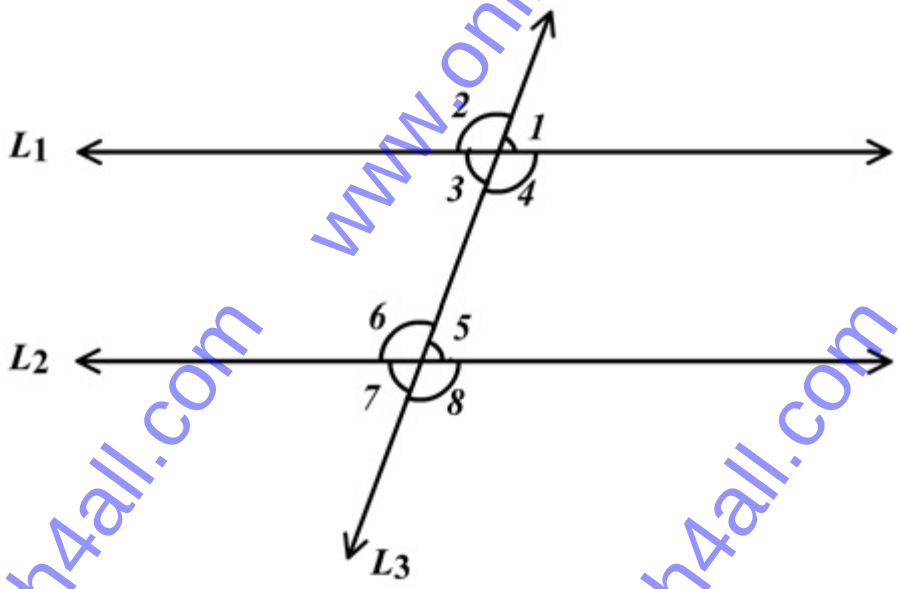
14. In the following figure, the line L_1 is parallel to the line L_2 and the line L_3 is the transversal of the lines L_1 and L_2. If the measures of the angles $\angle 1$ and $\angle 2$ are in the ratio 4:5, find the measure of the angle$\angle 8$.



(a) 70°

(b) 80°

(c) 90°

(d) 100°

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15. If the medians of a triangle are concurrent, in what ratio does the point of concurrency divide each median?

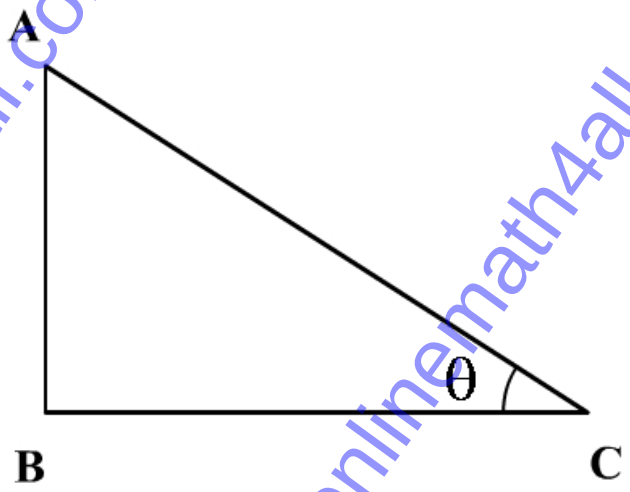
(a) 3:1

(c) 1:3

(b) 2:1

(d) 1:2

16. In the below triangle, the length of the side AB is 3cm and the length of the side BC is 4cm. Find the length of the side AC.



(a) 2 cm

(c) 5 cm

(b) 4 cm

(d) 3 cm

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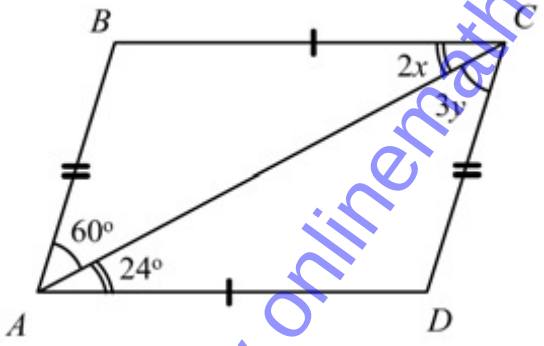
17. Find "x" and "y" from the following figure.



(a) x = 14°, y = 40°

(c) x = 22°, y = 30°

(b) x = 32°, y = 50°

(d) x = 12°, y = 20°

18. Interpret the slopes of the following lines joining (6, 4) and (–7, 4)

(a) Falling line

(c) Parallel to y-axis

(b) Parallel to x-axis

(d) Rising line

19. Find the slope and the *y*-intercept of the line whose equation is $3x + 4y + 5 = 0$.

(a) -3, -5

(c) 3, 5

(b) -3/4, -5/4

(d) 3/4, 5/4

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20. Find the distance between the points $A(-15, -3)$ and $B(7, 1)$.

(a) $10\sqrt{5}$

(c) $17\sqrt{5}$

(b) $16\sqrt{5}$

(d) $18\sqrt{5}$

21. If two lines are perpendicular, then the product of their slopes is equal to

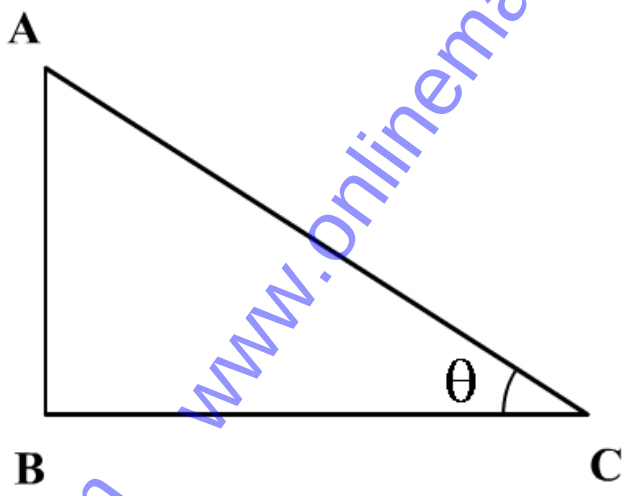
(a) -1

(c) 1

(b) 0

(d) -2

22. In the below triangle, $\sin\theta = 7/25$. Find $\operatorname{cosec}\theta$.



(a) 10/3

(c) 8/7

(b) 25/7

(d) 5/3

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23. The angle of elevation of the top of a tower at a distance of 60m from its foot on a horizontal plane is found to be 30°. Find the height of the tower.

(a) 24.64 m

(b) 14.64 m

(c) 44.64 m

(d) 34.64 m

24. Find the principal that yields a compound interest of $300 in 2 years at 3% per annum.

(a) $4626.11

(b) $4726.11

(c) $4826.11

(d) $4926.11

25. Kelvin purchased a car for $16000. If the cost of the car is depreciating at the rate of 5% per annum, calculate its value after two years.

(a) 14450

(b) 14445

(c) 14440

(d) 14435

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26. In a parallelogram, the two adjacent angles differ by 60°. Find all the angles of the parallelogram.

(a) 135°, 45°, 135°, 45°

(b) 125°, 55°, 125°, 55°

(c) 120°, 60°, 120°, 60°

(d) 130°, 50°, 130°, 50°

27. A chord 24 cm long is drawn in a circle 5 cm away from its center. Calculate the diameter of the circle.

(a) 26 cm

(b) 36 cm

(c) 49 cm

(d) 14 cm

28. Find the angle and area of the sector whose radius is 35 cm and length of the arc is 77 cm.

(a) 116°, 1247.5 cm^2

(b) 126°, 1347.5 cm^2

(c) 136°, 1447.5 cm^2

(d) 146°, 1547.5 cm^2

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29. The ratio of the prices of two motorcycles was 16:23. Two years later when the price of the first has increased by 10% and that of the second by $477, the ratio of the prices becomes 11:20. Find the original prices of the two motorcycles.

(a) $846,$1217

(b) $847,$1218

(c) $848,$1219

(d) $850,$1220

30. The age of a man is three times the sum of the ages of his two sons and 5 years hence his age will be double the sum of their ages. Find the present age of the man.

(a) 45 years

(b) 46 years

(c) 47 years

(d) 48 years

31. A piece of iron rod costs $60. If the rod was 2 meters shorter and each meter costs $1 more, the cost would remain unchanged. What is the length of the rod?

(a) 25 m

(b) 41 m

(c) 16 m

(d) 12 m

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32. Find the equation of the straight line which passes through the point of intersection of the straight lines $2x+3y = 5$ and $3x+5y = 7$ and makes equal positive intercepts on the coordinate axes.

(a) $x+y=-3$

(b) $x-y=3$

(c) $x+y=3$

(d) $x-y=-3$

33. A manufacturer produces 80 laptops at a cost of $220000 and 125 laptops at a cost of $287500. Assuming the cost curve to be linear using the equation of the line, estimate the cost of 95 laptops.

(a) $242600

(b) $242500

(c) $242200

(d) $242300

34. An employer recruits experienced (x) and fresh workmen (y), for his firm under the condition that he cannot employ more than 9 people. x and y can be related the inequality

(a) $x+y\leq 9$

(b) $x+y\geq 9$

(c) $x+y\neq 9$

(d) $x+y>9$

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35. In how many different ways can a club with 10 members select a President, Secretary and Treasurer, if no member can hold two offices and each member is eligible for any office?

(a) 1040

(c) 720

(b) 625

(d) 240

36. Let S be the collection of eight points in the plane with no three points on the straight line. Find the number of triangles that have points of S as vertices.

(a) 39

(c) 83

(b)76

(d) 56

37. If $A = \{1,2,3\}$, then find the number of proper subsets of A.

(a) 8

(c) 6

(b) 7

(d) 5

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38. If A = {1, 3, 5} and B = {2, 4, 6}, then the sets A and B are

(a) Equal sets

(b) Equivalent sets

(c) Singleton set

(d) Null set

39. A survey shows that 74% of the Singaporeans like grapes, whereas 68% like bananas. What percentage of the Singaporeans like both grapes and bananas?

(a) 13%

(b) 32%

(c) 52%

(d) 42%

40. Village X has a population of 68000, which is decreasing at the rate of 1200 per year. Village Y has a population of 42000, which is increasing at the rate of 800 per year. In how many years will the population of the two villages be equal?

(a) 13 years

(b) 12 years

(c) 15 years

(d) 16 years

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41. Find the value of the following.

$$4 - \cfrac{5}{1+\cfrac{1}{3+\cfrac{1}{2+\cfrac{1}{4}}}}$$

(a) 1/9

(c) 1/4

(b) 1/8

(d) 1/5

42. The price of commodity X increases by 40 cents every year, while the price of commodity Y increases by 15 cents every year. If in 2001, the price of commodity X was $4.20 and that of Y was $6.30, in which year commodity X will cost 40 cents more than the commodity Y?

(a) 2008

(c) 2010

(b) 2009

(d) 2011

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43. If the slope of a line is 2, then the line is

(a) rising line

(c) falling line

(b) parallel to y-axis

(d) parallel to x- axis

44. The sides of a triangular plot are in the ratio 3:5:7 and its perimeter is 300 m. Find its area.

(a) $750\sqrt{2}\ m^2$

(c) $1500\sqrt{3}\ m^2$

(b) $1500\sqrt{2}\ m^2$

(d) $750\sqrt{3}\ m^2$

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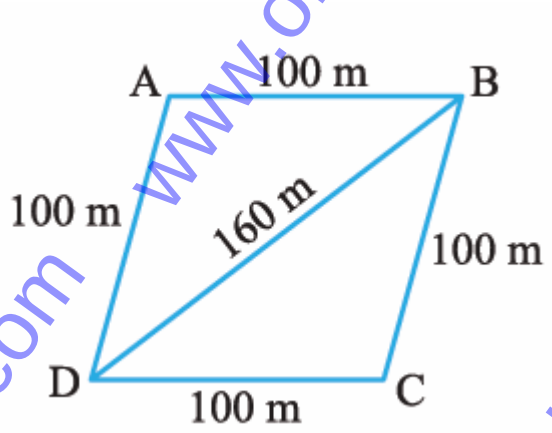
45. Lily has a piece of land which is in the shape of a rhombus (See the below figure). She wants her one daughter and one son to work on the land and produce different crops. She divided the land in two equal parts. If the perimeter of the land is 400 m and one of the diagonals is 160 m, how much area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



(a) 4800 m^2

(c) 2500 m^2

(b) 1500 m^2

(d) 3800 m^2

46. Solve: x+y=3, y+z=-5, z+x=2

(a) x=5, y=-2, z=-3

(c) x=5, y=-2, z=3

(b) x=5, y=2, z=-3

(d) x=-5, y=-2, z=-3

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47. Two coins are tossed simultaneously 500 times, and we get

Two heads: 105 times
One head : 275 times
No head : 120 times

Find the probability of occurrence of each of these events.

(a) 0.21, 0.54, 0.24

(b) 0.20, 0.55, 0.24

(c) 0.21, 0.55, 0.25

(d) 0.21, 0.55, 0.24

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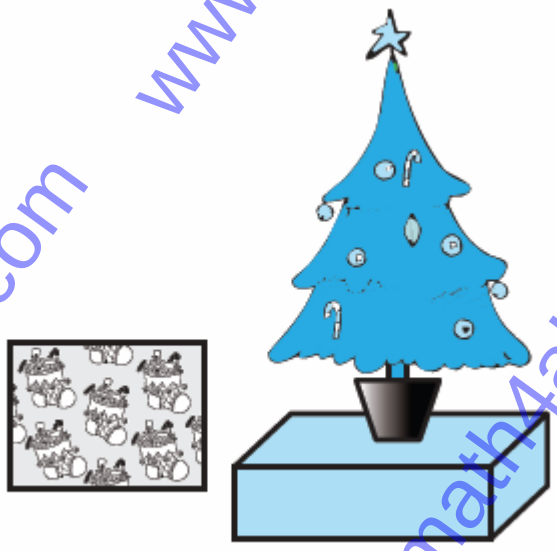
48. Mary wants to decorate her Christmas tree. She wants to place the tree on a wooden box covered with colored paper with picture of Santa Claus on it (See the below figure). She must know the exact quantity of paper to buy for this purpose. If the box has length, breadth and height as 80 cm, 40 cm and 20 cm respectively how many square sheets of paper of side 40 cm would she require?



(a) 2 sheets

(b) 4 sheets

(c) 7 sheets

(d) 5 sheets

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49. The hollow sphere, in which the circus motorcyclist performs his stunts, has a diameter of 7 m. Find the area available to the motorcyclist for riding.

(a) 484 m^2

(c) 154 m^2

(b) 254 m^2

(d) 384 m^2

50. Monica has a piece of canvas whose area is 551 m^2. She uses it to have a conical tent made, with a base radius of 7 m. Assuming that all the stitching margins and the wastage incurred while cutting, amounts to approximately 1 m^2, find the volume of the tent that can be made with it.

(a) 1232 m^3

(c) 2312 m^3

(b) 1132 m^3

(d) 3132 m^3

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Answers

1. a	2. d	3. c	4. c	5. d	6. a
7. b	8. a	9. c	10. c	11. d	12. b
13. c	14. d	15. b	16. c	17. d	18. b
19. b	20. a	21. a	22. b	23. d	24. d
25. c	26. c	27. a	28. b	29. c	30. a
31. d	32. c	33. b	34. a	35. c	36. d
37. a	38. b	39. d	40. a	41. b	42. d
43. a	44. c	45. a	46. a	47. d	48. c
49. c	50. a				

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