Agew Mider comprehensive senior secondary school worksheet for grade 9th

1. For what values of x is the inequality $6x - (2x - 4) \geq 0$ true?
   A. $x \leq -1$ B. $x \geq -1$ C. $x < -1$ D. $x > -1$
   B.
2. From the following intervals, which one is the solution set of the inequality $2x^2 + 5x-3<0$?

   A. $(-3,\frac{1}{2})$ B. $(-\frac{1}{2}, 3)$ C. $(-\infty, -3) \cup [\frac{1}{2}, \infty)$ D. $[-3,\frac{1}{2}]$

3. If $\sin\theta = \frac{2}{5}$ for an acute angle θ, then which one of the following is correct?
   A. $cos\theta = \sqrt{5}$ B. $\tan\theta = \frac{2}{\sqrt{21}}$ C. $\sin\theta = \frac{6}{5}\sqrt{5}$ D. $\cos\theta = \frac{3}{5}$
4. If a regular polygon circumscribes a circle and the sides of the polygon touches the circle exactly eight points, what is the maximum number of lines of symmetry of the polygon?
   A. Seven B. eight C. five D. six
5. Which one of the following interval(s) is the solution set of the quadratic inequality $10x^2 - 4x - 6 < 8x^2 + 4x - 12$?
   A. $(3, \infty)$ B. $(1,\infty)$ C. $(-\infty,1) \cup (3, \infty)$ D. $(-\infty,1)$
6. Which of the following is vector quantity?
   A. Floor area of a class room. C. force to push a car.
   B. Temperature of a room. D. Speed of motorbike.
7. The solution set of $|x^2 - 9| \geq 9$ is ____
   A. B. C. D.
8. The solution set of the inequality on the number line is $|x + 1| < 3x$ is?
   A. x<-1 B. $x>\frac{1}{2}$ C. $x>-\frac{1}{4}$ D. $x<\frac{1}{2}$
9. Solve the absolute value of the inequality $|7x + 6| > -3$
   A. $(-\infty, \infty)$ B.$(-\infty, 1)$ C. $[5, \infty)$ D. $.(-\infty, 1) \cup [5, \infty)$
10. Which of the following point is the solution of the inequality $\begin{cases} x - 4y > -1 \\ 3x - 2y < -2 \end{cases}$
    A. (2, 1) B. (0, 0) C. (-2, -1) D. (-1, 0)
11. For a parallelogram ABCD the length of side AB is equal to the length of the side of the square with area 64 cm^2. If the length of side BC of parallelogram ABCD is 3cm and <ABC=120^0, what is the area of ABCD?
    A. 64cm^2 B. $24\sqrt{3}cm^2$ C. $12\sqrt{3}cm^2$ D. $4\sqrt{3}cm^2$
12. Solve the inequality $4 - \big(-3(x + 1)\big) - \frac{x-4}{2} \leq \frac{2}{3}x - \frac{6x-4}{16} + 4x$
    A. $x \geq \frac{210}{43}$ B. $x \leq \frac{5}{3}$ C. $x \geq \frac{20}{13}$ D. $x \geq \frac{8}{3}$
13. If x is a natural number then the solution for the inequality 6x+8<16 is:
    A. 2 B. 5 C. 10 D. 1
14. If $\sin\theta = \frac{4}{5}$ for an acute angle θ, then which one of the following is correct?
    A. $\cos\theta = \frac{3}{5}$ B. $\tan\theta = \frac{4}{5}$ C. $\cos(90° - \theta) = 3$ D. $\sin\theta < \cos\theta$
15. Given $0° < \theta < 90°$. If $\tan\theta = 1$, then which one of the following is not true?
    A. $\cos\theta = \sqrt{2}/2$ B. $\cos\theta = \sin\theta$ C. $\theta = 45°$ D. $\tan\theta = \sin\theta$

16. On the coordinate of the graph is given as shown below.

Which one of the following system of linear inequalities has the above shaded region as its solution? \

A. $\begin{cases} x + y \leq 3 \\ x + 4y \geq 2 \end{cases}$ B. $\begin{cases} -x - y \geq -3 \\ x + 4y \leq 2 \end{cases}$ C. $\begin{cases} x + y \geq -3 \\ x + 4y \geq 2 \end{cases}$ D. $\begin{cases} -x - y \leq -3 \\ x + 4y \geq 2 \end{cases}$

17. In ΔABC, right-angled at B, AB = 25 cm , BC = 6cm. Determine sin A

A. $\frac{4}{9}$ B. $\frac{13}{3}$ C. $\frac{7}{25}$ D. $\frac{2}{5}$

18. Which of the following statement is true?

A. The value of tan$A$ is always less than 1.

B. sinθ=$\frac{4}{3}$, for some acute angle θ.

C. If sin $\theta = \frac{1}{3}$, then cos $\theta = \frac{2\sqrt{2}}{3}$.

D. When $0° \leq \theta \leq 90°$ is an angle of a right-angled triangle, both sin θ and cos θ are between -1 and 1.

19. Which one of the following statements is correct about a regular octagon?

A. From one vertex we can draw 6 diagonals only.

B. the sum of measures of all its interior angels is 1080^0

C. the sum of the measures of all its central angels is 180^0

D. the sum of the measures of all its central angels is 180^0

20. Suppose a building casts a shadow of length 45 meters when the angle of elevation of the sun is 30^0.How high is this building?

A. $45\sqrt{3}$ meters B. $\frac{45}{2}\sqrt{3}$ meters C. $45\frac{45}{2}\sqrt{2}$ meters D. $15\sqrt{3}$ meters

21. Which of the following is NOT correct about an n-sided regular polygon?

A. It has n lines of symmetry

B. All its sides and all its angles are equal.

C. The measure of each central angle and each exterior angle is 360^0/n.

D. The sum of measures of its exterior angles is 720^0.

22. If sin 150 = x and sin 750 =y, then which one of the following is correct?

A. tan $75^0 = \frac{x}{y}$ B. tan $15^0 = \frac{x}{y}$ C. cot $75^0 = \frac{y}{x}$ D. cot $15^0 = \frac{x}{y}$

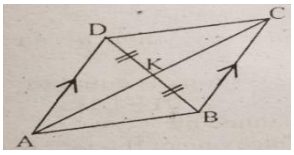
23. The solution set of the inequality $-2x^2+3x + 5 \leq 0$ is:

A. $\{x \in R: -1 \leq x \text{ or } x \geq 1\}$ B $\{x \in R: 0 \leq x \leq \frac{5}{2}\}$ C. $\{ x \in R: -1 \leq x \leq \frac{5}{2}\}$ D. $\{ x \in R: x \leq -1 \text{ or } x \geq \frac{5}{2}\}$

24. Given ΔABC with AB=5cm, BC=7cm and AC=8cm, then the area of this triangle is equal to

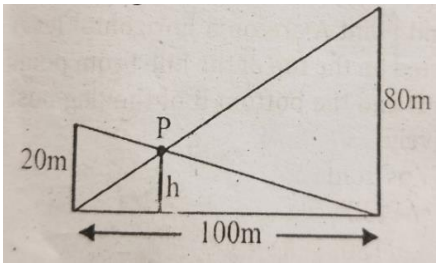
A. $100cm^2$ B. $100\sqrt{3}\ cm^2$ C. $10cm^2$ D. $10\sqrt{3}\ cm^2$

25. On the figure shown below, ABCD is quadrilateral with AD || BC and DK = KB. Which of the following is NOT correct about this quadrilateral?



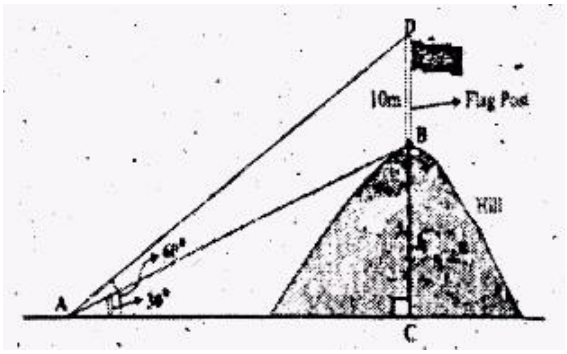
A. ΔABK=ΔCDK B. ΔABC=ΔBDC C. ABCD is parallelogram D. ΔADK=ΔCBK

26. Two Vertical poles are erected 100 meters apart on a horizontally leveled ground. Their heights are 20 meters and 80 meters as shown in the figure below. What is the vertical height (h) of the intersection point (P) of the lines joining the top of each pole to the foot of the other pole?



A. 16 m B. 15 m C. 10 m D. 12 m

27. In the figure shown below a hill and point A are on a horizontal level ground. A flag post is vertically erected on the top of the hill. From point A the angels of elevation of the top D and the bottom B of the flag post are measured 600 and 300, respectively. What is the height (h) of the hill if the height of the flag post is 10 meters?



A. 15 $\sqrt{3}$ meters B. 15 meters C. 10 $\sqrt{3}$meters D. 5 meters

28. Let ΔABC ~ ΔDEF. the area of ΔABC and ΔDEF are 256m^2 and 64m^2 respectively, which one of the following statement is true?

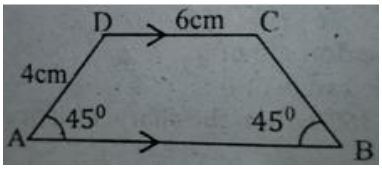
A. If CA=9m, then FD=3m B. The ratio of their corresponding sides is 4.

C. The ratio of their perimeter is 2. D. The ratio of their area is 16.

29. The degree measure of each exterior angle of a regular eight sided polygon is.

A. 270^0 B. 45^0 C. 135^0 D. 90^0

30. Trapezium ABCD, with AB//DC, is given as shown in the figure below, if DC=6cm, AD=4cm and m(<A)= m(<B)=45^0, then what is the length of AB



A. 10 cm B. (6+4$\sqrt{2}$) cm C. 14 cm D. 14$\sqrt{2}$cm

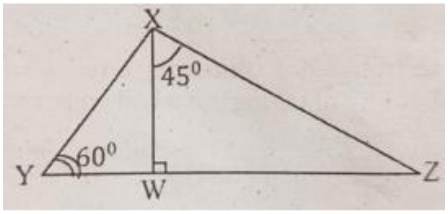
31. Given ΔABC with AB=5cm, BC=7cm and AC=8cm, then the area of this triangle is equal to

A. 100 cm^2 B. 100 $\sqrt{3}$ cm^2 C. 10cm^2 D. 10$\sqrt{3}$cm^2

32. If the measure of each exterior angle of a regular polygon is 400 then how many sides does this polygon have?

A.7 B. 9 C. 8 D. 10

32. Δ*XYZ* is given as shown in the figure below with m(<XYZ)=60^0. Point w is on side YZ, such that YZ is perpendicular to XW. If YW=3m and (<WXZ)=45^0 then what is the length of side XZ



A. $\frac{3}{3}$cm B. 6cm C. $\frac{3}{2}$cm D. $\frac{3}{6}$cm

33. Let $\Delta ABC \sim \Delta DEF$. the area of ΔABC and ΔDEF are $256m^2$ and $64m^2$ respectively, which one of the following statement is true?

A. If CA=9m, then FD=3m

B. The ratio of their corresponding sides is 4.

C. The ratio of their perimeter is 2.

D. The ratio of their area is 16.

34. The degree measure of each exterior angle of a regular eight sided polygon is:

A. 270^0 B. 45^0 C. 135^0 D. 90^0

35. Which one of the following is NOT the property of a regular polygon?

A. The degree measure of each central angle of a regular polygon with n-sides is equal to (360/n)0.

B. Radius of a regular polygon is the distance from its center to the mid-point of its side.

C. A regular polygon is a convex polygon where all its sides and all its angles are equal.

D. A regular polygon with n-sides has n-lines of symmetry.

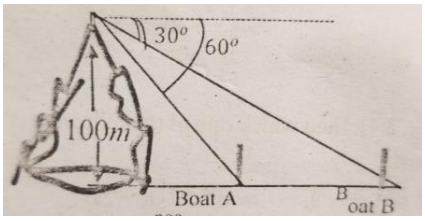
36. The solution set of the inequality $x^2 + 7x + 12 \geq 0$ is:

A. $\{x : x \leq 3 \text{ or } x \geq 4\}$ B. $\{x : x \leq -4 \text{ or } x \geq -3\}$ C. $\{x : -3 \leq x \leq -4\}$ D. $\{x : 3 \leq x \leq 4\}$

37. The solution set of $|2x-5| \geq 3$ is:

A. $\{x : x \leq -1 \text{ or } x \geq 4\}$ B. $\{x : x \leq -4 \text{ or } x \geq -1\}$ C. $\{x : 1 \leq x \leq 4\}$ D. $\{x : x \leq 1 \text{ or } x \geq 4\}$

38. A woman was at the top of a cliff that is 100 meters above the sea level as shown in the figure below. When she saw two boats A and B sailing away from the cliff due east, the angle of depression to boats A and B where 600 and 300 respectively (see figure). What was the distance between the two boats when she saw them?

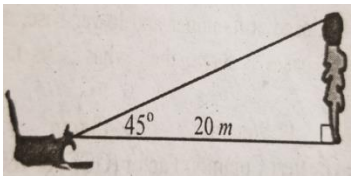


A. $100\sqrt{3}$ meters B. $200\sqrt{3}$ meters C. $\frac{200}{3}\sqrt{3}$ meters D. $\frac{100}{3}\sqrt{3}$ meters

39.What is the perimeter of a regular hexagon whose radius is 6cm?

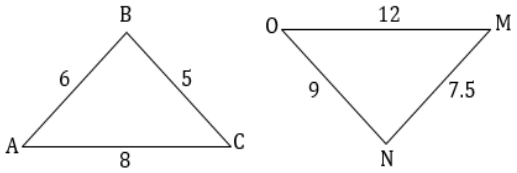
A. $6\sqrt{3}$ cm B. $36\sqrt{3}$ cm C. 6 cm D. 36cm

40.A cat is lying on a level ground 20 meters away from the base of tree. The cat can see a bird's nest directly above the bases of the tree. The angel of elevation from the car to the bird's nest is 450.How far above the base of the tree is the bird's nest?



A. 10 meters B. $\frac{45}{2}$ meters C. $15\sqrt{2}$meters D. 20 meters

41. A student found out that the following two triangles are similar by SSS similarity theorem. Which one of the following correct naming of these two similar triangles?



A. ΔABC ~ ΔOMN B. ΔABC ~ ΔNMO C. ΔABC ~ ΔMON D. ΔABC ~ ΔONM

In the afternoon at certain time of the day a tree casts a 25m shadow. At the same time a 1.8m boy casts a shadow of 1.5m. What is the height of the tree?

A. 30m B. 35m C. 50m D. 40m

42.On the following number lines, intervals are indicated by dark (bold) regions. Which one of the intervals indicates the solution of the inequality x^2 -5x +6 < 0.

A. [2,3] B. $(2, \infty)$ C. $(-\infty, 3)$ D. (2,3)

43. How many lines of symmetry does a regular hexagon have?

A. 6 B. 7 C. 5 D. 8

44. Which of the following is necessarily true about similar polygons?

A. They have congruent corresponding sides. B. They have congruent corresponding angels.
C. They are always congruent. D. Any two regular polygons are similar

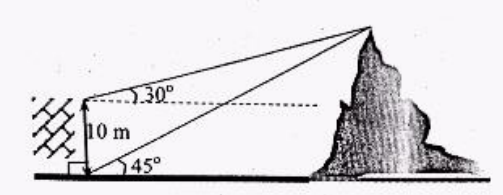
45. The area of a regular 8 sided polygon with radius 4 units is:

A. $8\sqrt{2}$ sq. units B. $64\sqrt{2}$ sq. units C. $16\sqrt{2}$ sq. units D. $32\sqrt{2}$ sq. units

46. A regular polygon in which the measure of each interior angel is equal to the measure of each of its central angel is:

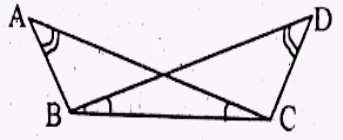
A. Regular hexagon B. Square C. Regular pentagon D. Equilateral triangle

47. As shown in the figure below, the angle of elevation of the top of the cliff when seen from the foot and top of a building are 45^0 and 30^0 respectively. If the height of the building is 10m, then how high is the top of the cliff?



A. 14.3 m B. 23.7 m C. 35.0 m D. 56.7 m

48. In the figure below, ∠BCA ≡ ∠CBD and∠ BAC ≡ ∠CDB. Based on the given conditions in the figure below, which one of the following theorems can be used to prove that ΔABC ≡ ΔDCB?



A. AA B. SSA C. SAS D. ASA

49. The solution set of the inequality 2 - x - x2 < 0 is given by

A. $(-\infty,-1)\cup(2,\infty)$ B. $(-\infty,-2)\cup(1,\infty)$ C. $(-2,1)$ D. $(-\infty,1)\cup(2,\infty)$

50. Which of the following is the value of $\sin 270^0$?

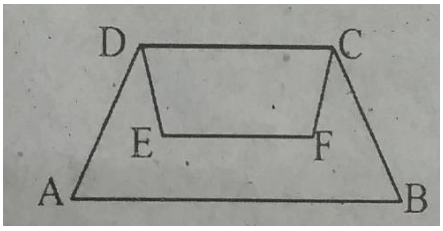
A. 1 B. 0 C. -0.5 D. -1

51. Which of the following is NOT necessarily true a regular polygon?

A. A cyclic quadrilateral is an example of a regular polygon. B. It can be inscribed in circle

C. The measures of all its interior angels are equal. D. The lengths of all its sides are equal

52. In the figure below quadrilaterals ABCD and CDEF are similar and AB =10cm,CD =8cm, AC = 12cm and DE = 6cm. The length CE is equal to



A. 6.4 cm B. 7.2 cm C. 7.5 cm D. 9.6 cm

53. if $\Delta ABC \sim \Delta DEF$,then which of the following is true?

A. $\frac{AB}{DE} = \frac{BC}{EF}$ B. $\frac{AB}{EF} = \frac{BC}{DE}$ C. $\frac{AC}{DF} = \frac{BC}{EF}$ D. .$\frac{DE}{AB} = \frac{EF}{BC}$

54. If the ratio of sides of triangles $\Delta ABC \; and \; \Delta DEF$ is K, then the ratio of their perimeter is:

A. K B. K^2 C. $\frac{1}{K}$ D.K+1

54. Two polygons are similar, their area 36cm^2 and 64 cm^2. A side of the first is 2 cm is long. What is the length of the corresponding side of the other polygon?

A. $\frac{8}{3}$ B. $\frac{1}{2}$ C. $\frac{5}{4}$ D. $\frac{9}{7}$

55. The perimeter of two similar polygons are 20cm and 85cm. if the area of smaller polygon is 40cm^2, find the area of the larger polygon

A.453.6cm^2 B.722.5cm^2 C. 1020.4cm^2 D. 900.1cm^2

56. If an interior angle of a regular polygon is 135^0 and its radius is 5cm, find the area of the polygon.

A. $5\sqrt{10}$ B. $10\sqrt{10}$ C. $10\sqrt{2}$ D. $5\sqrt{2}$

57. Consider ΔABC with right angle at C and m(<ABC)=55^0. If the length of AC is 10cm, then what is the area of the triangle? (Given tan35^0=0.7 and tan55^0=1.43)

A. $10\sqrt{149}$ cm^2 B. $5\sqrt{149}$ cm^2 C. 70cm^2 D. 35 cm^2

58. if the measures of each exterior angle of a regular polygon is 60^0, then how many sides does this polygon does this polygon have?

A.5 B. 8 C. 6 D.10

59. The perimeter of regular pentagon inscribed in a circle with radius 15 cm is equal to :

(Use sin 36° = 0.59 , cos36° = 0.81 , sin 72° = 0.95 , cos72° = 0.31)

A. 88.1cm B. 24.5 C. 63.2 D. 51.3

60. Which one of the following statements is correct about a regular octagon?

A. From one vertex we can draw 4 diagonals only.

B. The sum of the measures of its interior angles is 1080°.

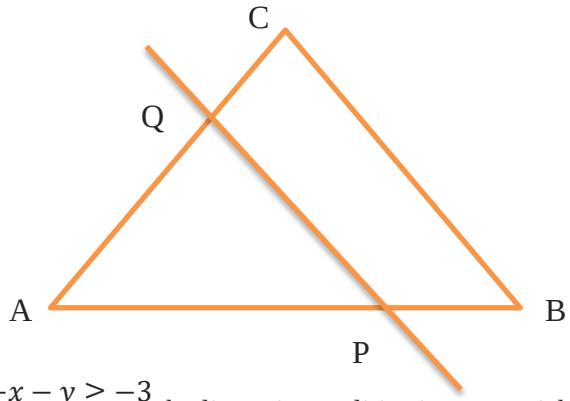
C. The sum of the measures of all its central angles is 180°.

D. The measure of each exterior angle is 135°.

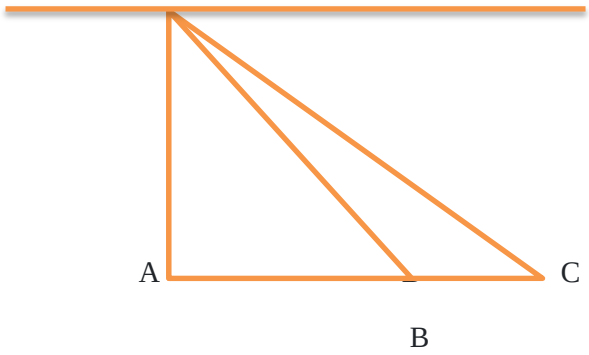
Group Assignment for grade 9th

Show necessary steps

1. In the figure below PQ//BC, m(<APQ) =65^0 and m(<ABC)=72^0, then find m(<AQP),m(<ABC) and m(<BAC).



2. Let $\begin{cases} -x - y \geq -3 \\ x + 6y \leq 3 \end{cases}$ be linear inequalities in two variables, Solve the inequalities by using graphical method.
3. Solve the quadratic inequalities $2x^2 + 5x + 3 \geq 0$ using product properties method
4. In figure below from the top of the cliff 80 meters above sea level, the angle of to boats B and C are 60 and 30 degrees respectively. if points A,B and C are on the same line, what is the distance between the two boats?



5. The figure below shows that an equilateral triangle is inscribed in a circle with the radius of 10 cm. find the length of the side, the apothem, the perimeter and the area of the triangle.

