



NAFYAD SCHOOL SAMPLE QUESTION FOR GRADE 10 /MATHEMATICS/

I. Choose the correct answer from the given alternatives.

1. What is the solution set of $7-3x \leq 5$

- A. $\left(\frac{2}{3}, 4\right)$ B. $\left\{\frac{2}{3}, 4\right\}$ C. $[1, 2, 3]$ D. $\left[\frac{2}{3}, 4\right]$

2. If the graph of $h(x) = -x^2 + ax + b$ passes through $(2, 12) \wedge (-1, 9)$, what will be the value of a & b respectively

- A. -1&2 B. 2&12 C. -2&1 D. 12&2

3. A polynomial function p is given by $p(x) = \frac{3x^3 - 4x^5 + x^2 + 6x + 1}{12} + \frac{x}{2} - x^4 - \frac{5}{12}$ from the following statement which one is true about p(x)

- A. In p(x) the coefficient of x is 0 C. the degree of p(x) is 3
B. Its leading coefficient is $\left(\frac{1}{4}\right)$ D. the constant term is $-\frac{1}{3}$

4. The solution set of $\log_{100} 2x^2 + 5x + 97 = 2$

- A. $\left\{-\frac{1}{2}, 3\right\}$ B. $[-1, -3]$ C. $\left\{-3, \frac{1}{2}\right\}$ D. $\left\{\frac{1}{2}, 3\right\}$

5. Out of 72 students in grade 10th, 48 students have taken mathematics test and 34 students have taken physics test. If 17 students have taken neither of the test, then how many students have taken only mathematics test

- A. 27 B. 7 C. 21 D. 17

6. What is the area of regular hexagon whose radius 8cm

- A. $96\sqrt{3} \text{ cm}^2$ B. $198\sqrt{3} \text{ cm}^2$ C. 96cm^2 D. $96\sqrt{2} \text{ cm}^2$

7. Which one of the following is true about 3rd quadrant angle θ in standard position whose terminal side lines on the $y-3x=0$

- A. $\sin \theta = \frac{-\sqrt{10}}{3}$ B. $\cos \theta = \frac{\sqrt{10}}{10}$ C. $\sec \theta = \frac{-1}{\sqrt{10}}$ D. $\cot \theta = \frac{1}{3}$

8. The simplified form of the expression $\log_{3\sqrt{3}} 81 + 3^{(1+\log_3 4)}$

- A. $\frac{33}{4}$ B. $\frac{44}{3}$ C. $\frac{40}{3}$ D. $\frac{20}{3}$

9. If the measure of each exterior angle of regular polygon is 24° then how many sides does this polygon have
- A. 15 B. 12 C. 16 D. 11
10. The areas of two similar triangles are 256cm^2 and 64cm^2 .if the side of the first is 12cm long , what is the length of corresponding side of the other
- A. 3.75cm B. 7.5cm C. 3cm D. 16cm
11. The simplified form of the expression $\log_{100}(0.01)(\sqrt{0.01})$ is equal to?
- A. $3/2$ B. $-3/4$ C. $3/4$ D. $-3/2$
12. Which one of the following is not true about regular polygon of side n
- A. Each interior angle measures $\left(1 - \frac{2}{n}\right)\pi$ radian C. It is convex polygon
- B. Length of all its side are equal D. Each central angle measures $\left(\frac{180^\circ}{n}\right)$
13. From the following pairs of equation of the lines which pair represents perpendicular lines
- A. $2x-5y+1=0$ & $5x+2y+1=0$ C. $2x+5y+1=0$ and $5x+2y+1=0$
- B. $2x-5y+1=0$ and $5x-2y+1=0$ D. $2x+5y+1=0$ and $4x+10y+2=0$
14. The solution set of $-3 \leq \frac{3-5x}{4} \leq 12$ is equal to
- A. $\left[\frac{-16}{5}, \frac{4}{5}\right]$ B. $\left(-\infty, \frac{-16}{5}\right] \cup \left[\frac{4}{5}, \infty\right)$ C. $\left(\frac{-16}{5}, \frac{4}{5}\right)$ D. $(-\infty, \infty)$
15. If you start a Biology experiment with 800,000 cells and 20% of the cells are dying every minutes .How long will it take to reach 2000cells
- (Use $\log 0.0025 = -2.6$, $\log 0.8 = -0.097$)
- A. 25minutes B. 30.2 minutes C. 28.7minutes D. 26.8 minutes
16. For what value of **k** does the quadratic equation $(3k-4)x^2 + 2kx - 1 = 0$ has two real roots?
- A. $(-4, 1)$ B. $(-\infty, -4) \cup (1, \infty)$ C. $[-4, 1]$ D. $(-\infty, \infty)$

17. A ball is drawn at random from a box containing 6 red balls, 4 white balls and 5 blue balls. What is the probability of taking out a ball drawn is not white

- A. $\frac{4}{15}$ B. $\frac{2}{5}$ C. $\frac{1}{3}$ D. $\frac{11}{15}$

18. Which one of the following system of equation has many solutions

- A. $\begin{cases} \frac{3}{2}x - 2y = 1 \\ 3x - 4y = 2 \end{cases}$ B. $\begin{cases} -2x + y = 4 \\ 2x + y = 4 \end{cases}$ C. $\begin{cases} \frac{1}{2}x - 2y = 5 \\ x + 4y = 7 \end{cases}$ D. $\begin{cases} \frac{2}{3}x + 2y = 5 \\ 2x + 6y = 2 \end{cases}$

19. A triangle ΔABC has vertices at $A(-3,3)$, $B(1,5)$ and $C(3,-1)$. What are the coordinate of the points at which the medians intersects

- A. $\left(\frac{5}{3}, \frac{4}{3}\right)$ B. $\left(\frac{1}{3}, \frac{7}{3}\right)$ C. $\left(\frac{-4}{3}, \frac{8}{3}\right)$ D. $\left(\frac{1}{3}, \frac{11}{3}\right)$

20. Dawit notes the angle of elevation of the top of tower to be 45° . If Dawit is 500m away horizontally from the base of tower. What is the height of the tower?

- A. 500m B. $500\sqrt{2}$ m C. 250m D. $250\sqrt{2}$

21. Which one of the following properties of quadrilaterals is correct?

- A. Rhombus is an equilateral rectangle
B. Every rectangle is a square
C. Diagonals of a rectangle bisects the vertex angles
D. Every square is a rectangle

22. Given a function $g(x) = 3x - \sqrt{x-5}$ which one of the following is true about this function **f**

- A.** Domain of **f** set of real numbers
B. Range of **f** $[5, \infty)$
C. the graph of **f** a crosses x-axis at two different points
D. The graph of **f** a crosses the origin

23. Let A and B be two vectors given by $A = 3i - 2j$ and $B = 5i - \frac{1}{2}j$ then the vector

$$\frac{1}{2}A - \frac{2}{3}B$$

- A. $\frac{-11}{6}i - \frac{4}{3}j$ B. $\frac{-29}{6}i - \frac{4}{3}j$ C. $8i - \frac{2}{3}j$ D. $\frac{-11}{6}i - \frac{2}{3}j$

24. Which one of the following are zeros of the polynomial function

$$p(x) = x^3 + 2x^2 - 5x - 6$$

- A. $[-1, 1, 2]$ B. $[-3, -1, 2]$ C. $[-3, 2, 3]$ D. $[-2, -1, 1, 2]$

25. If $\log_2 x = \frac{1}{3} \log_2 8 - 2 \log_2 \sqrt{3}$ then the value of x ?

- A. $\frac{2}{\sqrt{3}}$ B. $\frac{3}{2}$ C. $\frac{\sqrt{3}}{2}$ D. $\frac{2}{3}$

26. $\csc\left(\frac{3}{4}\pi\right)$ is equal to?

- A. $\frac{\sqrt{2}}{2}$ B. $-\frac{\sqrt{2}}{2}$ C. $\frac{2}{\sqrt{3}}$ D. $\sqrt{2}$

27. Suppose $\cos \theta = 0.8 \wedge \csc \theta < 0$ then $\tan \theta$ is equal to?

- A. $\frac{3}{5}$ B. $-\frac{3}{4}$ C. $\frac{4}{5}$ D. $-\frac{4}{3}$

28. If θ is an acute angle, then which one of the following statement is true?

- A. $\cot \theta = \tan\left(\frac{\pi}{2} + \theta\right)$ B. $\cos \theta = \sin\left(\frac{\pi}{2} + \theta\right)$ C. $\sin \theta = \cos\left(\frac{\pi}{2} - \theta\right)$ D. $\tan \theta = \tan\left(\frac{\pi}{2} - \theta\right)$

29. If $\log x = -2.4618$ then the characteristics of $\log x$ is

- A. 0.4618 B. -2 C. -3 D. 0.5382

30. If $\sin 38^\circ = \cos 2\theta$, then θ is equal to

- A. 28° B. 38° C. 26° D. 76°

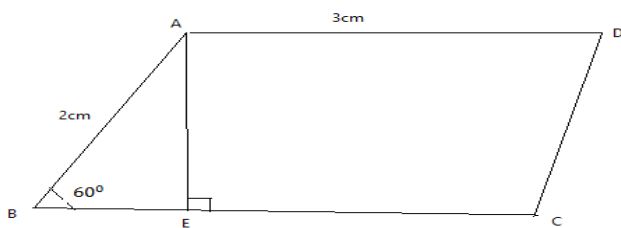
31. Which one of the following statement is not true?

- A. The graph of $y = \csc \theta$ and $y = \sec \theta$ never crosses x -axis
B. The domain of $y = \cot \theta \wedge y = \csc \theta$ is $\{\theta : \theta = n\pi, n \in \mathbb{Z}\}$
C. The range of $y = \sec \theta \wedge y = \csc \theta$ is $\mathbb{R} \setminus (-1, 1)$
D. The graph of $y = \sin \theta \wedge y = \cos \theta$ crosses the y -axis at $y = 1$

32. The simplified forms of $\frac{1 + \tan^2 \theta}{\csc^2 \theta}$ is equal to

- A. $\cot^2 \theta$ B. $\tan^2 \theta$ C. $\cos^2 \theta$ D. $\csc^2 \theta$

33. In a parallelogram ABCD, AB=2cm and AD=3cm $m(\angle B)=60^\circ$ Find the altitude from A to BC is equal to?



A. $\frac{2\sqrt{3}}{2}cm$

C. $\frac{\sqrt{3}}{2}cm$

B. $\sqrt{3}cm$

D. $\sqrt{2}cm$

34. Which one of the following is false about the polynomial $f(x)=x^2(x+1)^3(x^2+1)$

A. The graph of $f(x)$ necessarily crosses the x-axis at $x=-1$

B. -1 is root of $f(x)$ with highest multiplicity

C. the graph of $f(x)$ crosses the x-axis at $x=0$

D. The graph of $f(x)$ has at most 6 turning points

35. In a survey the weight of people that visited at certain clinic recorded and the results were as follows:

Weight(kg)	40-49	50-59	60-69	70-79	80-89
Number of people	15	12	14	21	10

A doctor at the clinic says that people whose weights are more than 79kg are prone to diabetics. What is the probability a person chosen at random has such risk?

A. $\frac{31}{72}$

B. $\frac{3}{8}$

C. $\frac{5}{56}$

D. $\frac{21}{72}$

36. The area of a regular hexagon is given as $384\sqrt{3}cm^2$ then the apothem of the hexagon is equal to?

A. 16cm

B. 8cm

C. $8\sqrt{3}cm$

D. $16\sqrt{3}cm$

37. In $\triangle ABC$, if $AB=15cm$, $BC=14cm$ and $AC=13cm$ then the area of $\triangle ABC$ is equal to?

A. $48cm^2$

B. $42cm^2$

C. $84cm^2$

D. $92cm^2$

38. If $A \cap B = \{-1, 0, 1\}$ and $A \cap C = \{-1, 0, 1, 3\}$ then $A \cap (B \cup C)$ is equal to?

A. $\{-1, 0, 1\}$

B. $\{-1, 0, 1, 2, 3\}$

C. $\{-1, 0\}$

D. $\{\}$

39. Which one of the following is polynomial function?

A. $\log_2 x$

B. $\sqrt[3]{8x^3} + \sqrt{2x^2} + 8$

$\log_{824} 256 + x$

D. $\frac{x^2+1}{x^2+1} - 6$

40. If the altitude of an equilateral triangle measures 10cm long then the length of its

side is

A. 20cm

B. $\frac{20\sqrt{3}}{3} \text{ cm}$

C. 10cm

D. $\frac{10\sqrt{3}}{3} \text{ cm}$

41. Which one of the following is not equal to $\tan 30$

A. $\frac{1}{\cot 30}$

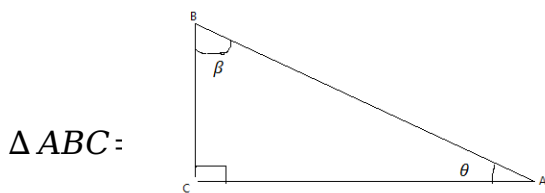
B. $\frac{1}{\tan 60}$

C. $\frac{\sin 30}{\cos 30}$

D. $\cos 60$

42. In figure shown below ΔABC is right angle triangle such that $\sin \theta = \frac{5}{13}$ then

which of the following is true?



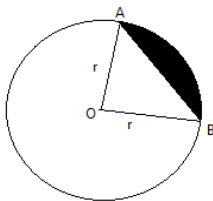
A. $\cos \theta = \frac{12}{13}$

C. area of

B. $\tan \theta = \frac{5}{12}$

D. $\sec \beta = \frac{13}{12}$

43. If $m(\angle AOB) = 60^\circ$ and $r = 10 \text{ m}$ then the area of the segment shaded below is equal to?



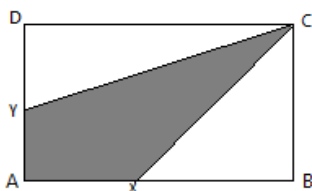
A. $\frac{50}{3} \pi \text{ cm}^2$

C. $\frac{(25\pi + 75\sqrt{3})}{3} \text{ cm}^2$

B. $\frac{25(\pi - 3\sqrt{3})}{3} \text{ cm}^2$

D. $\frac{(75\sqrt{3} - 25\pi)}{3} \text{ cm}^2$

44. If in figure ABCD is parallelogram such that x is the mid-points AB and y is the midpoint of AD then which one of the following statements is not true?



A. Area of $\Delta DCY = \frac{1}{4}$ area of parallelogram ABCD

B. Area of $\Delta DCY = \text{area of } \Delta BCX$

C. Area of shaded region =

$$\frac{1}{2} \text{ area of parallelogram } ABCD$$

D. Area of shaded region =

$$\frac{1}{3} \text{ area of parallelogram } ABCD$$

45. If $\vec{u}$ is a vector with initial point $(2,0)$ and terminal point $(5,0)$ and $\vec{v}$ is a vector with initial point $(0,7)$ and terminal point $(0,11)$. What will be magnitude of $\vec{u} + \vec{v}$

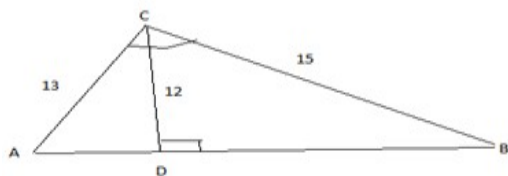
A. 25

B. 5

C. 18

D. 7

46. If $\triangle ABC$ is as shown in the figure below, which one of the following is not true



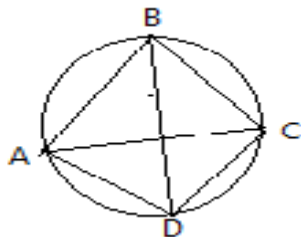
A. $\sin(\angle B) = \frac{12}{15}$

C. $\sin(\angle ACD) = \frac{5}{13}$

B. $\tan(\angle BCD) = \frac{13}{12}$

D. $\tan(\angle A) = \frac{12}{5}$

47. In the circle below, If $m(\angle ABC) = 60^\circ$ and $m(\angle ACB) = 50^\circ$ then $m(\angle BDC)$ is equal to



A. 30°

B. 50°

C. 70°

D. 80°

48. The total cost for ordering and storing x units is given by $a(x) = x^2 - 10x + 20$. How many units must be ordered to produce a minimum cost

A. 5

B. 10

C. 25

D. Unknown

49. A frustum of height 12cm is formed from right circular cone of height 16cm and base radius 8cm. then the volume of frustum is

A. $330\pi \text{ cm}^2$

B. $336\pi \text{ cm}^2$

C. $104\pi \text{ cm}^2$

D. $312\pi \text{ cm}^2$

50. The solution set of $4^x - 15(2^x) - 16 = 0$ is equal to?

A. $\{4\}$

B. $\{2\}$

C. $\{16\}$

D. $\{8\}$

51. What is the remainder when the polynomial $p(x) = 100x^{100} + 200x^{200} - 99x^{99} + 1$ is divided by $x+1$?

A. 400

B. 201

C. 399

D. 202

52. The solution set of inequalities $x^2 + 9x + 20 < 0$ is

A. $(-\infty, -5) \cup (-4, \infty)$ B. $[-5, -4]$ C. $(-5, -4)$ D. $(-5, 4)$

53. The solution set of $\ln(2x-1) = \ln 4x - 3 - \ln x$ is equal to

A. $[-1, 1]$ B. $\left\{\frac{2}{3}, 1\right\}$ C. $\left\{1, \frac{3}{2}\right\}$ D. $\left\{\frac{3}{2}, 2\right\}$

54. If $n(A) = 12$, $n(B) = 23$ and $n(A \cap B) = 6$ then which one of the following statements is

correct

A. $n(A \Delta B) = 31$ B. $n(A/B) = 6$ C. $n(B/A) = 11$ D. $n(A \cup B) = 35$

55. The area of the base of a pyramid is 128cm^2 . The altitude of the pyramid is 10cm. What is the area of a cross-section 5cm from vertex?

A. 64cm^2 B. 32cm^2 C. 16cm^2 D. 512cm^2

56. What is total surface area of right circular cylinder with volume

$864\pi\text{cm}^3$ and lateral surface area $288\pi\text{cm}^2$?

A. $36\pi\text{cm}^2$ B. $324\pi\text{cm}^2$ C. $576\pi\text{cm}^2$ D. $360\pi\text{cm}^2$

57. Which one of the following statements is not correct?

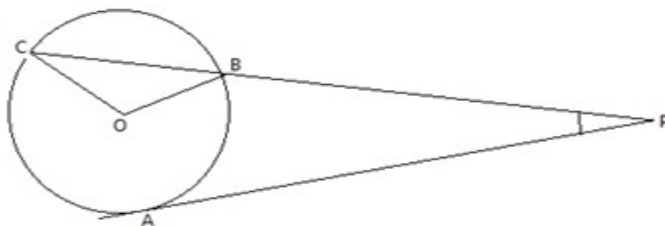
A. The lateral faces of a frustum of a pyramid are trapezium

B. an angle inscribed in semi-circle is right angle

C. Two angles are said to be supplementary if their sum is 90°

D. The region bounded by radii of the circle and arc is called sector.

58. In figure given below the radius of a circle with center O is 3cm, AP is tangent line and CP is a secant line. If $m(\angle BOC) = 60^\circ$ and $BP = 5\text{cm}$ then which one of the following is the length AP

A. $5\sqrt{2}\text{cm}$ B. $3\sqrt{5}\text{cm}$ C. $2\sqrt{10}\text{cm}$

D. 8cm

59. The direction of the position vector $\rightarrow_v(\sqrt{3}, -1)$ is equal to

A. 340°

B. 330°

C. 30°

D. W 60° S

60. A frustum of height 10 cm is formed from a right circular cone of height 16cm. If the radius of the base is 8cm, then which one of the following is not true?

A. The volume of the frustum is $\frac{112}{3}\pi cm^3$

B. Total surface area of the frustum is $(80+24\sqrt{29})cm^2$

C. Total surface area of the cone is $192\pi cm^2$

D. The volume of the cone is $\frac{640}{3}\pi cm^3$