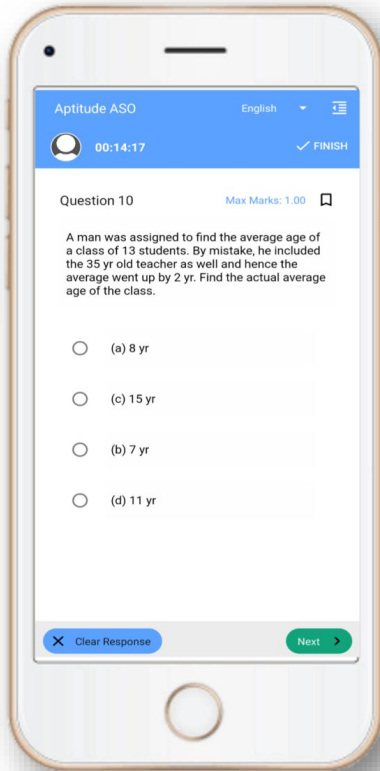


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81. If a line passing through $(3, k)$ and $(2, 7)$ is parallel to the line passing through $(-1, 4)$ and $(0, 6)$, then what is the value of k ?

- (A) 6 (B) 7
(C) 8 (D) 9

82. What is the equation of the circle with centre at the mid-point of the line segment joining the points $(1, 1)$ and $(3, 3)$ and radius?

- (A) $x^2 + y^2 - 4(x + y) + 7 = 0$
(B) $x^2 + y^2 - 4(x + y) + 8 = 0$
(C) $x^2 + y^2 + 4(x + y)$
(D) $x^2 + y^2 + 4(x + y) + 8 = 0$

83. What is the diameter of the sphere?

$$x^2 + y^2 + z^2 - 16x + 12y - 2\sqrt{d}z + d = 0$$

- (A) 40
(B) 20
(C) 10
(D) 5

84. A box contains 100 bulbs out of which 10 are defective. What is the probability that out of a sample of 5 bulbs, exactly 3 are defective?

- (A) $\frac{9^3}{10^5}$
(B) $\frac{9^2}{10^4}$
(C) $\frac{9}{10^3}$
(D) $\frac{9^3}{10^4}$

85. What is the variance of first five positive integers?

- (A) $\sqrt{2}$ (B) $2\sqrt{2}$
(C) 8 (D) 20

86. If $|A| = 50$, $|A \cap B| = 45$ and $|B| = 48$, then what is

$$P(A - B)?$$

- (A) 2^3
(B) 2^2
(C) 2^5
(D) 2

$$P(A - B) = \frac{n(A - B)}{n(A)}$$

$$= \frac{50 - 45}{50}$$

$$= \frac{5}{50}$$

87. Which of the following relations from $A = \{a, b, c\}$ to

$B = \{a, b, c, d\}$ is a function ?

(A) $\{(a, b), (b, c), (c, d), (b, b)\}$

(B) $\{(b, b), (c, c), (a, a), (d, d)\}$

(C) $\{(a, b), (b, c)\}$

(D) $\{(a, a), (b, c), (c, d)\}$

88. If $A = \{(5, 6)\}$ and $B = \{7, 8\}$,

then what is the number of relations from A to B ?

(A) 2^2 (B) 2^3

(C) 2^4 (D) 2^5

89. What is the number of divisors of 864 ?

(A) 24 (B) 30

(C) 36 (D) 42

90. If one of the roots of the quadratic equation

$$x^2 - 5x + p = 0$$

is 3 more than the other, then what is the value of p ?

(A) 1 (B) 2

(C) 3 (D) 4

91. $ABCD$ is a quadrilateral. What is the value of

$$\cos \frac{1}{2} (A + C) + \cos \frac{1}{2} (B + D) ?$$

(A) 0

(B) 1

(C) $\sin \frac{1}{2} (B + D)$

(D) $\cos \frac{1}{2} (B + D)$

92. What is the maximum value of $\sin \theta \cdot \cos \theta$?

(A) 1

(B) $\frac{1}{2}$

(C) 2

(D) 3

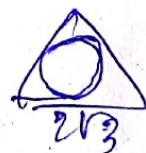
93. If the length of a side of an equilateral triangle is $2\sqrt{3}$ cm, then what is the radius of its circumcircle ?

(A) 1

(B) 2

(C) 3

(D) 4



94. A horse is placed for grazing inside a rectangular field 40 m by 36 m and tethered to a corner by a rope 14 m long. Over how much area can it graze? (Take $\pi = \frac{22}{7}$)
- (A) 150 m^2
 (B) 152 m^2
 (C) 151 m^2
 (D) 154 m^2
95. What is the cofactor a_{23} of the matrix $\begin{bmatrix} -1 & 2 & 1 \\ -2 & 1 & 2 \\ 1 & 3 & -1 \end{bmatrix}$?
- (A) -5 $-3 - 2$
 (B) -1
 (C) 5
 (D) 1
96. What about the set of natural numbers > 1 under multiplication?
- (A) It is a group
 (B) It is a semigroup
 (C) It is a monoid
 (D) It is a subgroup
97. If $x = 2t$ and $y = 2t^2$, then what is $\frac{dy}{dx}$?
- (A) x (B) $2x$
 (C) x^2 (D) $\frac{x}{2}$
98. What is the value of $\lim_{x \rightarrow 0} \frac{\sin x^\circ}{x}$?
- (A) π
 (B) 1
 (C) $\frac{\pi}{180}$
 (D) $\frac{180}{\pi}$
99. A.M. of two numbers a and b is 6 and GM of these numbers is 4, then what is $|\sqrt{a} - \sqrt{b}|$?
- (A) 2 (B) 4
 (C) 6 (D) 12
100. $x^2 - \frac{x^6}{3!} + \frac{x^{10}}{5!} - \dots$ is Maclaurin series of which function?
- (A) $\cos x$
 (B) e^{x^2}
 (C) $\cos x^2$
 (D) $\sin x^2$

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