

SECTION A: MATHEMATICS

Directions: While solving problems you can use any available space on the page for scratchwork. For each question in this section, read the five choices marked (A), (B), (C), (D) and (E) in your test book. Select the letter of the choice which you consider is the correct answer. Then fill in the corresponding circle on your answer sheet.

Numbers: All numbers used are real numbers.

Figures: Figures that accompany problems are intended to provide information useful in solving the problems. The figures may not be drawn to scale, and measurements from the figures may be misleading. All figures lie in a plane unless otherwise indicated.

1. A piece of paper is cut in half. The two pieces are placed on top of each other and are cut once again in half. The four pieces are then placed on top of each other and they are cut in half once again.... After a total of 8 cuts, how many pieces will there will be?

(A) 2^8 (B) 2^9 (C) $8!$ (D) 8^2 (E) 8^8

2. What is the area enclosed by the lines $y = 2x + 2$, $y = 2x - 2$, $y = 2$, and $y = -2$?

(A) 8 units
(B) 6 units
(C) 8.5 units
(D) 12 units
(E) 10 units

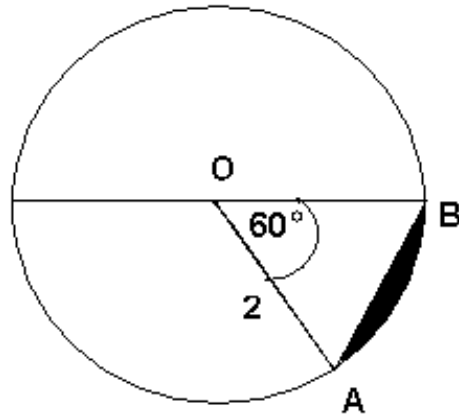
3. If $y(x - y) = \frac{(x^2 - y^2)}{z}$ and $x - y \neq 0$ then $x =$

(A) $y(1 + z)$ (B) $\frac{(x^2 - y^2)}{yz} - y$ (C) $y(z - 1)$ (D) $\frac{x^2 - y - z}{y}$ (E) $\frac{x^2 - y^2 - z}{y}$

4. The ratio of female teachers to male teachers in a school is 2:1. The student teacher ratio is 10:1. What is the ratio of female teachers to students?

(A) 1:15 (B) 1:20 (C) 1:25 (D) 1:30 (E) 1:35

5. In the figure below, the radius of the circle with center O is 2, and $\angle AOB = 60^\circ$. What is the perimeter of the shaded region?



- (A) $2 + \frac{\pi}{2}$ (B) $\sqrt{2} + \pi$ (C) $\frac{3}{2}(2 + \pi)$ (D) $\frac{2}{3}(3 + \pi)$ (E) $\frac{2}{3}(2 + \pi)$
6. A certain sum of money y was divided into 3 portions in the ratio 1:2:3. If the difference between the maximum and minimum portions was Rs 4,000, then $y =$
 (A) Rs 6,000 (B) Rs 8,000 (C) Rs 12,000 (D) Rs 15,000 (E) Rs 24,000
7. If $x < -x$ then
 (A) $1/x < 0$ (B) $x > 0$ (C) $-x^2 > 0$ (D) $x \leq 0$ (E) Impossible
8. If $x = \frac{y}{y+1}$ then $y =$
 (A) $\frac{x}{x+1}$ (B) $\frac{x}{x-1}$ (C) $\frac{x+1}{x}$ (D) $\frac{x-1}{x}$ (E) $\frac{x}{1-x}$
9. If x can have only the values $-3, 0,$ and $2,$ y can have only values $-4, 2,$ and $3,$ what is the greatest possible value of $2x + y^2$?
 (A) 10
 (B) 12
 (C) 16
 (D) 20
 (E) 25

10. $\frac{x - x^2}{\sqrt{x}} =$

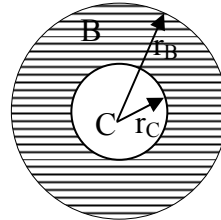
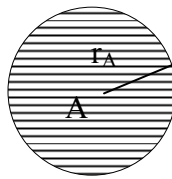
- (A) $x^{-1/2} - x^{3/2}$ (B) $(x - x^2)x^{1/2}$ (C) $x^{1/2} - x^{3/2}$
 (D) $x^{1/2} - x^2$ (E) none of the above

11. If numbers x and y have average z , then the numbers $2x$ and $3y$ have average

- (A) $2z + y/2$
 (B) $z/2 + y$
 (C) $2z + x/2$
 (D) $2z$
 (E) 7

12. If shaded area A equals shaded area B, then possible r_A , r_B , and r_C are

- (A) 4,5,3
 (B) 5,6,4
 (C) 6,7,5
 (D) 4,6,7
 (E) 5,4,2



13. Three dice are rolled simultaneously. What is the probability that each dice shows the same number.

- (A) $1/36$
 (B) $20/36$
 (C) $36/216$
 (D) $1/6$
 (E) $3/6$