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Name :	Batch:

MATH LECTURE - 10

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PART I: CLASS PRACTICE

MISCELLANEOUS PROBLEMS

1. The sum of two positive numbers is 12 and their product is 32. What is the sum of their reciprocals?

a. $\frac{3}{8}$ b. $\frac{8}{3}$ c. $\frac{3}{2}$ d. $\frac{2}{3}$ e. 12

2. If 'a' and 'b' are different positive integers and 5a + b = 32, what is the sum of all possible values of a?

a. 6 b. 11 c. 15 d. 18 e. 21

3. A trader usually makes a profit of 40% on items he sells. If he reduces the price by 10%, his sales increase by 40%. What is the ratio of his new total profit to his original total profit?

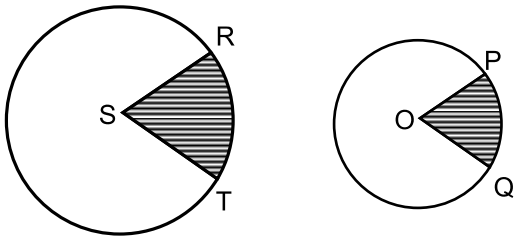
a. 1.28 b. 0.78 c. 1.11 d. 0.91 e. None of these

4. $\frac{4}{n}, \frac{5}{n}, \frac{7}{n}$ If each of the fractions beside is in its simplest reduced form, which of the following could be the value of 'n'?

a. 24 b. 25 c. 26 d. 27 e. 28

5. In the figure beside, the radius of the circle S is twice the radius of the circle O and the measure of ∠POQ is half that of ∠RST. If the area of the shaded region of circle O is 3, what is the area of the shaded region of circle S?

a. 1.5
b. 3
c. 6
d. 12
e. 24



6. During a special sale, eight shirts can be purchased for the price of five shirts. The savings per shirt is what percent of the usual price of a shirt?

a. 25% b. $37\frac{1}{2}\%$ c. 40% d. 60% e. $67\frac{1}{2}\%$

7. If $2 < x < 5$ and $3 < y < 6$, which of the following describes all the possible values of $x - y$?

a. $-4 < (x-y) < 1$ b. $-4 < (x-y) < 2$ c. $-1 < (x-y) < 1$ d. $-1 < (x-y) < 11$ e. $5 < (x-y) < 11$

8. In a certain school, the ratio of seniors to juniors is 5:4, and the ratio of seniors to sophomores is 6:5. What is the ratio of juniors to sophomores?

a. 2:3 b. 25:24 c. 1:1 d. 24:25 e. 3:2

9. The cost of two liters of oil and its container is Tk. 100. If the cost of the container is Tk. 23 less than the cost of one liter of oil, what is the cost of one liter of oil?

a. 39 b. 41 c. 43 d. 47 e. None of these

10. The result obtained when x is multiplied by y is equal to ten times the result obtained when y is subtracted from x. If y equals 5, what does x equal?

a. 50 b. 25 c. 15 d. 10 e. 5

11. $4^{20} + 4^{20} + 4^{20} + 4^{20} = ?$

a. 16^{80} b. 4^{80} c. 4^{21} d. 16^{20} e. None

12. In making a radio set, the cost of labor and materials are in the ratio of 3:2. A manufacturer sells a set for Tk. 1,500 to make a gain of 25% of the cost. What is the cost of the materials for the set?

a. Tk. 720 b. Tk. 600 c. Tk. 540 d. Tk. 490 e. Tk. 480

13. How long must a driver take to drive the final 70 miles of a trip if he wants to average 50 miles an hour for the entire trip and during the first part of the trip he drove 50 miles in $1\frac{1}{2}$ hours?

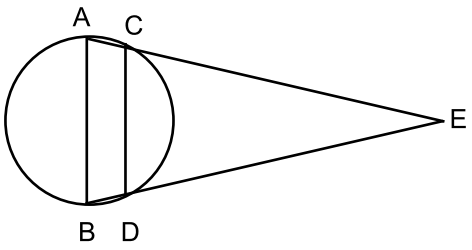
a. 50 minutes b. 54 minutes c. 66 minutes d. 70 minutes e. 75 minutes

14. Johan lives 4 kilometers due west of Tasman's house. Akib lives 6 kilometers due north of Tasman's house and 4 kilometers due west of Turab's house. What is the straight line distance, in kilometers, from Johan's house to Turab's house?

a. 4 b. 5 c. 8 d. 10 e. 12

15. In the figure, AB, the diameter of the circle, is parallel to CD. If ∠AEB = 40° and AE = BE, then ∠ACD =?

a. 100°
b. 110°
c. 115°
d. 120°
e. None of these



16. A man can work twice as much as a boy can and a man can complete a given job in 35 days working alone. In how many days can two men and three boys working together complete the same job?

a. 12 b. 10 c. 8 d. 14 e. 15

17. If the product of two integers is between 102 and 115, which of the following CANNOT be one of the integers?

a. 5 b. 10 c. 12 d. 15 e. 20

18. Which of the following is a factor of the expression $2x^2 - 8 = 0$?

a. x + 2 b. x – 2 c. x + √2 d. x – √2 e. Both a & b

19. It costs $1,000 to make the first thousand copies of a book and x dollars to make each subsequent copy. If it costs a total of $ 7,300 to make the first 8,000 copies of a book, what is the value of x?

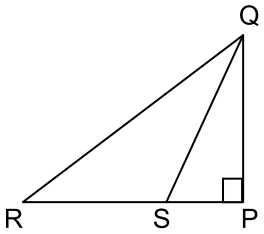
a. 0.89 b. 0.90 c. 1.00 d. 1.11 e. 90.00

20. A picture in an art museum is 6 feet wide and 8 feet long. If its frame has a width of 6 inches, what is the ratio of the area of the frame to the area of the picture?

a. $\frac{5}{16}$ b. $\frac{5}{4}$ c. $\frac{4}{5}$ d. $\frac{5}{12}$ e. $\frac{3}{10}$

21. The area of the ΔPQR beside is 36 units. If PQ = 4 and SQ = 5, what is the area of ΔSQR?

a. 6
b. 24
c. 72
d. 32
e. 30



22. If x is an integer and $\frac{x+7}{2}$ is an integer, which of the following must be true?

I. x is odd. II. x is a multiple of 7. III. $\frac{x+5}{2}$ is an integer.

a. I only b. II only c. III only d. I and II only e. I and III only

23. Three automatic looms produced quantities of material in the ratios of 5:4:3 during operating times in the ratios of 1:2:3, respectively. What are the ratios of their respective operating speeds?

a. 5:2:1 b. 4:2:1 c. 3:2:1 d. 1:1:1 e. 1:2:3

24. If $\frac{1}{2}$ of the number of white mice in a certain laboratory is $\frac{1}{8}$ of the total number of mice, and $\frac{1}{3}$ of the number of gray mice is $\frac{1}{9}$ of the total number of mice, then what is the ratio of the number of white mice to the number of gray mice?

a. 16:27 b. 2:3 c. 3:4 d. 4:5 e. 8:9

25. The average (arithmetic mean) weight of five chemical samples is 0.5 grams. If the weight of the lightest of the five samples is 0.35 grams, which of the following could NOT be the weight, in grams, of the heaviest of the five samples?

a. 0.80 b. 0.99 c. 1.05 d. 1.15 e. None of these

PART II: TAKE HOME ASSIGNMENT

01. If $2r = 5s = 3t$, which of the following is a true statement? $(r, s, t > 0)$

I. $3t = 2r + s$ II. $6s = 3t + r$ III. $10s = 3t + 2r$

a. I only b. II only c. III only d. I and III only e. I, II and III

02. The ratio of water and salt in a 16 kg solution of salt and water is 3:1. How much water in kg must be added to make the ratio of salt and water 4:1?

a. 2 b. 3 c. 4 d. 6 e. None of these

03. In the following diagram, AB = AC, $\angle A = 40^\circ$, and BD is perpendicular to AC at D. How many degrees are there in $\angle DBC$?

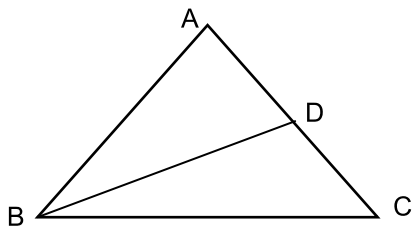
a. 20°

b. 40°

c. 50°

d. 70°

e. None of these



04. If a, b, c are all odd integers, which of the following expressions must be an even integer?

a. a+b+c b. ab+bc+ca c. a (b+c) d. abc e. bc(a−2)

05. What is the perimeter, in centimeters, of a rectangular newspaper ad 14 cm wide that has the same area as a rectangular newspaper ad 52 cm long and 28 cm wide?

a. 80 b. 118 c. 160 d. 208 e. 236

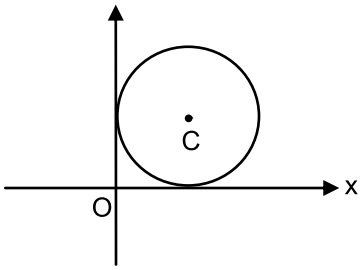
06. If 8x represents the perimeter and (2x + 3) represents the length of a rectangle, what is its width?

a. 6x + 3 b. 6x – 3 c. 3 d. 2x – 3 e. 10x + 3

07. If $\frac{t^2+2t}{2t+4} = \frac{t}{2}$, what value(s) may 't' have ?

a. −2 only b. 2 only c. Any value except 2

d. Any value except−2 e. Any value



08. The circle with center C shown above is tangent to both axes. If the distance from O to C is equal to k, what is the radius of the circle, in terms of k?

a. k b. $\frac{k}{\sqrt{2}}$ c. $\frac{k}{\sqrt{3}}$ d. $\frac{k}{2}$ e. $\frac{k}{3}$

09. If m and n are positive integers and m < n, which of the following must be greater than $\frac{m}{n}$?

I. $\frac{m+1}{n+1}$ II. $\frac{m+1}{n}$ III. $\frac{m}{n+1}$

a. I only b. II only c. III only d. I and II only e. II and III only

10. What is the next number of the series: 2, 3, 5, 7, 11, 13, …?

a) 15 b) 17 c) 19 d) 21 e) none of these

11. A sports jacket marked $48 is offered at a discount of 25 percent during a storewide sale. At this reduced price the dealer makes a profit of 20 percent of the cost. What is the cost to the dealer?

a. $26 b. $30 c. $34 d. $38 e. $42

12. Two cartons weigh (3x – 2) and (2x – 3). If the average weight of the cartons is 10, the heavier carton weighs how much more than the lighter carton?

a. 2 b. 4 c. 5 d. 6 e. 10

13. A group of 15 students took a test that was scored from 0 to 100. If exactly 10 students scored 75 or more on the test, what is the lowest possible value for the average of the scores of all students?

a. 25 b. 50 c. 70 d. 75 e. 90

14. 20% of which number exceeds a sixth of it by 10?

a. 300 b. 180 c. 150 d. 240 e. 500

15. Which of the following statements is NOT true?

a. The square root of a negative number is not a real number.
b. Every positive number has two square roots.
c. Every real number has exactly one real cubic root.
d. Squaring a number between 0 and 1 results in a greater number.
e. Any number having an even power is always positive or zero.

16. Which of the following equations have (has) only one integer solution?

I. $x + 9x = 0$ II. $x^2 + 9x = 0$ III. $x^3 + 9x = 0$

a. I only b. II only c. III only d. I and III only e. I, II and III

17. If k is an integer and $r = k^2 + 3k + 9$, which of the following statements about r must be true for all values of k?

a. r is even b. r is odd c. r is divisible by 3
d. r is not divisible by 3 e. r is the square of an integer

18. Three times a number less 7 is 2. What is 1/3 of the number?

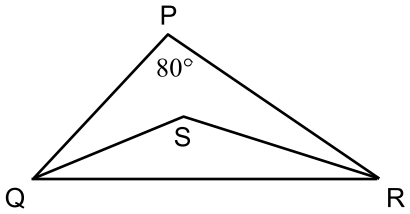
a. 9 b. $\frac{9}{2}$ c. $\frac{3}{2}$ d. 3 e. 1

19. A motorboat travels 90 km in 5 hours going upstream and 120 km in 4 hours going downstream. What is the speed of the current?

a. 4 km/hr b. 5 km/hr c. 6 km/hr d. 8 km/hr e. 24 km/hr

20. In triangle PQR, QS and SR are angle bisectors and ∠P = 80°. How many degrees are there in ∠QSR?

a. 115°
b. 120°
c. 125°
d. 130°
e. 135°



21. 20/x (where x is an integer greater than 0) has a remainder of x – 1. The value of x could be:

a. 2 b. 4 c. 5 d. 7 e. 9

22. On a certain toll road, the toll charge is 10 cents per mile for the first 50 miles, 20 cents per mile for the next 20 miles, and 30 cents per mile for the last 10 miles. What is the average cost per mile (in cents) for the entire trip?

a. 10.5 b. 12 c. 12.5 d. 15 e. 18

23. If a machine seals cans at the rate of 9 cans every four seconds, how many minutes will it take the machine to seal 270 cans?

a. 2 b. 3 c. 4 d. 5 e. 9

24. A worker is paid Tk. 40 per hour for the first 8 hours and then Tk. 52 for each additional hour. If on a certain day, his average pay was Tk. 44 per hour, how many hours did he work on that day?

a. 12 b. 10 c. 8 d. 4 e. None of these

25. In a certain shop, items were put in a showcase and assigned prices for January. Each month after that, the price was 10% less than the price for the previous month. If the price of an item was P dollars for January, what was the price for April?

a. 0.6P b. 0.65P c. 0.7P d. 0.729P e. 0.81P

Name……..

Review Test on Lecture 9

10 marks, 10 minutes

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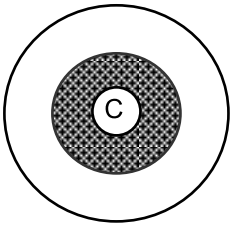
1. The perimeter of an equilateral triangle is equal to the perimeter of a regular hexagon. What is the ratio of their sides?

a. 1: 1 b. 2: 1 c. 1: 3 d. 1: 6 e. Cannot be determined

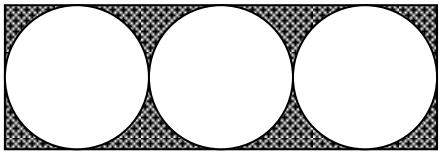


2. In the figure above, the three circles share a common center C. The smallest circle has a radius of 2; the next circle has a radius of 5; and the largest circle has a radius of 9. What fraction of the area of the largest circle is the area of the shaded region?

a. $\frac{7}{27}$ b. $\frac{25}{81}$ c. $\frac{1}{3}$ d. $\frac{7}{11}$ e. $\frac{12}{17}$

3. The ratio of the radii of two spheres is 3:1, which of the following represents the ratio of the volumes of the spheres?

a. 1:9 b. 9:1 c. 1:8 d. 27:1 e. None of these



4. The figure above shows a rectangular tile. The tile has three inscribed tangent circles. If the radius of each circle is 2 cm, what is the area of the shaded portion?

a. $12 - 48\pi$ b. $12 - 12\pi$ c. $48 - 12\pi$ d. $48 - 6\pi$ e. $12 - 6\pi$

5. What is the radius of the largest sphere that can be placed inside a cube of volume 64?

a. $4\sqrt{2}$ b. $2\sqrt{2}$ c. 8 d. 4 e. 2

6. What is the maximum area of the square that can be cut from a circular sheet of paper whose area equals to 25π square feet?

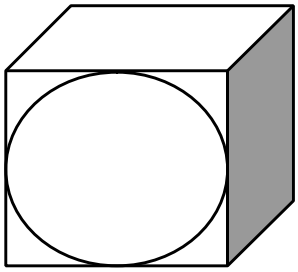
a. 25 square feet b. 40 square feet c. 50 square feet
d. 75 square feet e. 100 square feet

7. If the circumference of a circle becomes double, then the area of the circle is increased by:

a. 100% b. 150% c. 200% d. 300% e. 400%

8. If you double the area of the base of a rectangular solid, and also triple the solid's height, what is the ratio of the new volume to the old volume?

a. 2:3 b. 3:2 c. 1:6 d. 6:1 e. None of these



9. In the figure shown above, a sphere is inscribed inside a cube. If the radius of the sphere is 2.5 cm, what is the total surface area of the cube?

a. 25 cm^2 b. 50 cm^2 c. 100 cm^2 d. 150 cm^2 e) Cannot be determined

10. Line ℓ passes through the point (3,8) and the point (1,−4). Which of the following is the slope of line ℓ?

a. $\frac{1}{6}$ b. 3 c. 6 d. − 6 e. None of these

Answer Sheet

1. ☐ ☐ ☐ ☐ ☐
2. ☐ ☐ ☐ ☐ ☐
3. ☐ ☐ ☐ ☐ ☐
4. ☐ ☐ ☐ ☐ ☐
5. ☐ ☐ ☐ ☐ ☐
6. ☐ ☐ ☐ ☐ ☐
7. ☐ ☐ ☐ ☐ ☐
8. ☐ ☐ ☐ ☐ ☐
9. ☐ ☐ ☐ ☐ ☐
10. ☐ ☐ ☐ ☐ ☐

SCORE……

REMARKS……