



# MATHS

**BOOKS - INDEPENDENTLY PUBLISHED**

**MATHS (ENGLISH)**

**1600 CLUB BACKGROUND TOPICS**

## Example

1. If  $a$  and  $b$  are nonzero numbers such that  $a$  is the reciprocal of  $b$ , which of the following must be true?

I.  $\frac{1}{a} > \frac{1}{b}$

II.  $a^2 < b^2$

III.  $b^2 \geq 1$

A. None

B. I only

C. II only

D. III only

**Answer: A**



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2. A small bag contains 4 white and 3 red marbles . Two marbles are randomly removed from the bag . Find the probability that a white marble is removed , followed by a red.

A.  $\frac{1}{7}$

B.  $\frac{2}{7}$

C.  $\frac{3}{7}$

D.  $\frac{4}{7}$

**Answer: B**



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3. A hat contains the integers 1 to 100, inclusive. If a number is drawn at random from the hat, what is the probability that a multiple of 5 or a multiple of 8 is drawn ?

A.  $\frac{3}{5}$

B.  $\frac{33}{100}$

C.  $\frac{3}{10}$

D.  $\frac{31}{100}$

**Answer: C**



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4. In a batch of 10 light bulbs , 2 are defective .  
If 3 of the bulbs are chosen at random, what is  
the probability that at least 1 of the chosen  
bulbs is defective ?

A.  $\frac{8}{15}$

B.  $\frac{7}{15}$

C.  $\frac{3}{10}$

D.  $\frac{1}{4}$

**Answer: A**



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5. A colony of bacteria numbers 2,000 at 1 P.M. and increases 20 percent per hour . What is the population at 4 P.M. that same day ?

A. 2800

B. 3456

C. 3200

D. 3800

**Answer: B**



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**6.**  $16^{-\frac{3}{4}}$  is equal to

A.  $-8$

B.  $8$

C.  $-\frac{1}{8}$

D.  $\frac{1}{8}$

**Answer: D**



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7. If  $x = 2.4 \times 10^6$  and  $y = 6.0 \times 10^{-8}$ ,

express  $xy$  in scientific notation.

A.  $1.44 \times 10^{-1}$

B.  $1.44 \times 10^{-2}$

C.  $14.4 \times 10^{-2}$

D.  $1.44 \times 10^{-3}$

**Answer: A**





8. If  $x^2b^4 = ab^{-1}$ , what is  $a$  in terms of  $b$  and  $x$ ?

A.  $x^2b^3$

B.  $x^2b^5$

C.  $x^2b^{-3}$

D.  $x^2b^{-5}$

**Answer: B**



9.



Let A, P, Q, and B be points on  $\overline{AB}$ , as shown above. If  $AP:PQ=1:4$ ,  $PQ:QB=8:3$ , and AP, PQ and QB are all integer lengths, which could be the length of AB ?

A. 62

B. 63

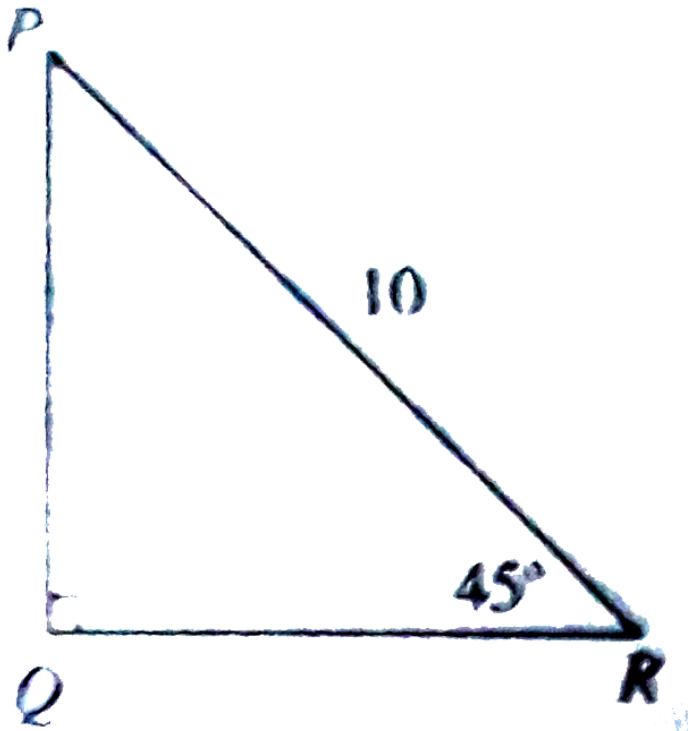
C. 64

D. 65

**Answer: D**



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10.

What is the length of  $\overline{QR}$ ?

A. 5

B.  $\frac{5\sqrt{2}}{2}$

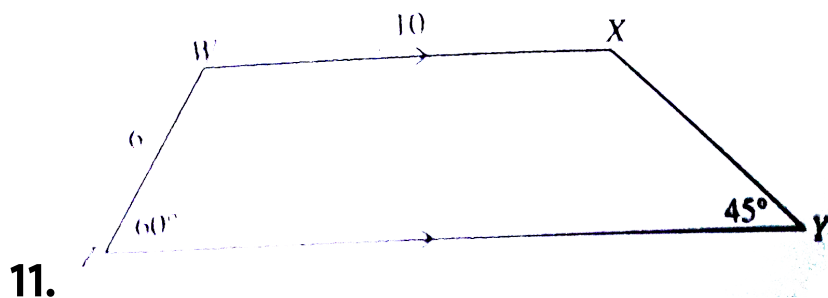
C.  $10\sqrt{2}$

D.  $5\sqrt{2}$

**Answer: D**



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In the figures shown above,  $\overline{WX}$  is parallel to

$\overline{ZY}$ . What is the perimeter of quadrilateral of

WXYZ ?

A.  $29 + 3\sqrt{3} + 3\sqrt{6}$

B.  $29 + 6\sqrt{3} + 6\sqrt{6}$

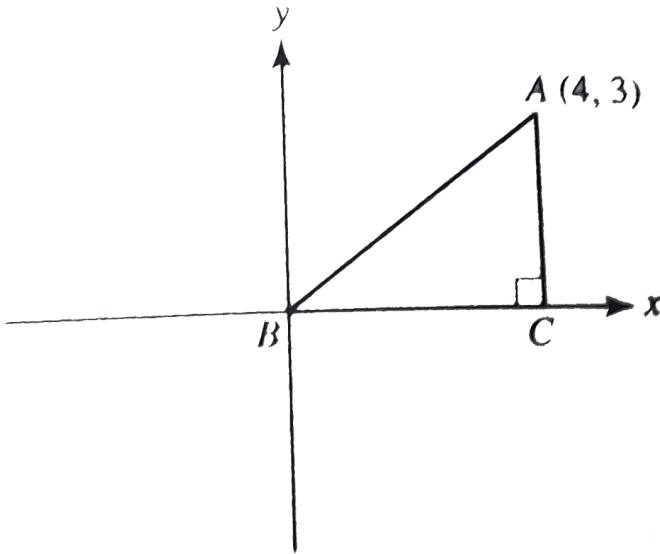
C.  $29 + 3\sqrt{3} + 3\sqrt{2}$

D.  $35 + 3\sqrt{2}$

**Answer: A**



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12.

In the figures above,  $\triangle ABC$  is rotated counterclockwise through  $90^\circ$  about the origin. Its image is  $\triangle A'B'C'$ . What is the slope of  $\overline{A'B'}$ ?

A.  $\frac{3}{4}$

B.  $\frac{4}{3}$

C.  $-\frac{3}{4}$

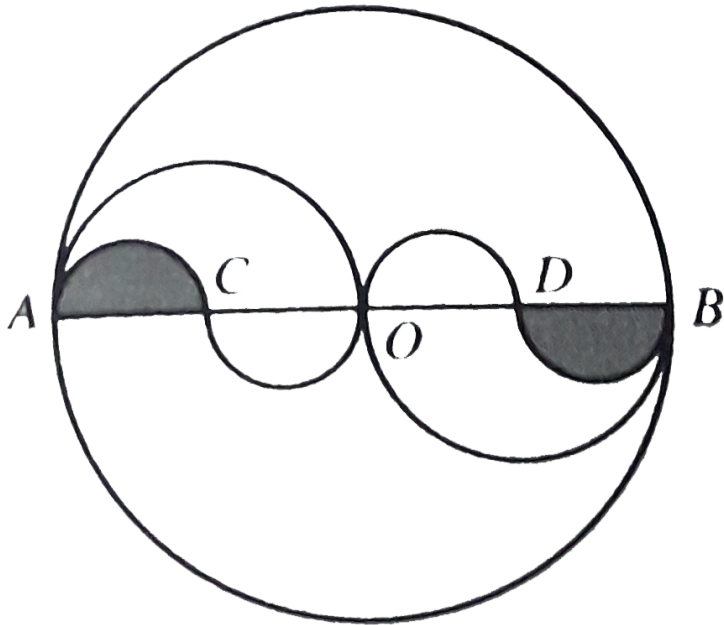
D.  $-\frac{4}{3}$

**Answer: D**



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13.

In the circle shown above,  $O$  is the center and  $\overline{AB}$  is a diameter. There are two semicircles with diameters  $\overline{AO}$  and  $\overline{BO}$ , and four smaller semicircles with congruent diameters  $\overline{AC}$ ,  $\overline{CO}$ ,  $\overline{OD}$  and  $\overline{DB}$ . A point is picked at

random in the large circle . What is the probability that it lands in a shaded region ?



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## Practice Test

1. Points A and B are on the number line in such a way that A corresponds to 0.625 and B corresponds to 0.637 . If P is the midpoint of  $\overline{AB}$  , and Q is on the number line two-thirds of

the distance from A to B , what is the ratio of PQ to AQ ?

A. 1 : 4

B. 1 : 3

C. 1 : 2

D. 2 : 3

**Answer: A**



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2. Ali is in a minivan with  $x$  children. Let  $y$  be the average (arithmetic mean) of the children's ages. If Ali's age is 6 times  $y$ , then her age is what fraction of the total ages of all the people in the minivan?

A.  $\frac{6}{6 + y}$

B.  $\frac{6}{6 + x}$

C.  $\frac{6}{x + y}$

D.  $\frac{x}{6y}$

**Answer: B**



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3. For the expression  $x\sqrt{x}$ , where  $-100 \leq x \leq 100$ , how many  $x$  values are there such that the expression is an integer ?

A. 100

B. 21

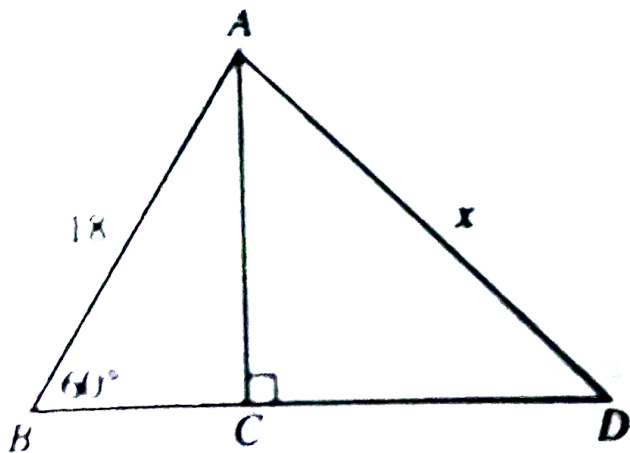
C. 20

D. 11

**Answer: D**



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4.

In the figures shown above , given that

$\overline{AC} \cong \overline{DC}$  , the value of  $x$  is

A.  $18\sqrt{6}$

B.  $18\sqrt{2}$

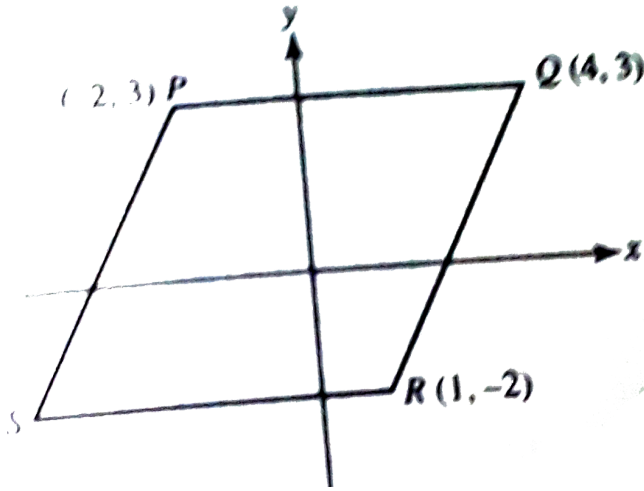
C.  $9\sqrt{2}$

D.  $9\sqrt{6}$

**Answer: D**



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5.

In the diagram above , PQRS is a parallelogram. What is the area of PQRS ?

A. 15

B. 18

C. 30

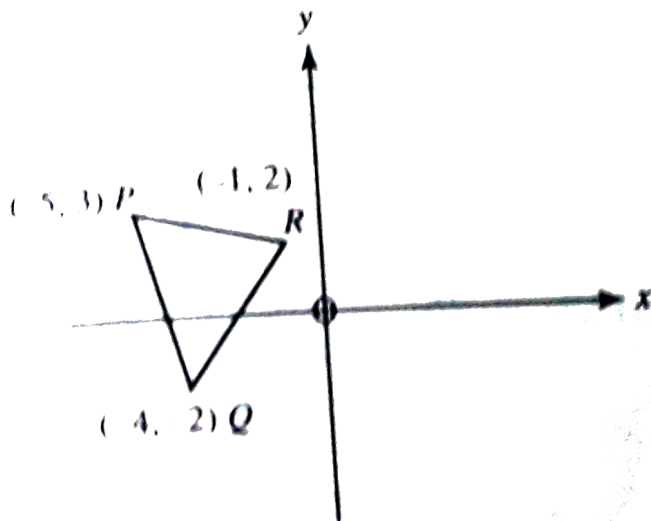
D.  $3\sqrt{34}$



**Answer: C**



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**6.**

Triangle PQR , shown in the diagram above , is translated 4 units to the right and 5 units down. The resulting triangle is then rotated

$180^\circ$  counterclockwise about the origin. What is the final image of point P ?

A. (-1,-2)

B. (1,2)

C. (2,1)

D. (-2,1)

**Answer: B**



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7. A line intersects two parallel lines , forming eight angles . If one of the angles has measure  $a^\circ$  , how many of the other seven angles are supplementary to it ?

A. 1

B. 2

C. 3

D. 4

**Answer: D**



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8.  $(3x^2y^{-3})^{-2}$  is equivalent to

A.  $\frac{9}{x^4y^6}$

B.  $\frac{y^6}{9x^4}$

C.  $\frac{9x^4}{y^6}$

D.  $-\frac{9}{x^4y^6}$

**Answer: B**



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9. A population of bacteria doubles every 2 hours . What is the percent increase after 4 hours ?

A. 400

B. 500

C. 300

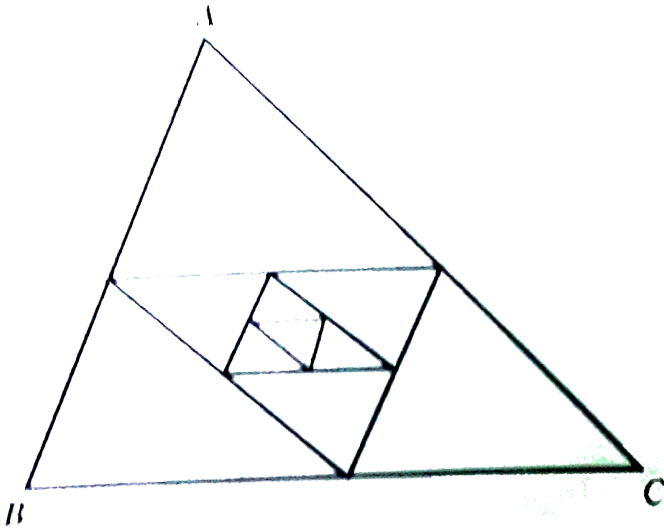
D. 600

**Answer: C**



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10. Six chairs are placed in a row to seat six people . How many different seating arrangements are possible if two of the people insist on sitting next to each other :



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11. The triangles inside  $\triangle ABC$ , shown above, are formed by joining the midpoints of the sides and then repeating the process. If a point is chosen at random inside  $\triangle ABC$ , what is the probability that the point lies in the shaded region ?



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