Column A

$(x^3 + 1)^2$

Column B

x^6

A	The quantity in Column A is greater
B	The quantity in Column B is greater
C	The two quantities are equal
D	The relationship cannot be determined from the information given

$ab = 12$

$b^2 = 16$ → $b = \pm 4$ ⟹ $\begin{cases} b = 4 \\ a = 3 \end{cases}$ $\begin{array}{l} b = -4 \\ a = -3 \end{array}$

<u>Column A</u>

a

<u>Column B</u>

b

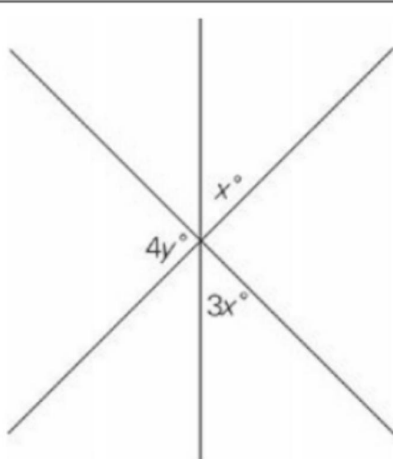| A	The quantity in Column A is greater
B	The quantity in Column B is greater
C	The two quantities are equal
D	The relationship cannot be determined from the information given

$(x + y)(x - y) = 0$

$xy \neq 0$

<u>Column A</u>

$6\sqrt{\dfrac{19}{2x^2}}$
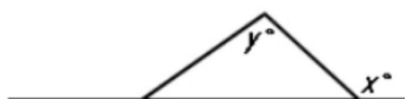
<u>Column B</u>

$\sqrt{\dfrac{342}{y^2}}$

A	The quantity in Column A is greater
B	The quantity in Column B is greater
C	The two quantities are equal
D	The relationship cannot be determined from the information given

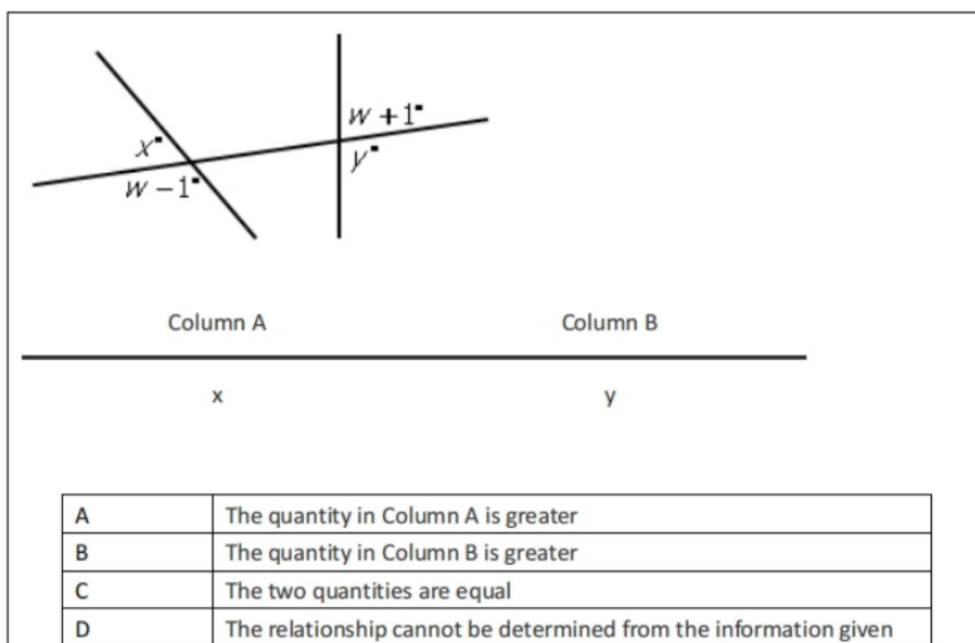What is the value of *y* in the figure above, if $5x = 4y$?

A	25
B	50
C	60
D	80
E	100

Column A	Column B
x	y

A	The quantity in Column A is greater
B	The quantity in Column B is greater
C	The two quantities are equal
D	The relationship cannot be determined from the information given

$x°$

$w - 1°$

$w + 1°$

$y°$

Column A	Column B
x	y

A	The quantity in Column A is greater
B	The quantity in Column B is greater
C	The two quantities are equal
D	The relationship cannot be determined from the information given

For positive numbers p and q, $\dfrac{p-q}{p+q} = \dfrac{2}{3}$

Column A	Column B
p + q	5

A	The quantity in Column A is greater
B	The quantity in Column B is greater
C	The two quantities are equal
D	The relationship cannot be determined from the information given

A jar contains only marbles of three different colors: red, green, and yellow. The red and green marbles are in a ratio of 2:5, and the yellow and red marbles are in a ratio of 5:6. Which of the following could be the total number of marbles?

A	13
B	24
C	52
D	90
E	134
F	182

a is the product of 3 and the square root of 2, b is the product of 2 and the square root of 3, and c is the product of 2 and the square root of 6. If x is the square of the sum of a and b, y is the product of 6 and the difference of 5 and c, and z is the product of 2 squared and 3 squared, what is $\frac{xy}{z}$?

A	1
B	$30 - 12\sqrt{6}$
C	36
D	$30 + 12\sqrt{6}$
E	64

Last year, Melania had a total of $20,000 invested in two mutual funds, Capital Growth Fund and Venture Index Fund. At the end of the year, she analyzed her investments and found that her earnings on her shares of Capital Growth Fund were three times half of her earnings on her investment in Venture Index Fund. If she earned a total of $1,250 on her investments in the two funds, and had three times as much money invested in Capital Growth Fund as in Venture Index Fund, what percent interest did Melania earn on her investment in Venture Index Fund? (percent interest $= \left(\dfrac{earnings}{investment} \right) \times 100$)

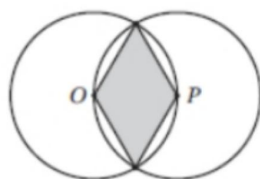| A	.075
B	.01
C	7.5
D	10
E	500

On Monday, Janice started training for a marathon and ran one mile that day. On Tuesday, Janice ran one mile more than she did on Monday. She continues this training process for 12 days. The sum of the total number of miles Janice ran has how many distinct prime factors?

For the following question, enter your answer in the boxes.

Of the 20 lightbulbs, in a box, 2 are defective. An inspector will select 2 lightbulbs simultaneously and at random from the box. What is the probability that neither of the lightbulbs selected will be defective?
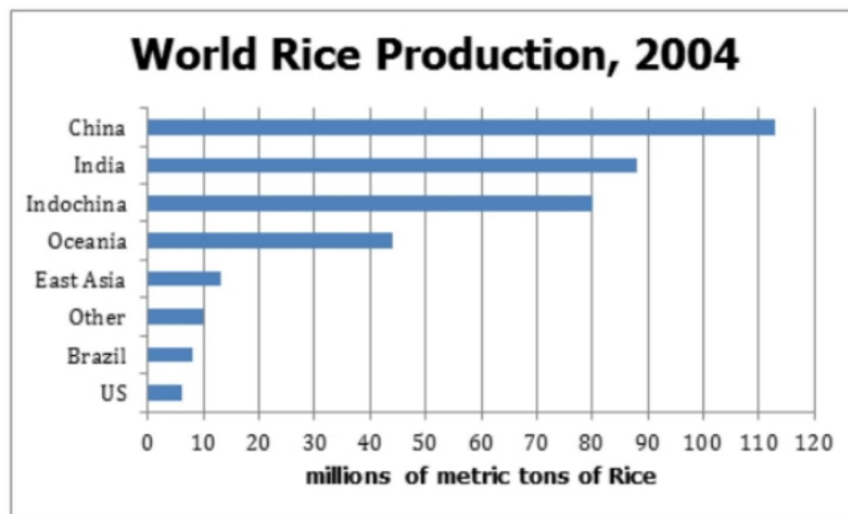
Give your answer as a fraction.

———

In the figure above, O and P are the centers of the two circles. If each circle has radius r, what is the area of the shaded region?
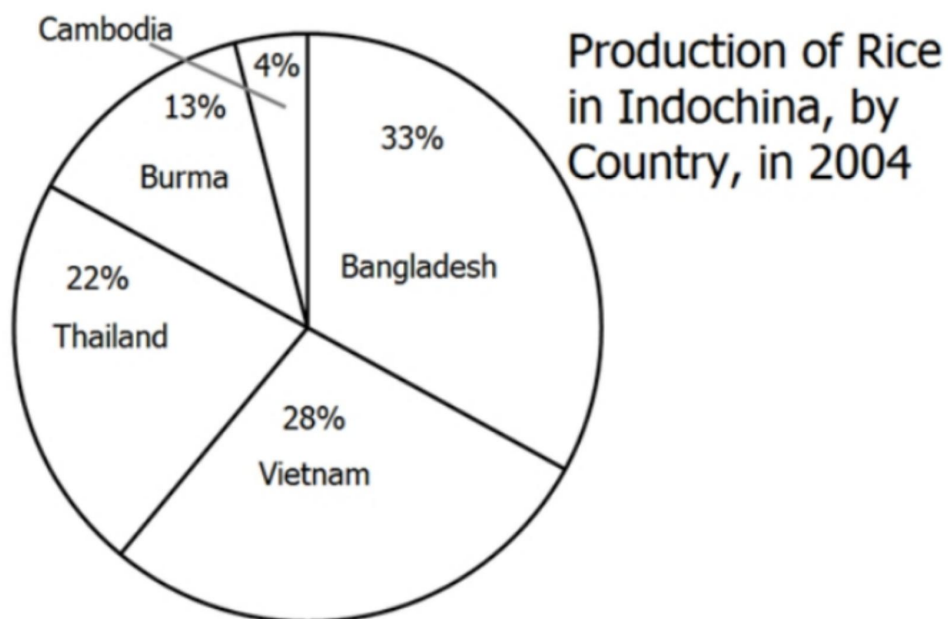
A	$\frac{\sqrt{2}}{2}r^2$
B	$\frac{\sqrt{3}}{2}r^2$
C	$\sqrt{2}r^2$
D	$\sqrt{3}r^2$
E	$2\sqrt{3}r^2$

If $0 < a < 1 < b$, which of the following is true about the reciprocals of a and b?

A	$1 < \dfrac{1}{a} < \dfrac{1}{b}$
B	$\dfrac{1}{a} < 1 < \dfrac{1}{b}$
C	$\dfrac{1}{a} < \dfrac{1}{b} < 1$
D	$\dfrac{1}{b} < 1 < \dfrac{1}{a}$
E	$\dfrac{1}{b} < \dfrac{1}{a} < 1$

World Rice Production, 2004

World's Total Rice Production in 2004 = 368,080,000 metric tons

Production of Rice in Indochina, by Country, in 2004

What was the approximate rice production of Vietnam in 2004?
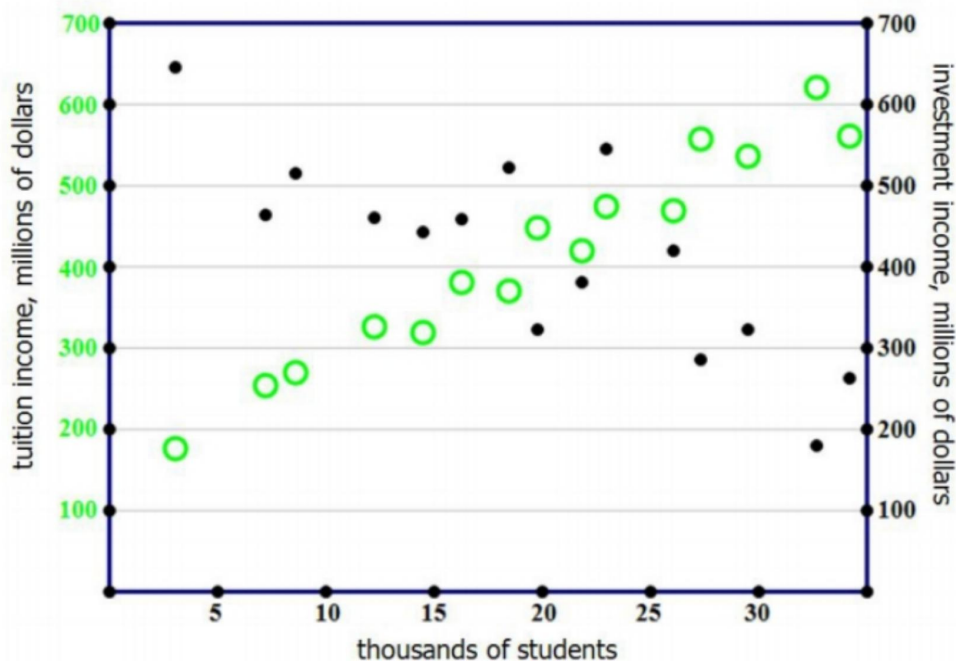
A	8,400,000
B	22,400,000
C	43,700,000
D	80,000,000
E	103,060,000

Suppose China's production remains more or less constant from 2004 to 2006. Suppose India is able to sustain the same percent increase in both of those years. By what percent would India's rice production have to increase from 2004 to 2005 and again from 2005 to 2006 so that it equaled China in rice production in 2006?

A	10.0%
B	12.8%
C	16.3%
D	21.5%
E	27.4%

Bangladesh accounted for what percent of world rice production in 2004?

A	1.4%
B	7.2%
C	11.6%
D	33%
E	47.6%

On the above diagram, each of fifteen private colleges is represented by a circle and a dot. The light green circle, read against the green scale on the left, gives the college's annual gross tuition income in 2008; the data point is the very center of the circle. The black dot, directly above or below the center of the green circle and read against the right scale, gives the college's annual income in 2008 from investments such as endowments.

For the 15 colleges shown, the graph supports which of the following statements

I. tuition income is positively correlated with student enrollment

II. investment income is negatively correlated with student enrollment

III. all colleges with over 20,000 student have less than $500 million in investment income

A	I only
B	I and II only
C	I and III only
D	II and III only
E	I, II, and III

The college that is drawing the most investment income in 2008 takes in approximately how much in mean total income per student in 2008? (Total income = tuition + investments)

A	$5,600
B	$28,000
C	$36,000
D	$56,000
E	$237,000

If the tuition income at a college exceeds its investment income, then that college is said to be "tuition driven." How many colleges shown here were tuition driven in 2008?

A	4
B	5
C	6
D	7
E	8