

Sample Regional Game

Question #1—100 Points

If we let P represent the population of Rhode Island, then $\log_{10} P$ is about

0

A. -1

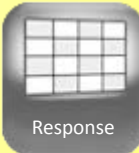
0

B. 0

0

C. 1

0

D. 6 

Question #2—200 Points

What is the surface area of a sphere of radius r divided by its volume?

0

A. $\frac{1}{3r}$

0

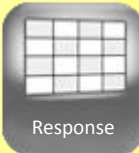
B. $\frac{4}{3r}$

0

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

0

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



Question #3—300 Points

Three fair two-sided coins are flipped (and H/T is noted). What is the probability that not all three coins land with the same result?

0

A. $1/2$

0

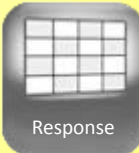
B. $5/8$

0

C. $3/4$

0

D. $7/8$



Question #4—400 Points

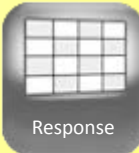
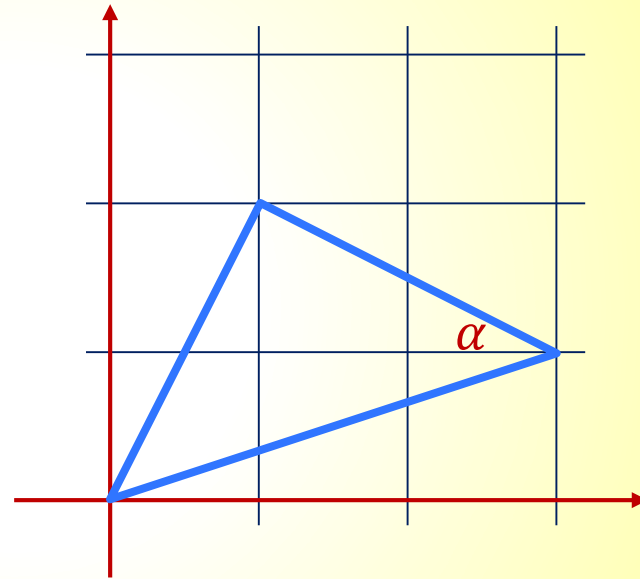
What is the measure of angle α (in radians)?

A. $\tan^{-1}\left(\frac{1}{\sqrt{2}}\right)$

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

C. $\tan^{-1}(\sqrt{2})$

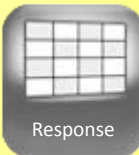
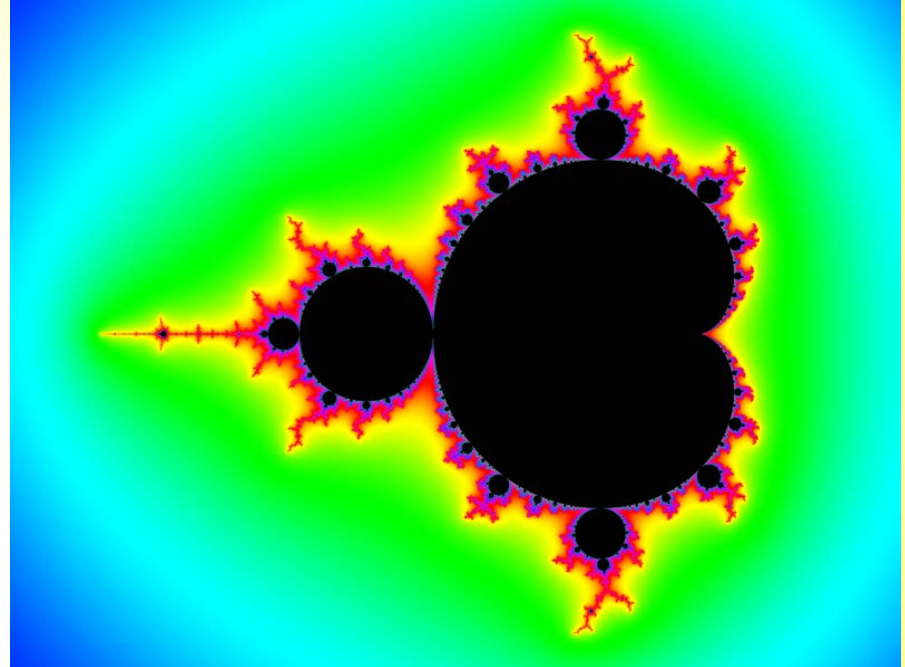
D. It can't be determined from the given information.



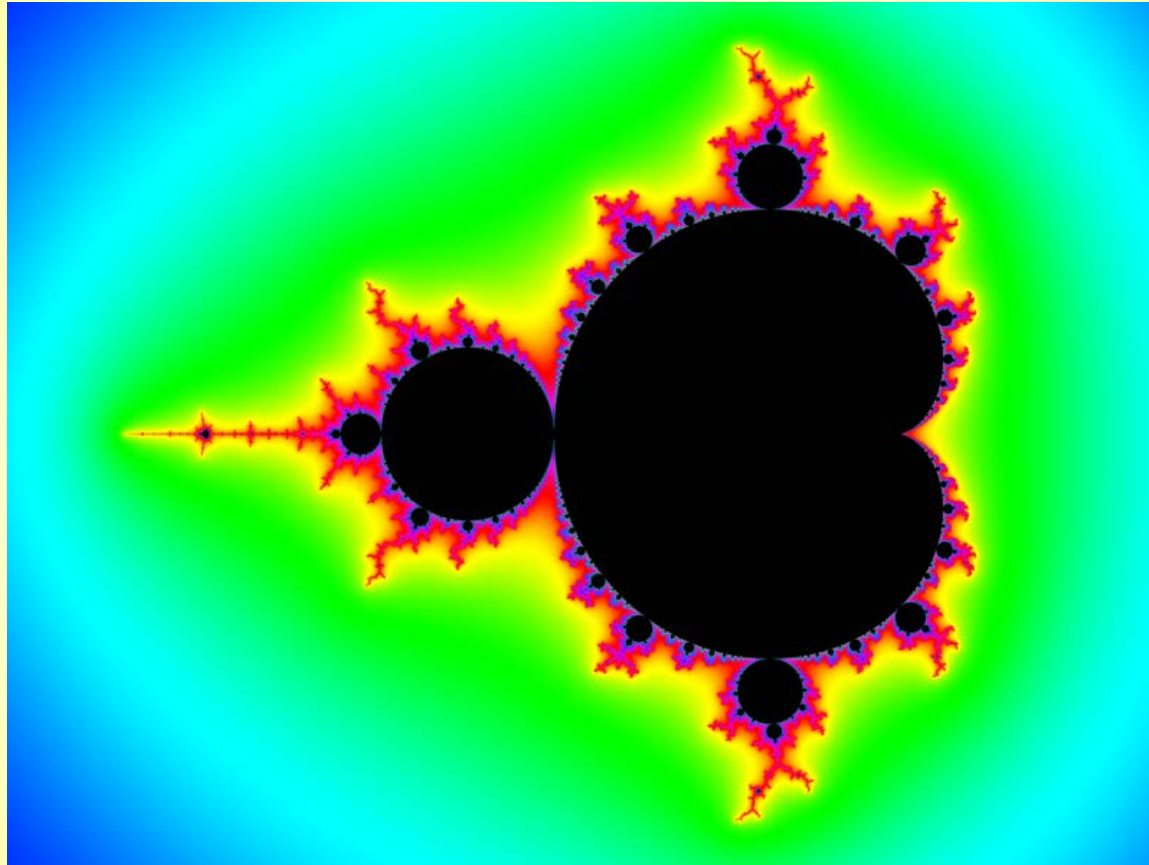
Question #5—500 Points

The set pictured is named after which of the following mathematicians?

- A. Rene Descartes
- B. Pierre Fatou
- C. Edward Lorenz
- D. Benoît Mandelbrot



The Mandelbrot Set



http://commons.wikimedia.org/wiki/File:Mandelbrot_set_rainbow_colors.png

Question #6—600 Points

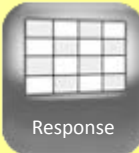
The number n^n is calculated for each positive integer n from 2010 to 2019 (inclusive). How many different units/ones digits result?

A. 6

B. 7

C. 8

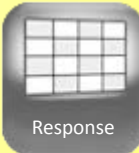
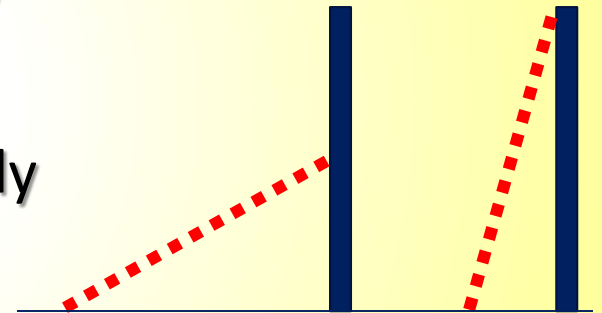
D. 9

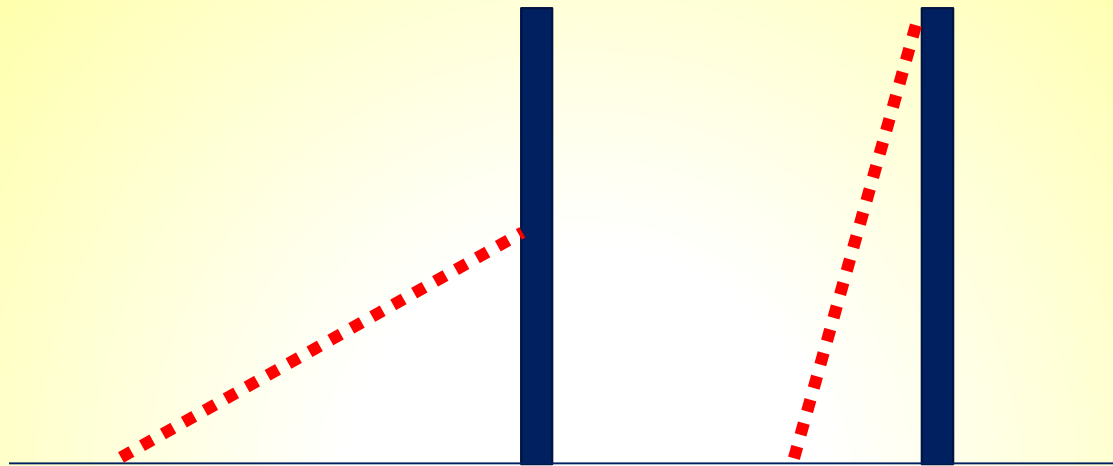


Question #7—700 Points

A ladder is leaning against the wall (as pictured). Then it is adjusted (against the same wall) so that it now reaches twice as high up the wall. The slope of the ladder is now ...

- A. Less than twice what it was initially
- B. Exactly twice what it was initially
- C. More than twice what it was initially
- D. More information is needed to determine which of the above is correct.





MAA Focus, "MAA Updates Testing for Calculus
Readiness," Feb/Mar 2011,
Marilyn Carlson, Bernard Madison, and Rich West.

Question #8—800 Points

What is the sum of the digits of all solutions to

$$\sqrt{x + \sqrt{x + 56}} + \sqrt{x - \sqrt{x + 56}} = 4?$$

0

A. 8

0

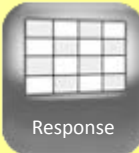
B. 11

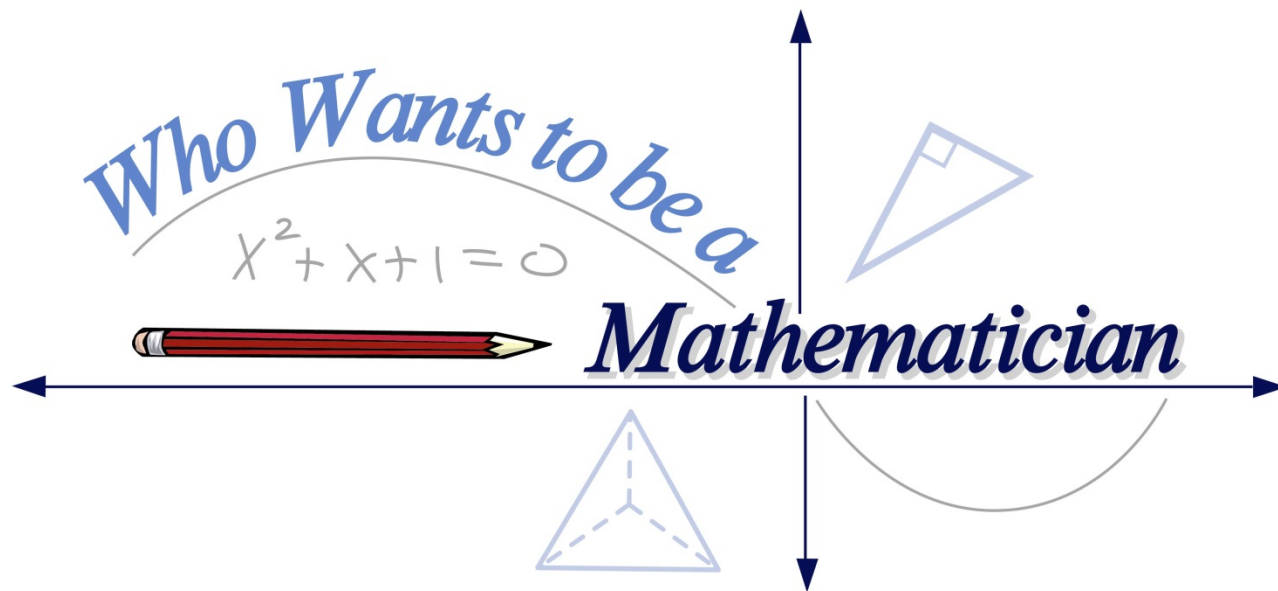
0

C. 17

0

D. 25



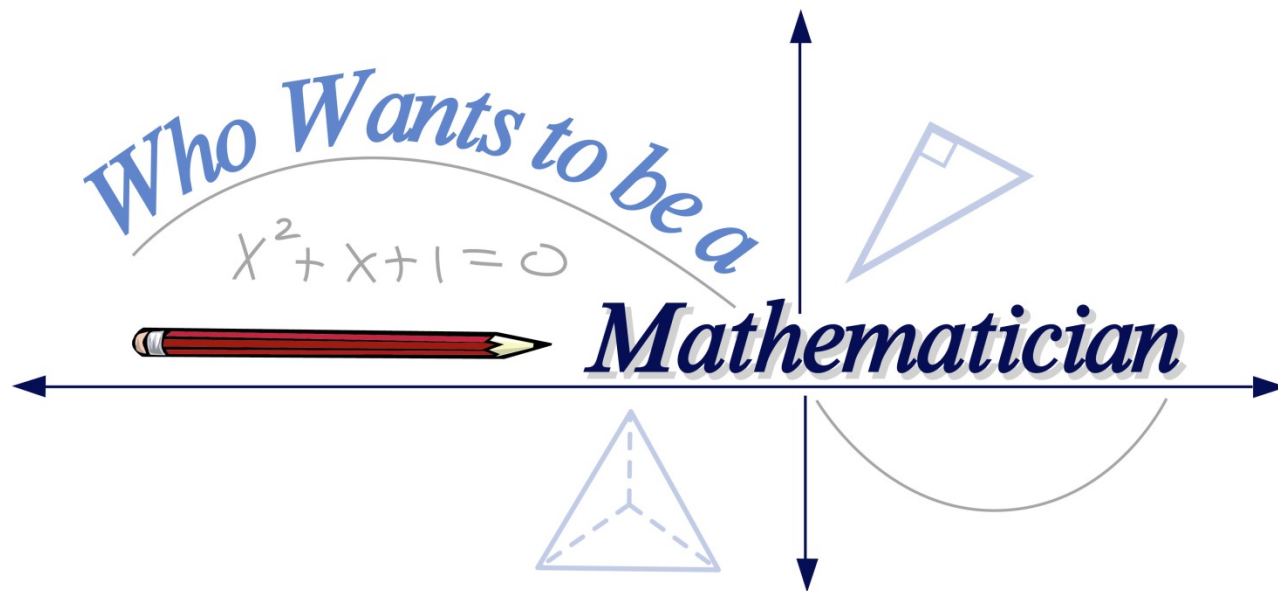


Off² Question

Square-Off Question

Analog clocks and watches are traditionally displayed for sale showing the time 10:10. What is the angle between the hour and minute hands at that time (the smaller of the two angles)?

- A. $11\pi/18$
- B. $23\pi/36$
- C. $2\pi/3$
- D. $25\pi/36$
- E. $3\pi/4$

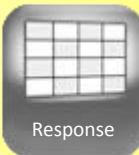
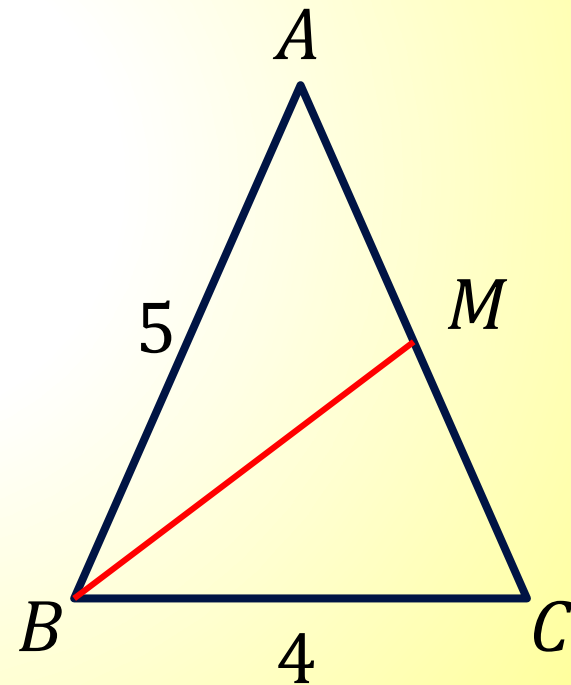


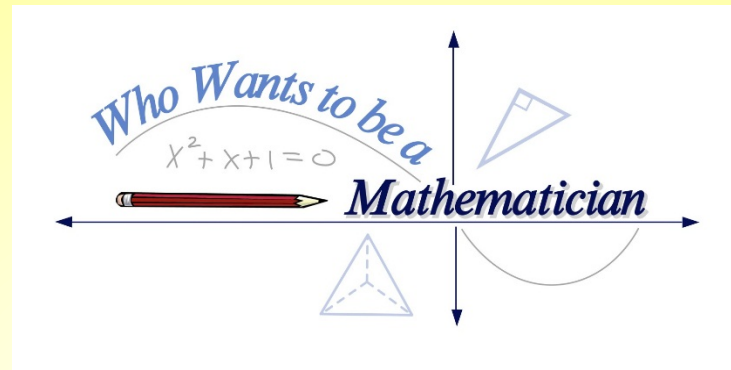
Two-Grand Prize Question

Bonus Question

Given isosceles triangle ABC (below) where $AB = AC$ and M is the midpoint of AC . Find BM .

- A. $\frac{\sqrt{39}}{2}$
- B. $\frac{\sqrt{57}}{2}$
- C. $\frac{3\sqrt{7}}{2}$
- D. $\frac{\sqrt{71}}{2}$
- E. $\frac{\sqrt{89}}{2}$





Answers

1. D
2. C
3. C
4. B
5. D

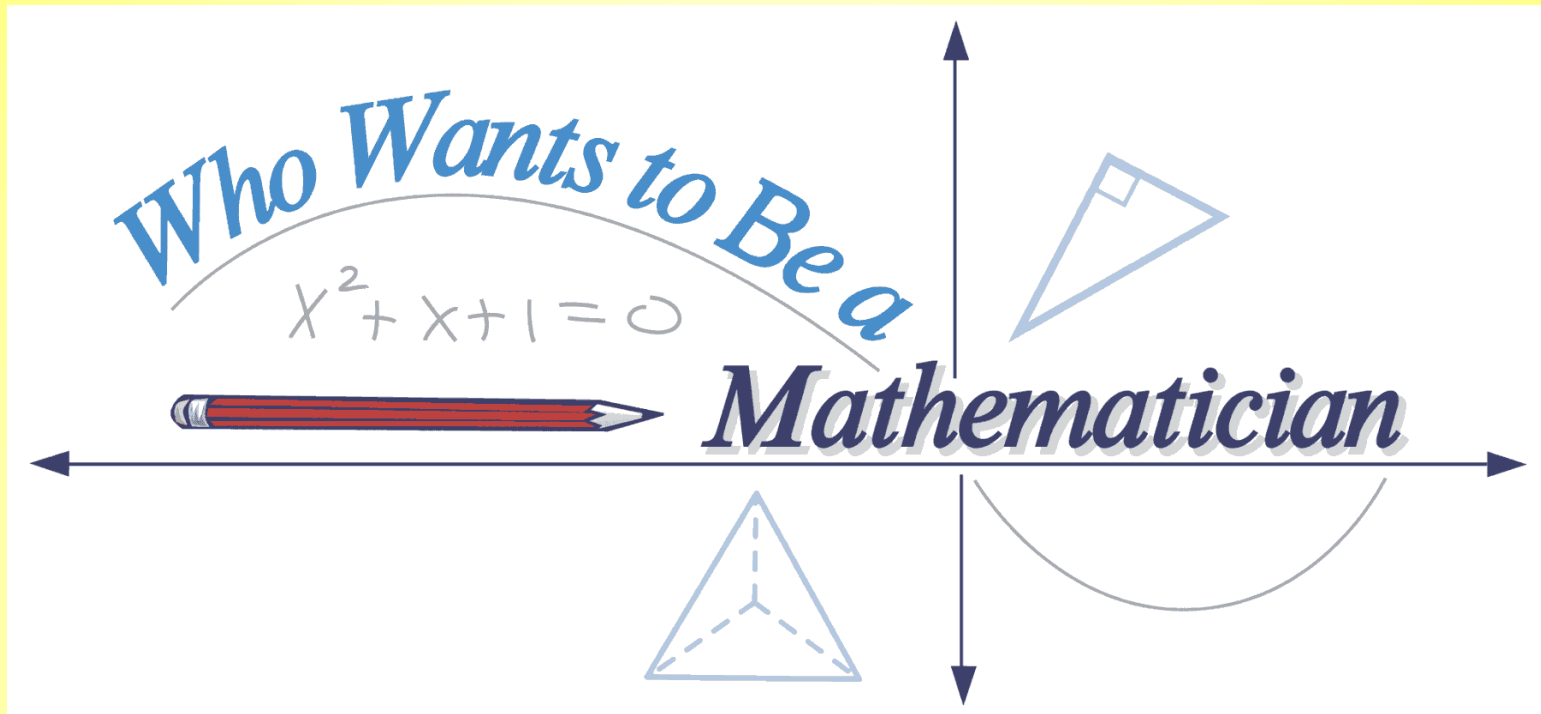
6. C

7. C

8. A

Square-Off: B

Bonus: B



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