Great Questions in Maths

Find all real solutions of the equation

$$(x^2 - 5x + 5)^{(x^2-11x+30)} = 1$$
$$(x^2 - 7x + 11)^{(x^2-13x+42)} = 1$$
$$(x^2 - 7x + 11)^{(x^2-1)} = 1$$

$$3^{444} + 4^{333}$$

Multiple of 5?

Using ALL of

3, 3, 8, 8

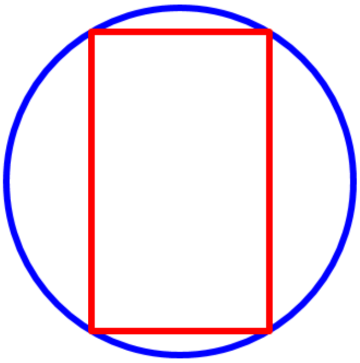
and ANY of

$\times \div + -$

Make the number 24.

Evaluate the sum

$$\frac{1}{\sqrt{1}+\sqrt{2}} + \frac{1}{\sqrt{2}+\sqrt{3}} + \frac{1}{\sqrt{3}+\sqrt{4}} + \cdots + \frac{1}{\sqrt{15}+\sqrt{16}}$$



A circle of radius 6cm is inscribed by a rectangle of perimeter 28cm. Find the area of the rectangle.

$$n^2 + n + 41$$

Is this a prime number for all natural numbers n?

$$p^2 - 1 = 24m$$

Take any prime number greater than 3, square it and subtract 1. Is the answer a multiple of 24? Why is that?

$$x^1, x^3, x^4, x^2, x^0.$$

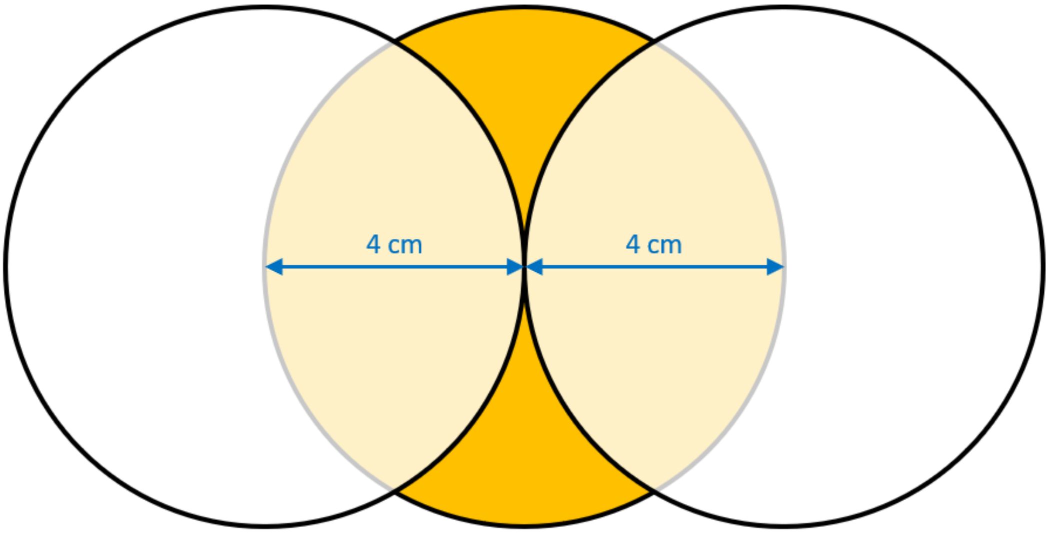
Five numbers are arranged in order from least to greatest as above. Where does $-x^{-1}$ belong in the list?

$$x + \frac{1}{x} \geq 2 \qquad \text{where } x \in R, x > 0$$

True or false?

Solve

$$8^x = \frac{2^{56} - 4^{26}}{30}$$



Find the orange area between the two white circles

(the radius of each circle is 4 cm and the two white circles meet at the centre of the orange circle)

Sketch…

- $(sinx)(sin10x)$
- $sinx + 0.1sin10x$

One day, Ant and Dec played several games of table tennis.

At five points during the day, Ant calculated the percentage of the games played so far that he had won. The results of these calculations were exactly 30%, exactly 40%, exactly 50%, exactly 60% and exactly 70% in this order.

What is the smallest possible number of games they played?

There are n sweets in a bag.
6 of the sweets are orange.
The rest of the sweets are yellow.

Hannah takes at random a sweet from the bag.
She eats the sweet.

Hannah then takes at random another sweet from the bag.
She eats the sweet.

The probability that Hannah eats two orange sweets is $\frac{1}{3}$

(a) Show that $n^2 - n - 90 = 0$