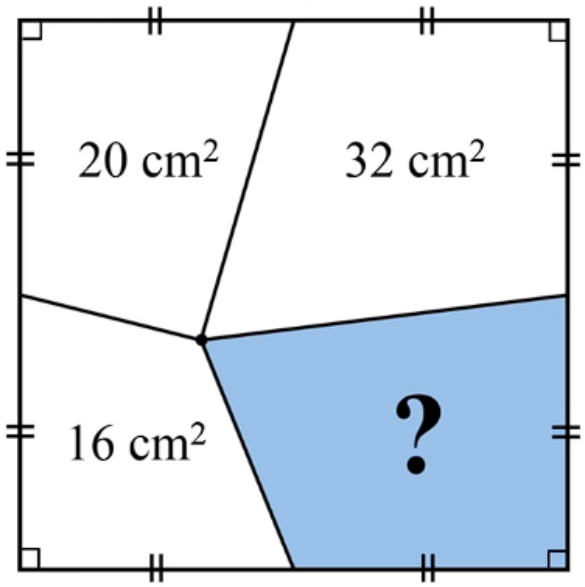
October Math Gems

Problem of the week 28

§1 Problems

Problem 1.1. Find the total area of the following figure:



(Diagram not to scale)

Problem 1.2. If 3X-Y=12,

$$\text{what is the value of } \frac{8^x}{2^y}$$

Problem 1.3.

$$(4+\sqrt{15})^x + (4-\sqrt{15})^x = 62$$

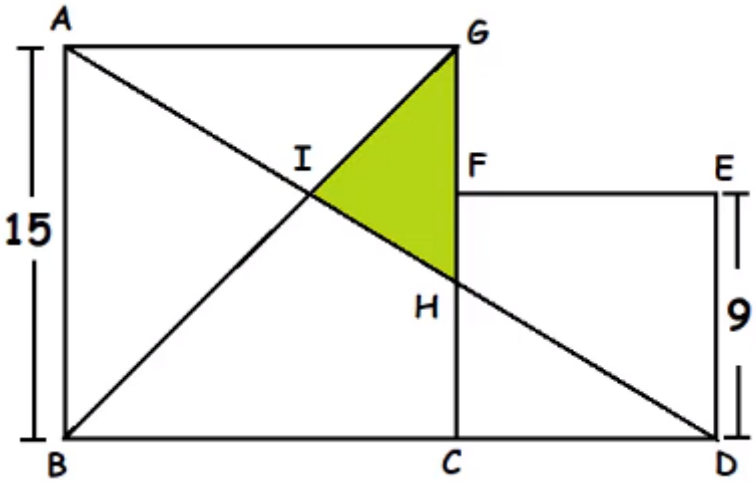
find the value of x.

Problem 1.4.

$$3^{x+2} = 9^{2x-3}$$

find the value of x.

Problem 1.5. Find the area of the green part(where units are in cm).

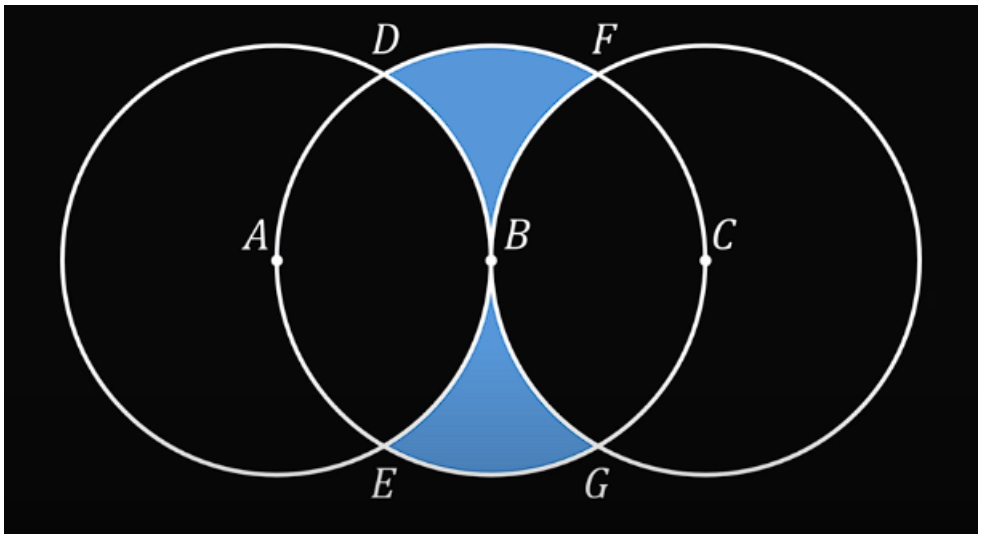


Problem 1.6.

$$\sqrt[3]{44X - 7} - 5 = 0$$

find the value of x.

Problem 1.7. find the area of the blue part, where r=4.



Problem 1.8. The surface area of a human's lungs is equal to half of a tennis court (2100 ft^2). How many square feet would the lungs of a 30-person baseball team cover?

Problem 1.9. At a shop in Times Square one "I LOVE NY" t-shirt is sold every 10 minutes for 19.95 dollars each. The shop opens from 9 am until 9 pm every day.
How many t-shirts are sold in a week?

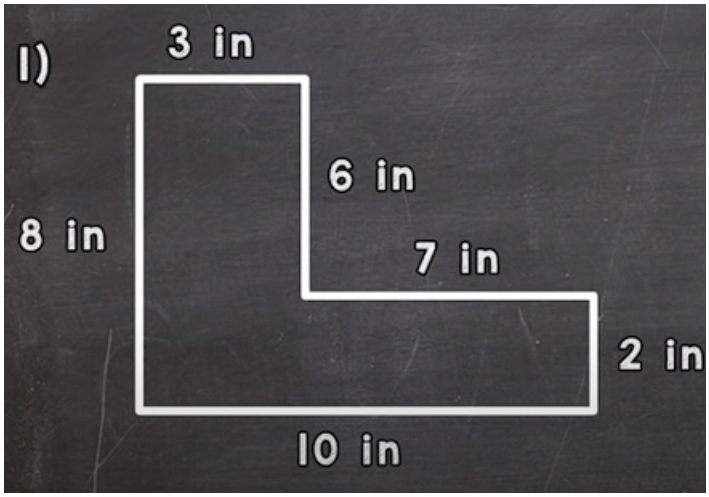
Problem 1.10.

$$(x + 3)(x - 5) = 5$$

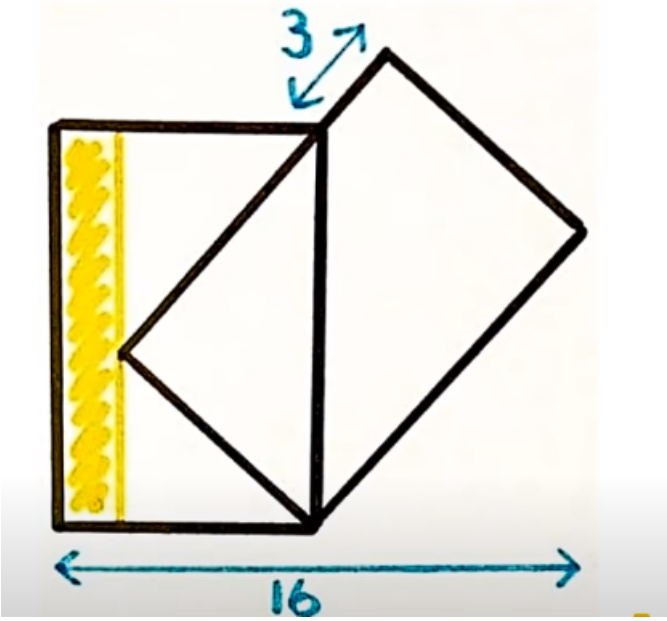
Find all the solutions to the equation above.

Problem 1.11. The leaning tower of Pisa in Italy leans at an angle of 84.7 degrees. 171ft from the base of the tower, the angle of elevation to the top is 50 degrees. Find the height of the tower if it was sitting straight up.

Problem 1.12. Find the area of the following figure:



Problem 1.13. Find the area of the yellow part, knowing that the dimensions are in cm unit.



Problem 1.14. Suppose A and B are positive real numbers for which $\log_A B = \log_B A$. If neither A nor B is 1 and $A \neq B$, find the Value of AB

Problem 1.15.

$$log_2(11 - 6x) = 2log_2(x - 1) + 3$$

find the value x.

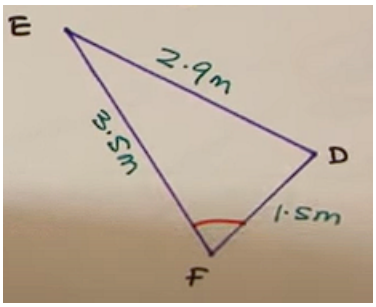
Problem 1.16. if f(x)= $x^2 + 1$ then what is (f.f)(x)?

Problem 1.17. Solve $cos^2(\frac{x}{2}) = cos^2(x)$, on the interval $0 \leq x < 2\pi$.

Problem 1.18. Determine the period of

$$y = 8 + 6cos(\frac{2\pi x}{15})$$

Problem 1.19. Find angle F



Problem 1.20. Determine the range of the function

$$f(x) = 4 - 2sin(3x)$$
