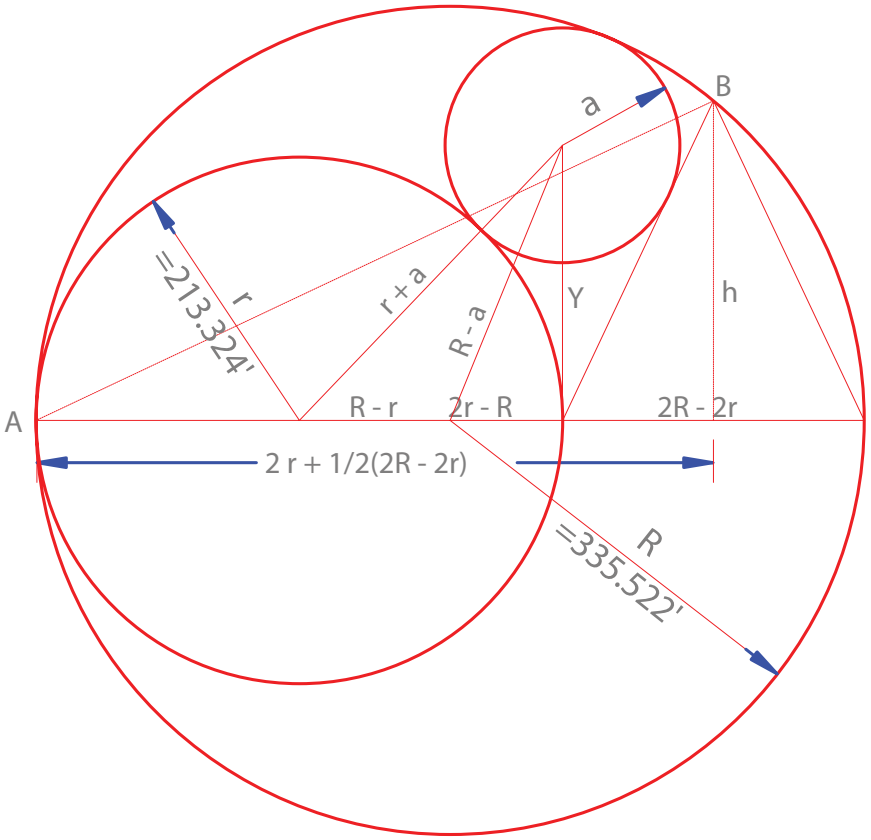
problem corner solution

Solution to Problem 152

by Dave Lindell, L.S.

Did you find this problem difficult without a diagram? We accidently left the diagram out of the magazine, but we've put it in the problem here on the website. So before you examine this solution, look again at the problem to get the full picture.



$(r + a)^2 = r^2 + Y^2$ ..... (1)

$(R - a)^2 = (2r - R)^2 + Y^2$ ..... (2)

$(r + a)^2 - (R - a)^2 = r^2 - (2r - R)^2$ .....[subtracting (2) from (1)]

$r^2 + 2ar + a^2 - (R^2 - 2aR + a^2) = r^2 - (4r^2 - 4rR + R^2)$

$2a(r + R) = 4r(R - r)$

from which

$$a = \frac{2r(R - r)}{r + R} = \frac{2(213.324)(335.522 - 213.324)}{213.324 + 335.522} = 94.991$$

$Y^2 = (r + a)^2 - r^2 = (213.324 + 94.991)^2 - 213.324^2$

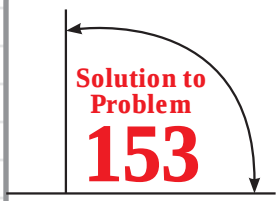
$Y = 222.601'$

Note that the triangle with hypotenuse A-B and short leg "h" is similar to half of the isosceles triangle; in fact

$$\frac{2r + \frac{1}{2}(2R - 2r)}{h} = \frac{h}{R - r} = \frac{r + R}{h}$$

$h^2 = (213.324 + 335.522)(335.522 - 213.324)$

$h = 258.975$



by Benjamin Bloch, Ph.D.

a) In the beginning was W; thus **W**
and W was with G; thus **W + 1, since G = 1**
and W was G, **W = G = 1**
as in beginning, W; thus **W**

Thus, **W/(W + 1) = 1/W**
Cross multiplying gives us: **$1 + W = W^2$**

b) What number when increased by one becomes its own square?
$1 + w = w^2$

And we have the same problem as part a). We use the large W and the small w for illustrative purposes only.

Solution to a) and b)

After rearranging terms, we apply the quadratic formula to **$w^2 - w - 1 = 0$**
The quadratic formula is of the form: **$ax^2 + bx + c = 0$.** Here **$x = w$, $a = 1$, $b = -1$, and $c = -1$.**
The positive solution is:
$w = (1+\sqrt{5})/2 = 1.618$, rounded to **1.62 (SDQ of 9)** is known as phi, Φ the Golden Proportion.

Special Question Answer
As opposed to modern maps which are drawn with North on top, ancient maps were drawn with East on top, since the direction of East was considered sacred. The top of the map, East, was called **up**, the bottom of the map, West, was called **down**, South was called **right**, and North was called **left**.

Therefore, in ancient times going from Israel to Egypt was traveling down, from East to West. Moses traveled way **down** in Egypt land.

The arrangement of the 12 tribes of Israel follows that pattern with the tribe of Benjamin, which means "son of the right hand," on the right side or in the South.