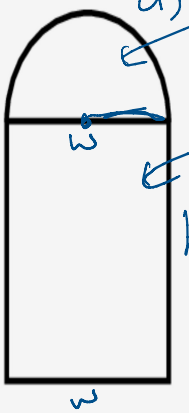
4/28 More Log Stuff

Thursday, April 28, 2022 2:03 PM

HW11 #6

This question was **not** broken. What I missed in lecture was that the area was meant to mean the area of the window and I did not realize this during lecture, but instead right after lecture when a student asked about this.

A window has the shape of a semi-circle placed on top of a rectangle as shown below. (The diagram at the top of page 50 in the text is equivalent.)



a) $A_C = \frac{1}{2}\pi r^2 = \frac{1}{2}\cdot\pi\left(\frac{w}{2}\right)^2 = \frac{1}{8}\pi w^2$

$A_R = w\cdot h$

Window area $= A_C + A_R = \frac{1}{8}\pi w^2 + w\cdot h$

b) Window area: $7 = \frac{1}{8}\pi w^2 + w\cdot h$

solve for h: $h = \frac{7 - \frac{1}{8}\pi w^2}{w} = \frac{7}{w} - \frac{\pi}{8}w$

(a) Express the area A of the window in terms of the width w and height h of the rectangle. (b) If the area is 7, express the height in terms of the width.

(a) A(h,w)=

(b) h(w) =

$100\cdot 3^n = 10^7$

$\log(100\cdot 3^n) = \log(10^7)$

$\log(100) + \log(3^n) = 7$

$2 + n\cdot\log(3) = 7$

More Bunnies

We saw that:

- if we start with 100 bunnies, and
- the bunny population triples every generation,

then we have 100×3^n bunnies after n generations.

$100 \cdot 3^n = 10^7$

$\log 2 + \log(3^n) = 7$

$\log(3^n) = 5$

$n \cdot \log(3) = 5$

1. How many generations until there are $10^7 = 10,000,000$ bunnies?

A= $\log(5/3)$ B= $5 - \log(3)$ C= $5/\log(3)$
D= $5/3$ E= $10^5/3$

Flu Outbreak

$5 \cdot 2^{t/3} = 80$

$2^{t/3} = 16$

$t/3 = 4$

2. At the start of an outbreak of H1N1 flu in a large class of students, there were 5 infected individuals. The numbers doubles every 3 days. How many days until there are 80 infected students?

A= $\log(16)/\log(2)$ B= $\log(16/2)$ C= $16/\log(2)$

D= $3\log(16)/\log(2)$ E= $\log(48/2)$

$\frac{t}{3} = \frac{\log(16)}{\log(2)}$

$\log(2^{t/3}) = \log(16)$

$t/3 \cdot \log(2) = \log(16)$

Limits and Speed

We'll go over this next Tuesday.