Team Brainstorming 2007

1. Find and simplify $\dfrac{f(x+h)-f(x)}{h}$ when $f(x)=\dfrac{x}{x+3}$.

2. Find all solutions, both real and complex, of

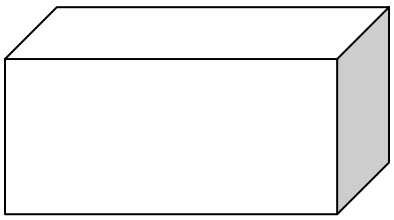
$$x^4-3x^3+6x^2-12x+8=0.$$

3. Find all exact values of x in radians in the interval $[0,2\pi]$ for which

$$\log_{10}(2\sin x+2)=0.$$

4. A line L contains the point $(-4,1/2)$ and is perpendicular to the line whose equation is $x-2y+10=0$. Find the y-intercept of the line L.

5. A rectangular box with no top has height 4 feet. The length of the base is three times the width, and the volume is 300 cubic feet. Find the amount of cardboard needed to construct the box, and label your answer with appropriate units.



Answers:

1. $\frac{3}{(x+h+3)(x+3)}$

2. $1, 2, \pm 2i$

3. $\frac{7\pi}{6}, \frac{11\pi}{6}$

4. -7.5

5. 235 square feet