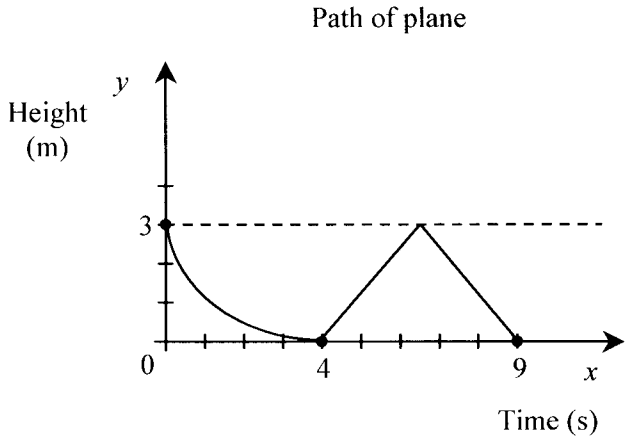
Name : SOLUTIONS.

Date : _____

Absolute Value: Practice problems #2....pretest

1 Jonas is playing with his remote control plane. From 0 to 4 seconds, its path is that of a square root function, $f(x)$, whose vertex is located at (0,3). From 4 to 9 seconds, the plane follows the path of an absolute value function, $g(x)$. The following diagram shows the path of the plane over 9 seconds with respect to height, in meters.



What is the value of $(f \circ g)(6)$, rounded to the nearest tenth?

① $f(x) = a\sqrt{x-h} + k$

$= a\sqrt{x} + 3$

$0 = a\sqrt{4} + 3$

$-3 = 2a$

$-1.5 = a$

$\therefore f(x) = -1.5\sqrt{x} + 3$

② $g(x) = a|x-h| + k$

$= a|x-6.5| + 3$

$0 = a|9-6.5| + 3$

$a = -1.2$

and $g(x) = -1.2|x-6.5| + 3$

③ $f(g(6)) = f\left[-1.2|6-6.5| + 3\right]$

$= f(2.4)$

$= -1.5\sqrt{2.4} + 3$

$= 0.67$

$= 0.7$

2 On a given day, the market value, $V(t)$, of *Bio Tech* stock shares fluctuated in relation to the time elapsed in hours, t, from the opening of the day's trading session, according to an absolute value function.

At the opening of trading, *Bio Tech* stock was worth \$6. Three hours later, it reached its maximum value of \$9.

How many hours had elapsed from the time the share first reached \$8 until it decreased to \$5?

you can do this one.

answer: 5 hours.

3 Each morning, the traffic on a certain highway increases, reaches a peak, and then decreases again.

This situation is represented mathematically by the function:

$$V(t) = -25 \mid t - 8 \mid + 65$$

$V(t)$ = the number of vehicles passing per minute
t = the time, in hours, since midnight

To ensure a smooth and safe flow of traffic, a police officer has been assigned to monitor this section of highway when the volume of traffic is at least 35 vehicles per minute.

For how many hours should the police officer be on duty to ensure the safe flow of traffic?

① $V(t) = -25|t-8|+65$

$V(t) \geq 35$

$\therefore \quad -25|t-8|+65 \geq 35$

$|t-8| \leq 1.2.$

② if $|t-8| \geq 0$ and if $|t-8| < 0.$

$t-8 \leq 1.2$ $\quad -(t-8) \leq 1.2$

$t \leq 9.2$ $\quad -t+8 \leq 1.2$

$t > 6.8$

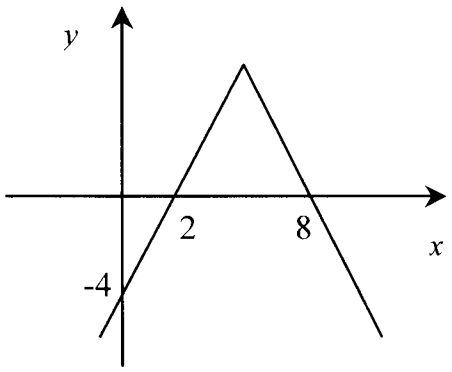
$\therefore \quad 9.2 - 6.8 = 2.4$ hours.

4 During one month this spring the value of a share in a travel company behaved according to an absolute value function.

Its initial value was \$4 below its average price.

On Day 2 and Day 8 it was exactly the same as its average price.

This situation can be represented by the graph below.



What is the rule of correspondence that represents this situation?

Show your work.

$y = a|x - h| + k$

$h = (2+8)/2 = 5$

$a = -2$

$k = 6$

$\therefore \quad y = -2|x-5| + 6$