

Name: ANSWER KEY

Score: \_\_\_\_\_

A boy shoots a rocket into the air on a windy day. The number of feet above the ground after  $t$  seconds is given by the equation  $y = -8t^2 + 48t$ .

(2)(a) When will the rocket be 72 feet off the ground?

$$\begin{array}{l|l} 72 = -8t^2 + 48t & t^2 - 6t + 9 = 0 \\ 8t^2 - 48t + 72 = 0 & (t-3)^2 = 0 \\ & \boxed{t=3} \end{array}$$

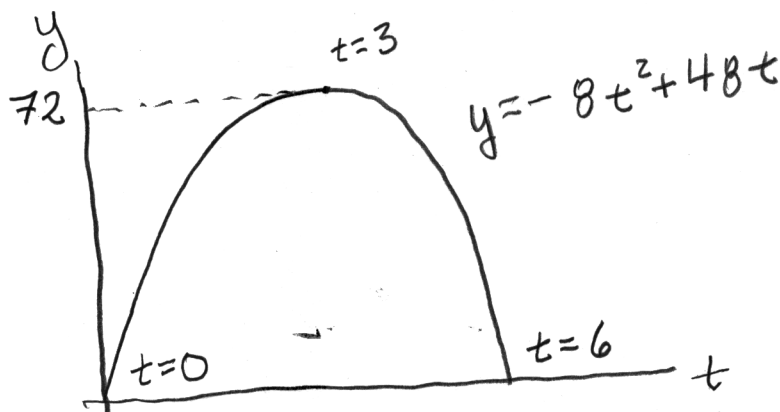
(4)(b) When will the rocket hit the ground?

$$0 = -8t^2 + 48t$$

$$= 8t(-t+6) \Rightarrow t=0, 6$$

$$\boxed{t=6}$$

(4)(c) Considering the context of this word problem, what is the domain of this function? (In other words, what values of  $t$  make sense in this problem.) Also, give an example of a positive value of  $t$  that NOT part of the domain and explain why.



The admissible values of  $t$  are those that permit  $y \geq 0$ . Since the rocket leaves the ground at  $t=0$  and strikes the ground when  $t=6$ , it will be airborne for  $\boxed{0 \leq t \leq 6}$ . (This includes the instant of departure and instant of impact.) Thus  $t=7$  is not admissible because the rocket is no longer in flight.