

6. [8 points] Suppose that a ring made entirely of gold and platinum is made from g ounces of gold and p ounces of platinum and that gold costs h dollars per ounce and platinum costs k dollars per ounce. Then the value, in dollars, of the ring is given by

$$v = gh + pk.$$

- a. [3 points] Pat has a ring made entirely of gold and platinum. Pat's ring is made from 0.25 ounces of gold and 0.15 ounces of platinum. Suppose that the cost of gold is decreasing at an instantaneous rate of \$20 per ounce per year while the cost of platinum is increasing at an instantaneous rate of \$30 per ounce per year. At what instantaneous rate is the value of Pat's ring increasing or decreasing? *Remember to include units in your answer.*

Answer: The value of Pat's ring is (circle one) INCREASING DECREASING

at a rate of _____

- b. [5 points] Jordan wants to design a ring made entirely of gold and platinum with a current value of \$900. Currently, gold costs \$1200 per ounce and platinum costs \$1500 per ounce. Let $w(p)$ be the total weight of Jordan's ring, in ounces, if p ounces of platinum are used.
- (i) In the context of this problem, what is the domain of $w(p)$?

Answer: _____

- (ii) Find a formula for $w(p)$. No variables other than p should appear in your answer.

Answer: $w(p) =$ _____

- (iii) How much gold and platinum should be in the ring if Jordan wants to minimize the weight of the ring? *You do not need to justify your answer.*

Answer: _____ ounces of gold and _____ ounces of platinum