

9. [14 points] A fashion designer has a budget of \$300 for fabric for a fabulous garment. The designer is going to use a combination of denim fabric which costs \$8 per yard and jersey fabric which costs \$12 per yard. (Assume that the fabric store will sell any length of these fabrics, i.e. partial yards are okay.)

Assume that the designer spends the entire budget of \$300 on these two fabrics. Let  $D$  be the number of yards of denim and  $J$  be the number of yards of jersey that the designer purchases.

- a. [2 points] In one complete sentence, explain why  $J$  is a function of  $D$ .

Let  $f(D)$  be the number of yards of jersey that the designer buys if the designer buys  $D$  yards of denim, so  $J = f(D)$ .

- b. [3 points] Evaluate  $f(5)$  and interpret it in the context of this problem. (Use a complete sentence and include units.)

- c. [3 points] Find a formula for  $f(D)$ .

- d. [3 points] Find and interpret, in the context of this problem, the  $D$ -intercept of the graph of  $J = f(D)$ . (Use a complete sentence and include units.)

- e. [3 points] Give a practical interpretation of  $f^{-1}(k)$  in the context of this problem. (Use a complete sentence and include units. You do not need to find a formula.)