

11. [10 points] There is a third pizza restaurant in town known as “TPR”. Let $Z(A)$ be the expected number of pizzas TPR will sell in a month when TPR spends A dollars on advertising. Let k be the average amount (in dollars) that TPR spends on advertising each month.
- a. [2 points] Write an equation expressing the following statement:
 “When TPR spends \$100 more than average on advertising, it expects to sell 25 more pizzas than average.”

Answer: $Z(k + 100) = Z(k) + 25$

For each of the quantities in parts (b)–(e) below, pick the ONE expression from the list of “Answer Choices” that best represents the described quantity. Clearly write the CAPITAL LETTER of your choice on the answer blank provided.

Answer Choices for (b)–(e)

- | | | | |
|------------------|--------------|-------------------|----------------------|
| A. $Z(k)$ | F. $Z(500k)$ | K. $Z(k) - 0.5$ | P. $Z^{-1}(k + 0.5)$ |
| B. $Z^{-1}(k)$ | G. $1.5Z(k)$ | L. $Z(k) + 0.5$ | Q. $Z^{-1}(1.5k)$ |
| C. $Z(500)$ | H. $0.5Z(k)$ | M. $Z(k - 0.5)$ | R. $Z^{-1}(1.5Z(k))$ |
| D. $Z^{-1}(500)$ | I. $Z(1.5k)$ | N. $0.5Z^{-1}(k)$ | S. $Z^{-1}(0.5k)$ |
| E. $Z(k + 500)$ | J. $Z(0.5k)$ | O. $1.5Z^{-1}(k)$ | T. $Z^{-1}(0.5Z(k))$ |

- b. [2 points] Which expression represents TPR’s expected monthly pizza sales when \$500 is spent on advertising that month?

Answer: $Z(500)$ (C)

- c. [2 points] Which expression represents the amount TPR spends on advertising in a month when it expects to sell 500 pizzas?

Answer: $Z^{-1}(500)$ (D)

- d. [2 points] Which expression represents TPR’s expected monthly pizza sales if it spends 50% less on advertising than average?

Answer: $Z(0.5k)$ (J)

- e. [2 points] Which expression represents the amount TPR spends on advertising if it expects to sell 50% more pizzas than in a month with average spending on advertising?

Answer: $Z^{-1}(1.5Z(k))$ (R)