

Midterm 1

This calculator-free midterm is designed as a post-assessment of your understanding of important ideas in Chapters 12, 13 and parts of 14. Please ask if you have any questions. Good luck!

1. **Multiply the following polynomials using a rectangular area model.** Label each of the original polynomials and resulting components in your diagram. Clearly indicate how your diagram shows the solution. Write your solution in lowest terms.

$$(n + 4) \cdot (5n + 2)$$

2. Can the following data be **modeled with a linear function**? Say how you know.

x	1	2	3	4	5
y	3	9	27	81	243

x	-4	-1	4	7	12
y	52	43	28	19	4

3. How many dots are in figure 12? What about figure n ? Explain how you know using algebraic thinking, **labeling any quantities** you refer to.

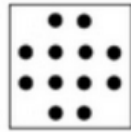


Figure 2

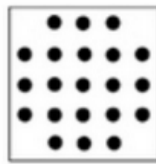


Figure 3

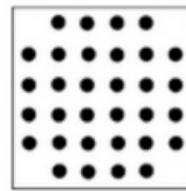


Figure 4

4. Is this a **proportional situation**? Why or why not? If yes, describe the relationship. If not, give a counter-example that shows it is not proportional.

If 8 chocolates cost \$1.20, how much do 12 chocolates cost, assuming that each chocolate costs the same amount?

5. Two workers, Ava and Bob, working 9 hours made 243 parts. Ava makes 13 parts in 1 hour.

- a. Write two **equations**, one for each worker, relating hours worked and parts made. Label each variable.

- b. If the workers work at a steady rate throughout the day, who is more productive, Ava or Bob? Briefly explain how you know.

6. Please circle **T for true or F for false** for each of the following statements. If the statement is false, explain **why it is false**. If the statement is true, simply circle true.

a. Distance-time graphs are always either increasing or constant. **T** **F**

b. In a position-time graph, the slope of the line represents ‘total distance traveled’. **T** **F**

c. Michael got an increase in his salary and increases his donations to local charities. **T** **F**

d. $\frac{y}{x} = 3$ describes a proportional relationship. **T** **F**

e. $A = 2\pi r$ is a linear function. **T** **F**

7. **Consider the following story problem:** Lizeth left her apartment for a coffee shop. She walked down University Avenue for three blocks at a constant rate, then instantly began jogging at a constant rate for three more blocks. Halfway to the coffee shop, she realized that she forgot to lock her apartment! She immediately turned and sprinted back towards her apartment at a constant rate. She caught her breathe for a few moments as soon as she arrived home while locking her door. To ensure she would not be late to meet her Chrissy, she immediately sprinted to the coffee shop at a constant rate.

a. Graph the relationship between Lizeth’s **position from apartment** and **time**.

b. Graph the relationship between Lizeth’s **distance traveled** and **time**. Use the same scale as in part (a), and put part (b) right under (a).

For each graph, make it clear what part of your function corresponds with her different parts of her travels.

8. Solve the following in expanded form. **Show each step of your work.**
 $626548 + 892354$

9. Determine whether the following problems are functions or not. If they are not function(s), you must explain why it is not a function.

a. $(8,3), (7,4), (6,3), (5,2), (4,1), (3,0), (2,1), (0,2)$

b. $(3,8), (4,7), (3,6), (2,5), (1,4), (0,3), (1,2), (2,0)$

10. A dog eats $\frac{1}{2}$ pound of dog food every day. The dog's owner buys a bag that weighs 24 pounds. What amount A remains after d days? Graph the problem and describe each part of the equation you find.

Graph : ?

$A = ?$

Slope = ?

$d = ?$

y - intercept = ?