Algebra II — Review Sheet

Practice for the test · Try every question first — then check with the answer sheet from your teacher.

Name: _____

Part 1 — Open the Brackets

1. Open the bracket: $(n + 3)^2 = ?$ (1 point)

$(n + 3)^2$ means $(n + 3)(n + 3)$.

- ◯ **A. $n^2 + 9$**
- ◯ **B. $n^2 + 6n + 9$**
- ◯ **C. $n^2 + 3n + 9$**
- ◯ **D. $2n + 6$**

2. Open the bracket: $n(n + 4) + 3 = ?$ (1 point)

The n multiplies BOTH things inside the bracket.

- ◯ **A. $n^2 + 4n + 3$**
- ◯ **B. $n^2 + 7$**
- ◯ **C. $2n + 4 + 3$**
- ◯ **D. $2n^2 + 3$**

Part 1 — Distribute

3. Distribute: 3(n + 2) = ? (1 point)

The 3 multiplies BOTH things inside the bracket.

- ◯ **A. 3n + 2**
- ◯ **B. 3n + 6**
- ◯ **C. n + 6**
- ◯ **D. 3n**

4. Ali wrote (n + 1)² + 2(n + 3). Sara wrote n² + 4n + 7. Open Ali's brackets. What do you get? (1 point)

Step 1: (n + 1)² = n² + 2n + 1. Step 2: add 2(n + 3) = 2n + 6.

- ◯ **A. n² + 4n + 7 — the same as Sara!**
- ◯ **B. n² + 2n + 7**
- ◯ **C. n² + 4n + 4**
- ◯ **D. n² + 6n + 7**

5. The machine is c(x) = 2x + 3. Find c(5). (1 point)

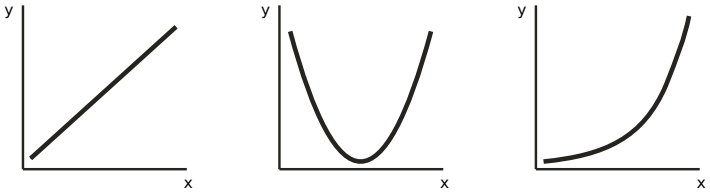
Put 5 where the x is. Remember: c(5) is not c times 5.

- ◯ **A. 13**
- ◯ **B. 25**
- ◯ **C. 10**
- ◯ **D. 16**

Part 2 — Read the Graphs

6. Which graph is LINEAR? (1 point)

Linear = a perfectly straight line.

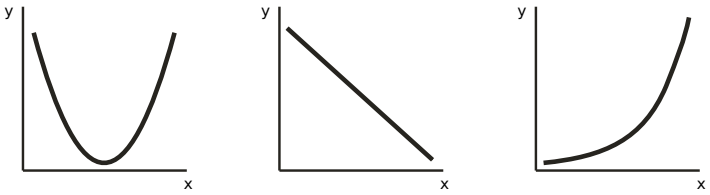


A **B** **C**

○ **A. Graph A** ○ **B. Graph B** ○ **C. Graph C**

7. Which graph is EXPONENTIAL? (1 point)

Exponential = starts slow, then shoots up faster and faster.

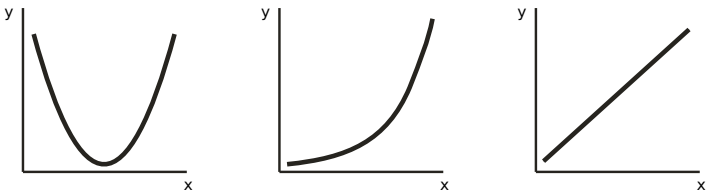


A **B** **C**

○ **A. Graph A** ○ **B. Graph B** ○ **C. Graph C**

8. Which graph is QUADRATIC? (1 point)

Quadratic = a U shape.



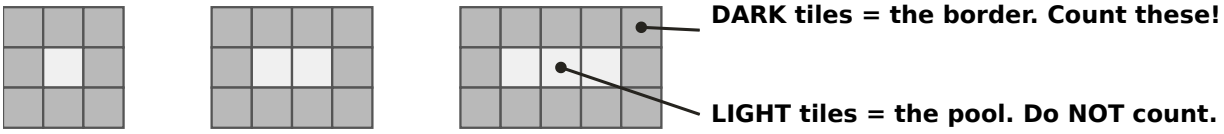
A **B** **C**

○ **A. Graph A** ○ **B. Graph B** ○ **C. Graph C**

Problem 1 — The Long Pool

A hotel has a **long skinny swimming pool** (light gray), 1 tile wide. Border tiles (dark gray) go all around it.
In Design 1 the pool is 1 tile long. In Design 2 it is 2 tiles long. In Design 3 it is 3 tiles long. It keeps going.

Design 1 **Design 2** **Design 3**



a. Count only the DARK border tiles. Fill in the table. Design 1 is done for you. (5 points)

Design	1	2	3	4	5	6
Border tiles	**8**					

b. What kind of pattern is this? Fill in one bubble. (2 points)

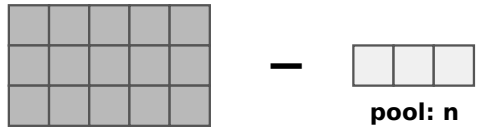
- ◯ **A. Linear**
- ◯ **B. Quadratic**
- ◯ **C. Exponential**

Problem 1 — The Long Pool (continued)

c. Write TWO different expressions for the border tiles in Design n. (10 points)

Go step by step. First count with numbers. Then swap the numbers for n.

Way 1 — BIG rectangle minus the pool



3 rows of (n + 2)

Step 1 — the TOTAL for Design 3, with numbers:

Big rectangle: 3 × 5 = _____

Pool: _____

Border total: _____ − _____ = **12** ✓

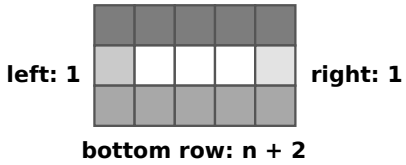
Step 2 — same thing, but with n:

Big rectangle: 3 × (n + 2). Pool: n.

Step 3 — write it as one expression:

Expression 1 =

Way 2 — add the four pieces



Step 1 — the TOTAL for Design 3, with numbers:

Top: 5 Bottom: 5 Left: 1 Right: 1

Border total: 5 + 5 + 1 + 1 = _____ ✓ (same as Way 1!)

Step 2 — same thing, but with n:

Top: _____ Bottom: _____ Left: _____ Right: _____

Step 3 — write it as one expression:

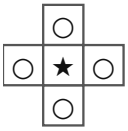
Expression 2 =

Check your work: put n = 1 into both expressions. Both must give 8.

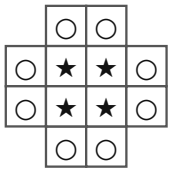
Problem 2 — The Star Box

A company makes gift boxes with small tiles.
Stars ★ go on the top of the box. **Circles ○** go on the sides.
Here are the first 3 designs, opened flat:

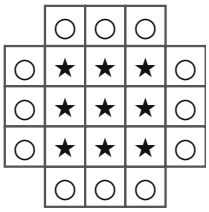
Design 1



Design 2



Design 3



a. Count the tiles. Fill in the table. Design 1 is done for you. (2 points)

	Design 1	Design 2	Design 3
Star tiles ★	**1**		
Circle tiles ○	**4**		

b. Finish the sentences. (1 point)

From Design 2 to Design 3, the number of **circle** tiles grows by _____ tiles.

The star part of Design n is n tiles long and _____ tiles tall.

c. One design uses the SAME number of stars as circles. Which design is it? Use the expressions. (2 points)

The expressions: stars = $\mathbf{n^2}$ circles = $\mathbf{4n}$ (check Design 2: $2^2 = 4$ ✓ and $4 \times 2 = 8$ ✓)

Divide them: stars ÷ circles = $n^2 \div 4n$ = $\mathbf{n \div 4}$

"The SAME number" means the division = 1. So $n \div 4 = 1 \rightarrow n =$ _____

It is Design _____

Problem 3 — Omar's Club

Omar starts a club.
He invites **2 friends**. They are **Group 1**.
Each person in Group 1 invites **2 more friends**. They are **Group 2**.
Each person in Group 2 invites **2 more friends**. They are **Group 3**. It keeps going the same way.

a. Draw a picture of Groups 1, 2, and 3. Use dots for people. Omar is not counted. (1 point)

Draw big. Dots and lines are enough.

b. Fill in the table. Group 1 is done for you. (2 points)

Group	1	2	3	4	5	6
People in group	**2**					

c. What kind of pattern is this? Fill in one bubble. (1 point)

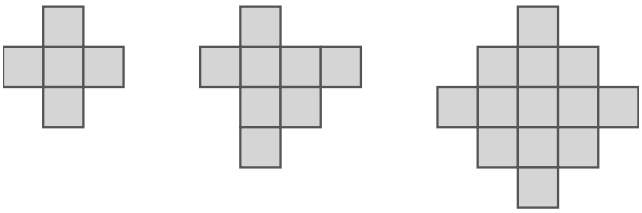
- ◯ **A. Linear**
- ◯ **B. Quadratic**
- ◯ **C. Exponential**

Each group is _____ times bigger than the group before.

Problem 4 — The Plus Tiles

A tile company puts plus-shaped designs on floors. Here are the first 3 designs:

Design 1 **Design 2** **Design 3**



a. Count the tiles in each design. Fill in the table. Design 1 is done for you. (3 points)

Design	1	2	3	4	5	6
Number of tiles	**5**					

Hint for Designs 4, 5, 6: look at the jumps between the numbers.

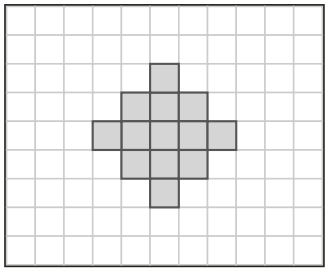
b. What kind of pattern is this? Fill in one bubble. (1 point)

- ◯ **A. Linear**
- ◯ **B. Quadratic**
- ◯ **C. Exponential**

c. The company puts one design on a floor that is 9 tiles tall and 11 tiles wide. (2 points)

11 tiles wide

9 tiles tall



Design 3 fits easily. Which is the BIGGEST one that fits?

Design 1 is 3 tiles tall. Design 2 is 4 tiles tall. Design 3 is 5 tiles tall. It keeps going.

The biggest design that fits is Design _____ It uses _____ tiles.