

Positive & Negative Sequences

DO NOT SOLVE THE PROBLEMS. Instead, for each problem:

1. Build a table using the information provided.
2. Identify the slope, m , using $m = \frac{RISE}{RUN}$
3. Identify the initial value, b , where $x = 0$.
4. Substitute m and b into $y = mx + b$.

● Mild

1. A music app shows total songs downloaded: **48 songs, 52 songs, 56 songs** after each day. How many songs will there be after Day 7?
2. A candle is 15 cm tall and burns down at a constant rate. After 1 hour it is 14 cm, and after 2 hours it is 13 cm tall. How long until the candle is 8 cm long?
3. A cyclist's speed going uphill is 32 km/h, then 29 km/h one minute later, and 26 km/h the next minute. If the slowdown continues at the same rate, after how many minutes will the cyclist come to a stop?

● Medium

4. A swimmer increases her lap total each practice: **30 laps, 38 laps, 46 laps**. How many laps will she complete in Practice 6?
5. A climber tracks her elevation on a hike. She starts at **200 m**, then after 1 km she is at **230 m**, and after 2 km she is at **260 m**. What elevation will she be at after 10 km?
6. A plane descends from 7400 m to 7100 m to 6800 m, dropping steadily each minute.
 - a) How many minutes will it take to reach an altitude of 1000 m?
 - b) Is the plane still above ground level after 10 more minutes?
7. A phone battery drops from 95% to 88% to 81% while running a high-power app. If the owner wants to shut it down before it reaches 20%, how long can they keep using it?

🔥 Spicy

8. A submarine's depth readings are **-350 m, -310 m, -270 m** every minute. What will the depth be after 10 minutes?
9. A savings account starts at a **-\$12 balance** (overdrawn). After one paycheck it's **-\$4**, and after the next it's **\$4**. What will the balance be after 5 paychecks?

10. A commercial freezer warms from $-32.4\text{ }^{\circ}\text{C}$ to $-30.8\text{ }^{\circ}\text{C}$ to $-29.2\text{ }^{\circ}\text{C}$ each hour after a power failure. Meat spoils at $-12\text{ }^{\circ}\text{C}$.
- How long until the freezer reaches that temperature?
 - Will the food be safe if repairs take 9 hours?
11. A truck is worth \$74,000, then \$67,800, then \$61,600 a year later.
- At what point does the truck's value fall to half of the original price?
 - How many years until it is worth \$0 if the pattern continued?

Extra Spicy

12. A drone flies a rescue pattern. It is **-120 m** below the ridge, then **-50 m** , then **20 m** above the ridge on consecutive passes. Where will it be on Pass 12?
13. A steel bar is heated gradually. Its length readings are **146.2 mm** , **153.9 mm** , **161.6 mm** every 30 seconds. What will the length be after the 7th reading?
14. A satellite is falling out of orbit. Its height is 12 050 km, then 11 620 km, then 11 190 km each orbit. Atmospheric burn-up begins at 80 km.
- How many orbits remain before destruction?
 - If each orbit takes 90 minutes, how much time is that?
15. A high-speed train brakes from 118 km/h to 83 km/h to 48 km/h every minute. It must slow to **30 km/h** before reaching a sharp curve, which is **1.8 km** away.
- Will the train reach 30 km/h before the curve?
 - If not, by how much does it exceed the safe speed at the curve?