

AP Precalculus

Name: _____ Score: _____

1. An **arithmetic sequence** has a constant...
 - ☐ difference between consecutive terms
 - ☐ ratio between consecutive terms
 - ☐ first term only
 - ☐ number of terms
2. Over equal input intervals, a **linear function** changes by...
 - ☐ adding a constant amount
 - ☐ multiplying by a constant factor
 - ☐ squaring the input
 - ☐ a random amount
3. An **exponential function** has the form...
 - ☐ $f(x) = a b^x$ with $b > 0$, $b \neq 1$
 - ☐ $f(x) = ax^2 + bx + c$
 - ☐ $f(x) = ax + b$
 - ☐ $f(x) = \frac{a}{x}$
4. The **product rule** for exponents says $b^m \cdot b^n =$
 - ☐ b^{m+n}
 - ☐ b^{mn}
 - ☐ b^{m-n}
 - ☐ $2b^{m+n}$
5. To build $y = a b^x$ from data, the coefficient a is the value when...
 - ☐ $x = 0$
 - ☐ $x = 1$
 - ☐ $y = 0$
 - ☐ the data ends
6. Solve $2^x = 8$ by matching bases.

7. If a quantity grows by 20% each period, the growth _____ (the base b) is 1.2.

8. Given enough time, an exponential model eventually grows faster than any polynomial model.

☐ True ☐ False

9. If $g(x) = x + 1$ and $f(x) = x^2$, what is $f(g(2))$?

10. A function has an inverse function only if it is _____ (each output comes from exactly one input).

1. **difference between consecutive terms**

Each term is the previous one **plus** a fixed **common difference** — that steady addition makes it arithmetic.

2. **adding a constant amount**

A line has a constant slope, so equal steps in x add the same amount to y — like an arithmetic sequence.

3. $f(x) = ab^x$ **with** $b > 0$, $b \neq 1$

The variable sits in the **exponent** over a fixed base b — that is what makes it exponential, not polynomial.

4. b^{m+n}

Multiplying powers of the same base **adds** the exponents: $b^m \cdot b^n = b^{m+n}$.

5. $x = 0$

At $x = 0$, $b^0 = 1$, so $y = a$: the coefficient is the **initial value**.

6. **3**

$8 = 2^3$, so $2^x = 2^3$ gives $x = 3$ — equal bases mean equal exponents.

7. **factor**

A 20% increase multiplies by $1 + 0.20 = 1.2$ — that multiplier is the **growth factor**.

8. **True**

Exponential growth outpaces x^2 , x^3 , even x^{100} in the long run — the exponent always wins.

9. **9**

Inner first: $g(2) = 3$. Then outer: $f(3) = 3^2 = 9$.

10. **one-to-one**

If two inputs share an output, the reverse map is ambiguous — so only a **one-to-one** function is invertible.