

1. Polynomial and Rational Functions

Starter Quiz · 课前小测

AP Precalculus

Name: _____ Score: _____

1. A function is **increasing** on an interval when...

- ☐ as the input increases, the output increases
- ☐ as the input increases, the output decreases
- ☐ the output is a large number
- ☐ the graph is a straight line

2. The **average rate of change** of f over the interval $[a, b]$ equals...

- ☐ $f(b) - f(a)$
- ☐ $\frac{f(b) - f(a)}{b - a}$
- ☐ $\frac{f(b)}{f(a)}$
- ☐ $b - a$

3. The average rate of change of a **linear function** over any interval is...

- ☐ always zero
- ☐ always the same (constant)
- ☐ always increasing
- ☐ impossible to find

4. The **degree** of a polynomial is...

- ☐ the number of terms it has
- ☐ the highest power of x
- ☐ the constant term
- ☐ the number of turning points

5. A zero where the graph just **touches** the x-axis (instead of crossing) has an even _____.

6. An **odd-degree** polynomial with a **positive** leading coefficient...

- ☐ falls on the left, rises on the right
- ☐ rises on both ends
- ☐ falls on both ends
- ☐ rises on the left, falls on the right

7. If a graph is perfectly flat (horizontal) over an interval, the function is **constant** there.

- ☐ True ☐ False

8. A runner's distance is $f(t)$ metres. If $f(2) = 10$ and $f(5) = 40$, what is the average speed over $[2, 5]$?

_____ m/s

9. For a **quadratic function**, the average rate of change is the same over every interval.

- ☐ True ☐ False

10. A point where the graph switches from decreasing to increasing is a local _____.

1. **as the input increases, the output increases**

Increasing is about **direction**, not size: move right along the input and the output climbs. It can be increasing while its values are still negative.

2. $\frac{f(b) - f(a)}{b - a}$

It is the **change in output** divided by the **change in input** — a ratio, so it carries units of output per unit of input.

3. **always the same (constant)**

A straight line has one fixed slope, so the average rate of change is the same over *every* interval — that is what makes it linear.

4. **the highest power of x**

The degree is the highest exponent on the variable — e.g. $2x^4 - x + 7$ has degree 4. It controls the graph's overall shape and end behavior.

5. **multiplicity**

Even **multiplicity** (like $(x - 3)^2$) makes the curve bounce off the axis; odd multiplicity makes it cross.

6. **falls on the left, rises on the right**

Odd degree makes the ends point *opposite* ways; a positive lead sends the right end up (and so the left end down).

7. **True**

A flat graph means the output does not change as the input changes — that is exactly what constant means.

8. **10 m/s**

Average speed = $\frac{40 - 10}{5 - 2} = \frac{30}{3} = 10$ m/s — the secant slope over that interval.

9. **False**

A parabola bends, so its slope keeps changing — different intervals give different average rates of change.

10. **minimum**

A **local minimum** is a valley — the curve stops falling and starts rising.