

1. Pure Mathematics 1

Starter Quiz · 课前小测

A-Level Mathematics

Name: _____ Score: _____

- For $x^2 + 4x + 1 = 0$, what is the discriminant $b^2 - 4ac$?

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

- What is the gradient of the line through $(2, 3)$ and $(6, 11)$?

- π radians equals how many degrees?

- What is the exact value of $\sin 30^\circ$?

- The graph of $y = f^{-1}(x)$ is the reflection of $y = f(x)$ in the line:
☐ $y = x$
☐ the x-axis
☐ the y-axis
☐ $y = -x$
- At a stationary point, if the second derivative $f''(x) > 0$, the point is a:
☐ minimum
☐ maximum
☐ point of inflection
☐ root
- Why does an indefinite integral include $+ C$?
☐ many curves share the same derivative, differing by a constant
☐ C is always zero
☐ it marks the limits
☐ it is the area
- If $b^2 - 4ac < 0$, the quadratic equation has:
☐ no real roots

- ☐ one repeated root
- ☐ two distinct roots
- ☐ three roots

10. Only a one-one function has an inverse function.

- ☐ True ☐ False

A-Level Mathematics

1. **12**

$b^2 - 4ac = 4^2 - 4(1)(1) = 16 - 4 = 12 (> 0, \text{ so two distinct real roots}).$

2. **9**

$g(2) = 3$, then $f(3) = 3^2 = 9$.

3. **2**

$m = (11 - 3) / (6 - 2) = 8/4 = 2$.

4. **180**

By definition, π radians $= 180^\circ$.

5. **0.5**

$\sin 30^\circ = 1/2 = 0.5$.

6. **$y = x$**

An inverse reflects the original graph in the line $y = x$; a point (a, b) becomes (b, a) .

7. **minimum**

$f'' > 0$ means the curve bends upward — a minimum; $f'' < 0$ gives a maximum.

8. **many curves share the same derivative, differing by a constant**

Differentiating a constant gives 0, so the original could have had any constant — hence $+ C$.

9. **no real roots**

A negative discriminant means the parabola never crosses the x-axis — no real roots.

10. **True**

If two inputs gave the same output, the reverse rule would be ambiguous — so only one-one functions are invertible.