1. Let $f(x) = x^2$. For which value of c is the tangent line to the graph of f at $x = c$ parallel to the secant line that passes through the two points $(1, f(1))$ and $(5, f(5))$?

(A) $c = 2$

(B) $c = 3$

(C) $c = 4$

(D) None of the above

2. True or False?

$$\lim_{x \to \infty} \frac{x^2 + 3x + 2}{e^x - \ln x} = 0.$$

3. What is $\lim_{x \to 0} x^{\sin x}$?

(A) 0

(B) 1

(C) The limit doesn't exist

(D) None of the above

4. What is $\lim_{x \to 0} \dfrac{e^x}{e^x - 1}$?

(A) 0

(B) 1

(C) ∞

(D) None of the above

5. True or False?

The rectangle of maximum area that can be formed using 4 m of wire is a square.

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The rectangle of maximum area that can be formed using 4 m of wire is a square.

Follow-up. What can you say about the a rectangle of smallest area that can be formed using 4 m of wire?

6. What are the two real numbers $x, y \geq 1$ such that the product of x and y is 800 and such that $x + 2y$ is as small possible?

(A) $x = 40$ and $y = 20$

(B) $x = 20$ and $y = 40$

(C) $x = 800$ and $y = 1$

(D) None of the above

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Follow-up. What can you say about the real numbers $x, y \geq 1$ such that the product of x and y is 800 and $x + 2y$ is as large as possible?

7. A landscape architect wants to enclose a rectangular garden of area 1000 m^2. One side will have a brick wall costing \$90/m and the other three sides will have a metal fence costing \$30/m. What is the length of the brick wall that minimizes cost?

(A) 10 m

(B) $10\sqrt{5}$ m

(C) $100/\sqrt{5}$ m

(D) None of the above

8. What are the dimensions of the largest rectangle that can be inscribed inside a circle of radius 4?

(A) 4×4

(B) $\sqrt{32} \times \sqrt{32}$

(C) $\sqrt{60} \times 2$

(D) None of the above