



AP[®] Calculus AB 2002 Sample Student Responses Form B

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NO CALCULATOR ALLOWED

A,

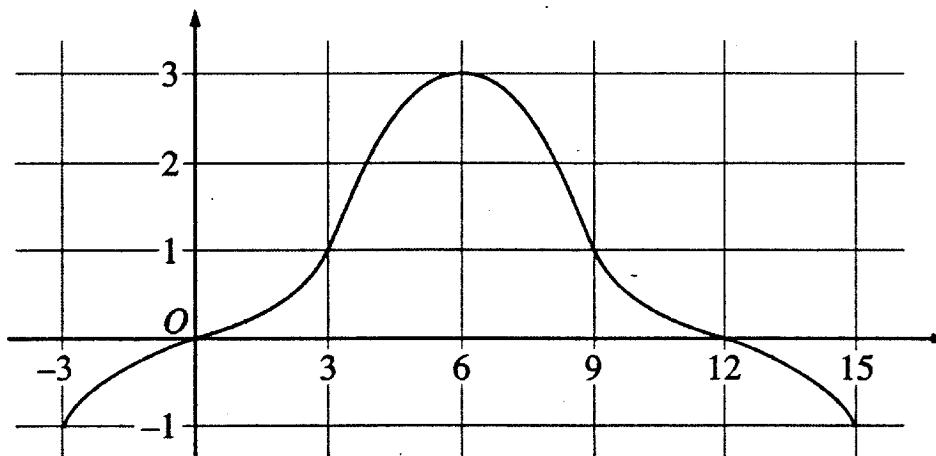
CALCULUS

SECTION II, Part B

Time—45 minutes

Number of problems—3

No calculator is allowed for these problems.

Graph of f

Work for problem 4(a)

$$g(6) = 5 + \int_6^6 f(t) dt = 5$$

$$g'(6) = f(6) = 3$$

$$g''(6) = f'(6) = 0$$

Work for problem 4(b)

$$g'(x) = \frac{d}{dx} \int_6^x f(t) dt = f(x)$$

g decreases when $f(x) < 0$.

$$-3 < x < 0, \quad 12 < x < 15$$

Work for problem 4(c)

$$g''(x) = f'(x) < 0$$

$f'(x) < 0$ when $f(x)$ is decreasing

$$6 < x < 15$$

Work for problem 4(d)

$$3 \times \left(\frac{-1+0}{2} \right) + 3 \times \left(\frac{0+1}{2} \right) + 3 \times \left(\frac{1+3}{2} \right) + 3 \times \left(\frac{3+1}{2} \right) + 3 \times \left(\frac{1+0}{2} \right) + 3 \times \left(\frac{0+(-1)}{2} \right)$$

$$= 3 \times 4 = 12$$

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NO CALCULATOR ALLOWED

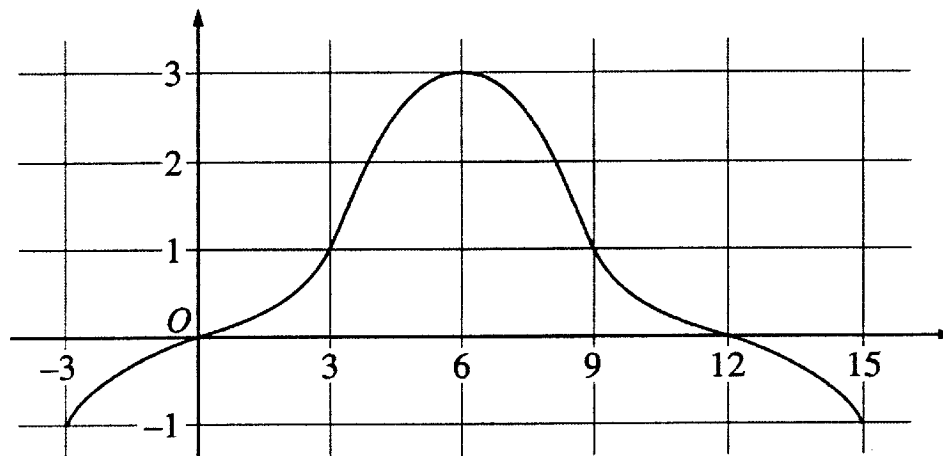
CALCULUS AB

SECTION II, Part B

Time—45 minutes

Number of problems—3

No calculator is allowed for these problems.



Graph of f

Work for problem 4(a)

$$g(6) = 5 + \int_6^6 f(t) dt = 0$$

$$g'(x) = f(x)$$

$$\therefore g'(6) = f(6) = 3$$

$$g''(6) = f'(6) = 0$$

Work for problem 4(b)

$$g'(x) = f(x) \text{ from } g'(x) = 0 + \frac{dg}{dx} \left[\int_6^x f(t) dt \right]$$

$$f(x) < 0 \text{ on } -3 < t < 0 \text{ and } 12 < t < 15$$

$$\therefore g(x) \text{ is decreasing on } -3 < t < 0 \text{ and } 12 < t < 15$$

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NO CALCULATOR ALLOWED

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Work for problem 4(c)

$$g''(x) = f'(x)$$

$$f'(x) < 0 \text{ on } 6 < t < 15$$

$\therefore g(x)$ is concave down on $6 < t < 15$

Work for problem 4(d)

$$A \approx \frac{18}{12} (|1-1| + (1)(2) + (3)(2) + (1)(2) + |1-1|)$$

$$\approx \frac{18}{12} (12) \approx 18 \text{ squared units}$$

GO ON TO THE NEXT PAGE.