AP® Calculus AB
2002 Sample Student Responses
Form B

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NO CALCULATOR ALLOWED

A,

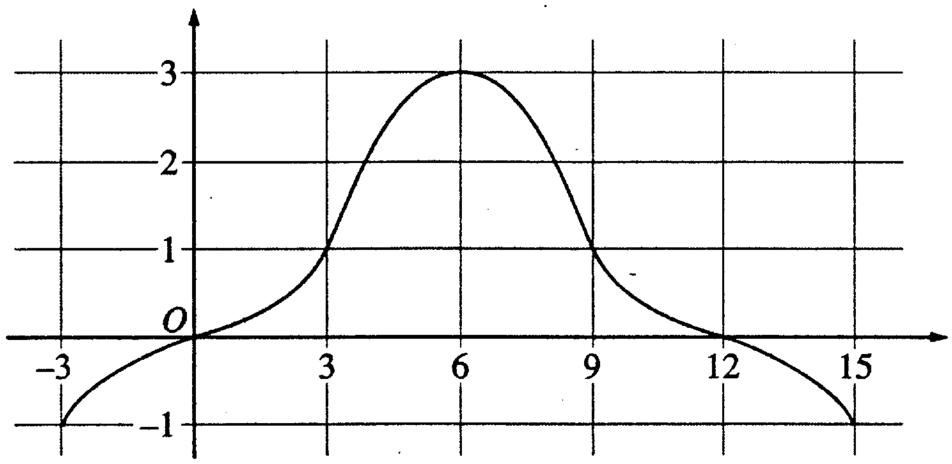
CALCULUS

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 $f(x) < 0$.

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

NO CALCULATOR ALLOWED

A2

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)

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

$= 3 \times 4 = 12$

GO ON TO THE NEXT PAGE.

 C,

NO CALCULATOR ALLOWED

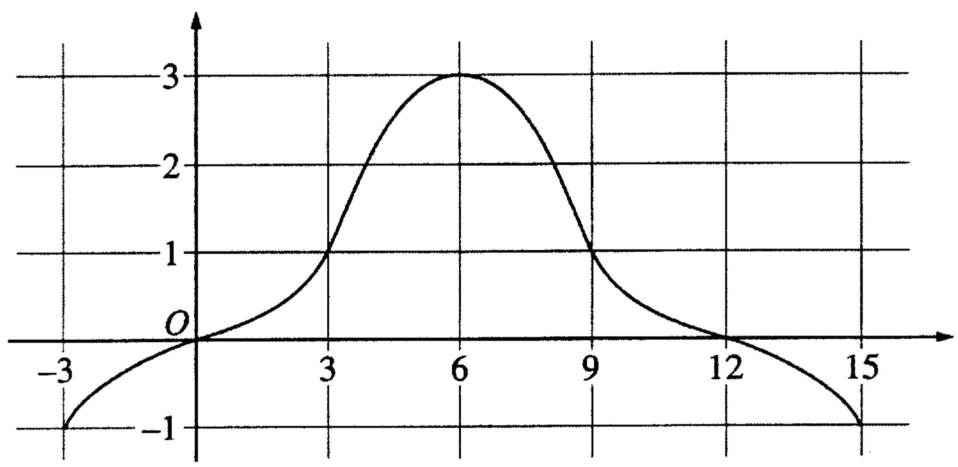
CALCULUS AB

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)

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

$f(x) < 0$ on $-3 < t < 0$ and $12 < t < 15$

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

C2

Work for problem 4(c)

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

$f'(x) < 0$ on $6 < t < 15$

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

Work for problem 4(d)

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

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

GO ON TO THE NEXT PAGE.