



AP[®] Calculus AB 2002 Sample Student Responses

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NO CALCULATOR ALLOWED

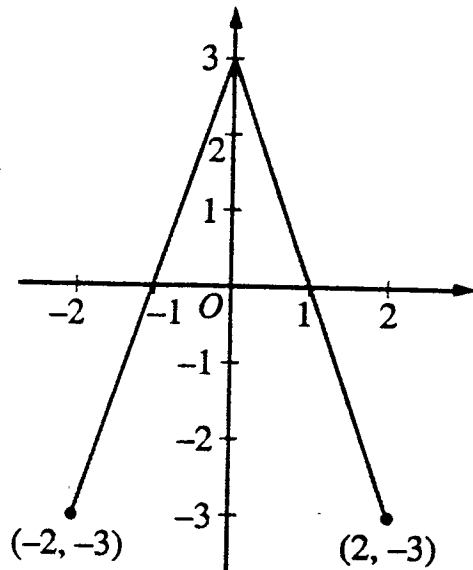
B₁

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)

$$g(-1) = \int_0^{-1} f(t) dt = -1 \cdot 3 \cdot \frac{1}{2} = -\frac{3}{2}$$

$$g'(-1) = f(-1) = 0$$

$$g''(-1) = f'(-1) = 3$$

4

4

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NO CALCULATOR ALLOWED

B₃

Work for problem 4(b)

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

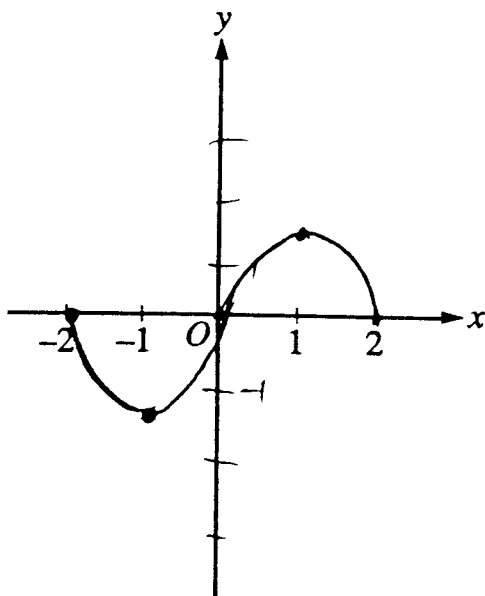
For $-1 < x < 1$, g is increasing, because $g'(x) = f(x)$ is positive for this interval.

Work for problem 4(c)

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

For $0 < x < 2$, g concaves down, because $g''(x) = f'(x)$ is negative for this interval.

Work for problem 4(d)



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4

NO CALCULATOR ALLOWED

C₁

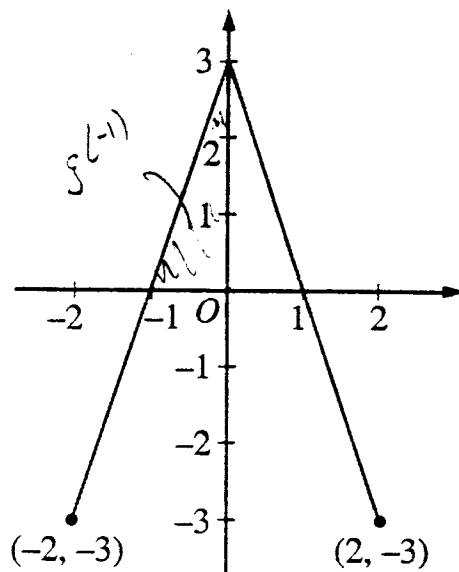
CALCULUS

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)

$$g(x) = \int_0^x f(t) dt$$

$$g(-1) = \int_0^{-1} f(t) dt = \frac{1}{2}bh = \frac{1}{2}(1)(3) = \frac{3}{2}$$

$$g(-1) = \frac{3}{2}$$

$$g'(-1) = f(-1) = 0$$

$$g'(-1) = 0$$

$$g''(-1) = \text{slope from } -2 \text{ to } 0 = \frac{-3-3}{-2-0} = \frac{-6}{-2} = 3$$

$$g''(-1) = 3$$

4

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4

NO CALCULATOR ALLOWED

C2

Work for problem 4(b)

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

$g(x)$ increases when $f(x)$ is positive $f(x) > 0$ at $-1 < x < 1$

$g(x)$ increases at $-1 < x < 1$

Work for problem 4(c)

$g(x)$ is concave down where $g''(x)$ is negative

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

$g''(x) = f'(x)$ $g''(x) = f'(x)$ is negative for all $0 < x < 2$

$g(x)$ is concave down for all $0 < x < 2$

$$f'(x) = \frac{-3-3}{2-0} = -3$$

Work for problem 4(d)

