

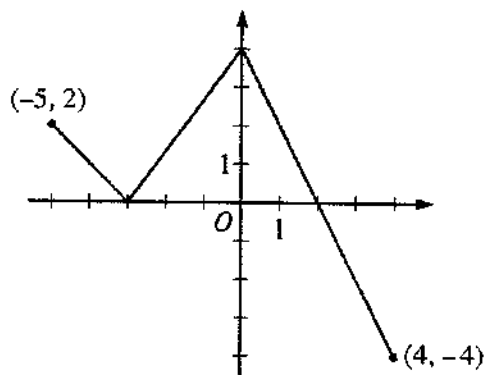
**2014 AP<sup>®</sup> CALCULUS AB FREE-RESPONSE QUESTIONS**

**CALCULUS AB  
SECTION II, Part B**

**Time—60 minutes**

**Number of problems—4**

**No calculator is allowed for these problems.**



Graph of  $f$

3. The function  $f$  is defined on the closed interval  $[-5, 4]$ . The graph of  $f$  consists of three line segments and is shown in the figure above. Let  $g$  be the function defined by  $g(x) = \int_{-3}^x f(t) dt$ .
- (a) Find  $g(3)$ .
  - (b) On what open intervals contained in  $-5 < x < 4$  is the graph of  $g$  both increasing and concave down? Give a reason for your answer.
  - (c) The function  $h$  is defined by  $h(x) = \frac{g(x)}{5x}$ . Find  $h'(3)$ .
  - (d) The function  $p$  is defined by  $p(x) = f(x^2 - x)$ . Find the slope of the line tangent to the graph of  $p$  at the point where  $x = -1$ .
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