Unit 5 Curve Sketching

REVIEW

TEST PREP

1. What are the *x*-coordinate(s) of the points of inflection for the graph of $f(x) = \sin^2 x$ on the closed interval $[0, \pi]$?

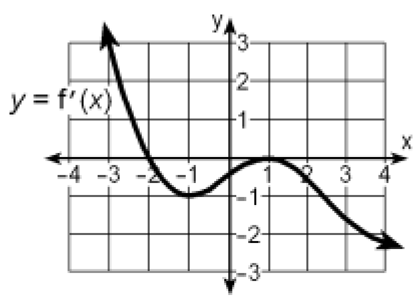
   (A) $x = \frac{3\pi}{4}$ only
   (B) $x = \frac{\pi}{4}$, $x = \frac{\pi}{2}$, and $x = \frac{3\pi}{4}$
   (C) $x = \frac{\pi}{4}$ and $x = \frac{3\pi}{4}$
   (D) $x = \frac{\pi}{2}$ only
   (E) $x = \frac{\pi}{4}$ only

2. The function defined by $g(x) = 4x^3 - 3x^2$ for all values of *x* has a relative maximum at $x =$

   (A) $-\frac{1}{2}$
   (B) 0
   (C) $\frac{1}{2}$
   (D) $\frac{1}{4}$
   (E) 1

3. The graph of the derivative of function *f* is shown below. At what value of *x* does function *f* have a relative maximum?

   (A) 1
   (B) -1
   (C) 0
   (D) -2
   (E) 3



4. The function *g* is defined by the equation $g(x) = 6x^5 - 10x^3$. Determine the values of *x* for which the graph of function *g* is concaved upwards.

   (A) $x > \frac{1}{2}$
   (B) $-\frac{\sqrt{2}}{2} < x < 0$ or $x > \frac{\sqrt{2}}{2}$
   (C) $-\frac{1}{2} < x < 0$ or $x > \frac{1}{2}$
   (D) $-\frac{1}{2} < x < \frac{1}{2}$
   (E) $-\frac{\sqrt{2}}{2} < x < \frac{\sqrt{2}}{2}$

5. For what values of k will $f(x) = x^2 + \frac{k}{x}$ have a relative minimum at $x = 2$?

(A) -2

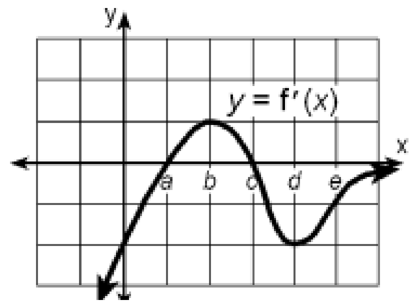
(B) 2

(C) 8

(D) -16

(E) 16

6. The graph shown below shows the derivative f' of the function f. At what value(s) of x does function f have a point of inflection?



(A) c and e only

(B) a, b, c, and d only

(C) a and c only

(D) b and d only

(E) a only

7. An equation of the line tangent to the graph of $f(x) = 2x^3 - 3x^2$ at its point of inflection is

(A) $3x + 2y = 5$

(B) $6x + 4y = 1$

(C) $6x + 4y = 5$

(D) $3x + 2y = 1$

(E) $6x - 4y = 1$

8. The graph of the function $y = f(x)$ is shown below. On which of the following intervals is $f'(x) > 0$ and $f''(x) > 0$?

(A) I, II, and III

(B) II and III only

(C) II only

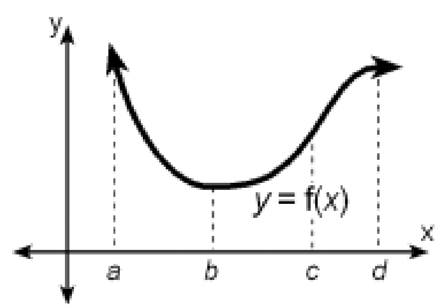
(D) I only

(E) III only

I. $c < x < d$

II. $a < x < b$

III. $b < x < c$



9. The graph of the derivative of function f is shown below. Where on the interval $[-2, 3]$ is function f decreasing?

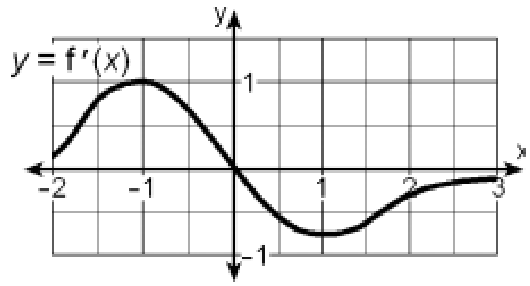
(A) $[-2, 3]$

(B) $[-1, 1]$

(C) $[1, 3]$

(D) $[-2, 0]$

(E) $[0, 3]$



10. For what interval is $f(x) = \frac{1}{1-x^2}$ increasing?

(A) Function f increases for all real values of x

(B) $(-\infty, -1) \cup (-1, 0]$

(C) $[0, 1) \cup (1, \infty)$

(D) $(-1, 1)$

(E) $(-\infty, -1) \cup (1, \infty)$

11. The table below shows various values for the derivatives of differentiable functions f, g, and h. Which of these functions must have a relative maximum on the open interval $(-3, 3)$?

(A) g only

(B) f, g, and h

(C) g and h only

(D) h only

(E) f only

x	-3	-2	-1	0	1	2	3
$f'(x)$	0.5	1	1.5	2	1.5	1	0.5
$g'(x)$	-1.5	-1	-0.5	0	0.5	1	1.5
$h'(x)$	-0.5	0	-0.5	0	0.5	0	-0.5

12. If $\lim_{h\to 0} \frac{f(-2+h) - f(-2)}{h} = 2.637$,then the graph of function f at $x = -2$ is

(A) Decreasing
(B) Concave downwards
(C) Increasing
(D) Concave upwards
(E) Stationary

13. The graph of $y = f(x)$ is shown below. If f is twice-differentiable, which of the following is true?

(A) $f(x) < 0, f'(x) < 0, f''(x) < 0$

(B) $f(x) > 0, f'(x) < 0, f''(x) > 0$

(C) $f(x) > 0, f'(x) > 0, f''(x) > 0$

(D) $f(x) > 0, f'(x) < 0, f''(x) < 0$

(E) $f(x) > 0, f'(x) > 0, f''(x) < 0$