3.1 – 3.6 Practice AP Questions

Name:_____

1) The graph of $y = 3x^2 - x^3$ has a relative maximum at

(A) (0,0) only

(B) (1,2) only

(C) (2,4) only

(D) (4,-16) only

(E) (0,0) and (2,4)

2) If the graph of $f(x) = 2x^2 + k/x$ has a point of inflection at x = -1, then the value of k is

(A) -2

(B) -1

(C) 0

(D) 1

(E) 2

3) What are all value of x for which the graph of $y = \frac{2}{4-x}$ is concave downward?

(A) No values of x

(B) x < 4

(C) x > -4

(D) x < -4

(E) x > 4

4) The functions *f* and *g* are piecewise linear functions whose graph are shown below. If h(x) = f(x)g(x), then h'(3) =

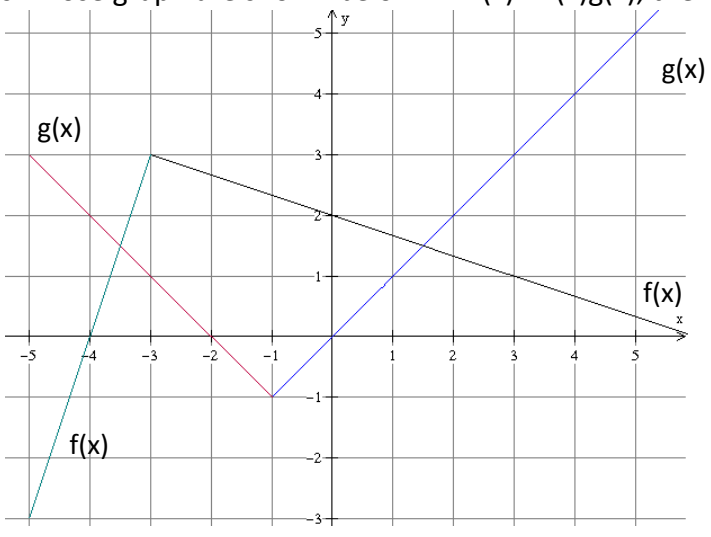
(A) -8/3

(B) -1/3

(C) 0

(D) 2/3

(E) 8/3



5) At what value(s) of x does $f(x) = x^4 - 8x^2$ have a relative minimum?

(A) 0 and -2 only

(B) 0 and 2 only

(C) 0 only

(D) -2 and 2 only

(E) -2, 0, and 2

6) The function $y = x^4 + bx^2 + 8x + 1$ has a horizontal tangent and a point of inflection for the same value of x. What must be the value of b?

(A) -6

(B) -1

(C) 1

(D) 4

(E) 6

7) Let *f* be the function given by $f(x) = x^3$. What are all value of c that satisfy the conclusion of the Mean Value Theorem on the closed interval [-1, 2]?

(A) 0 only

(B) 1 only

(C) $\sqrt{3}$

(D) -1 and 1

(E) $-\sqrt{3}$ and $\sqrt{3}$

8) What are all values of x for which the function $f(x) = x^3 + 6x^2 + 9x + 1$ is increasing?

(A) $(-\infty, -3)$ only

(B) (-3, -1) only

(C) $(-1, \infty)$ only

(D) $(-\infty, -3) \cup (-1, \infty)$

(E) $(-\infty, -3) \cup (1, \infty)$

9) If *f* is defined by $f(x)=\frac{5x^7}{7}+4x^6+6x^5+x+1$, what are all the x-coordinates of the points of inflection of the graph of *f*?

(A) -2 only

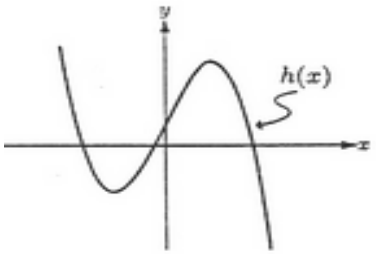
(B) 0 only

(C) 2 only

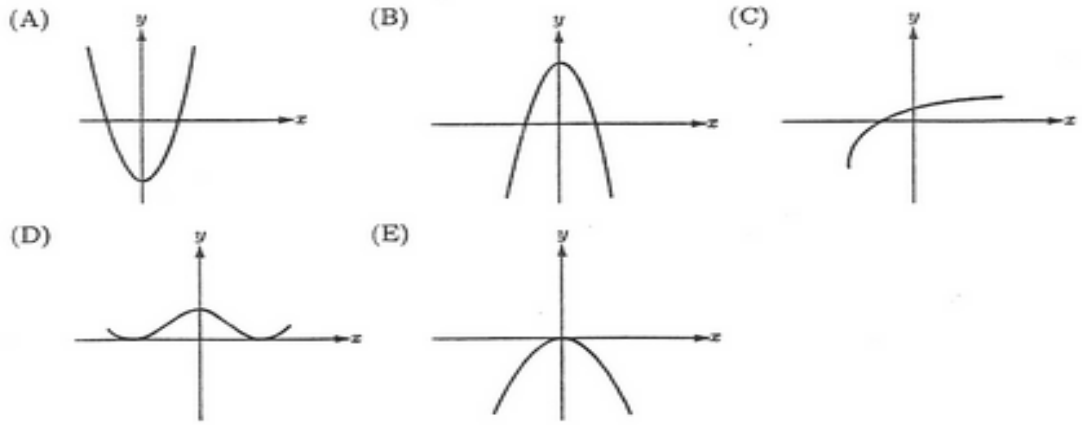
(D) -2 and 0 only

(E) -2, 0, 2

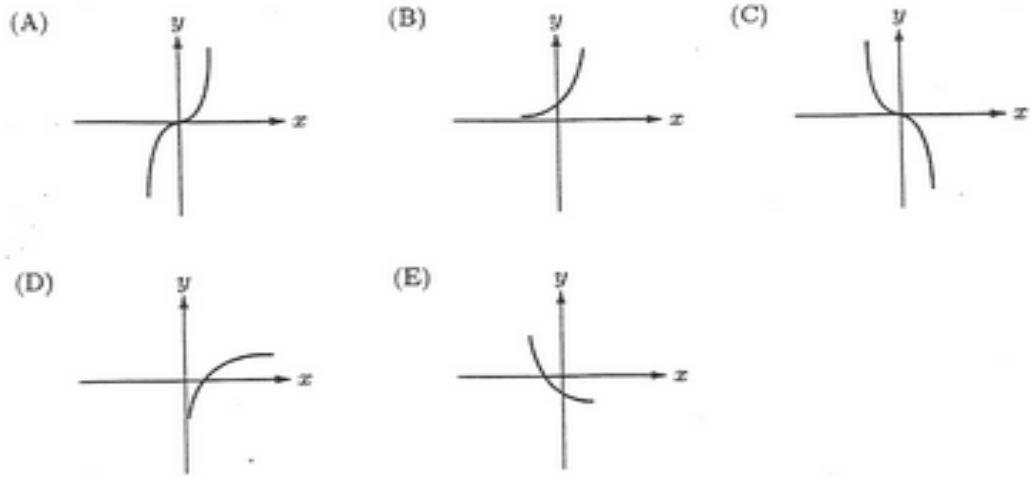
10)



The graph of h(x) is shown above. Which of the following could be the graph of y = h ‘(x)?



11. If, for all real numbers x, f ‘(x) < 0 and f ‘’(x) > 0, which of the following curves could be part of the graph of f?



12) The figure below shows the graph of the derivative of a function f. How many points of inflection does f have in the interval shown?

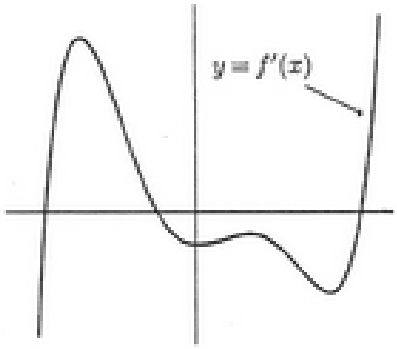
(A) None

(B) One

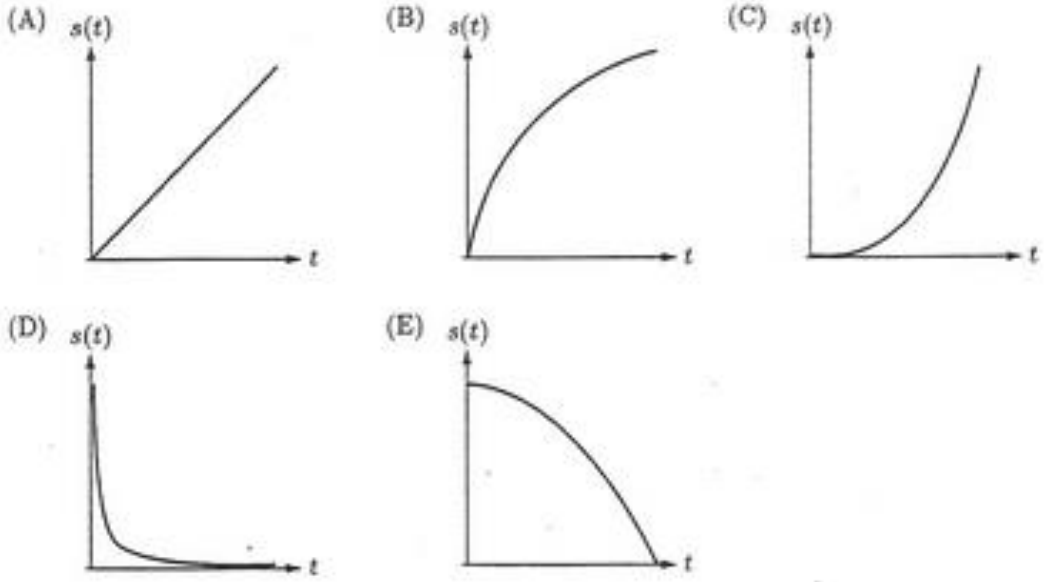
(C) Two

(D) Three

(E) Four



13) Which graph best represents the position of a particle, s(t), as a function of time, if the particle's velocity and acceleration are both positive?



14) Water is draining out of a rectangular tank whose base measures 50 x 10 cm and height measures 20 cm. The water level of the tank is changing by 0.1 cm every second. The water is draining into another rectangular tank whose base measures 30 x 20 cm and height measures 20 cm. How fast is the water level rising in the 2nd tank?