HW 235 Name_____ Pd_____

AP Questions

1. The instantaneous rate of change of the function $f(x) = \dfrac{x^2 + 2x}{x + 1}$ at $x = 3$ is

(A) $\frac{1}{8}$

(B) $\frac{17}{16}$

(C) $\frac{31}{16}$

(D) $\frac{47}{16}$

(E) $\frac{15}{4}$

1. If $f(x) = \dfrac{x + 3}{x^2 + 1}$, then $f'(-2) =$

(A) $-\frac{9}{25}$

(B) $-\frac{1}{4}$

(C) $\frac{1}{25}$

(D) $\frac{1}{4}$

(E) $\frac{9}{25}$

3. If $f(x) = \dfrac{3x^2 + x}{3x^2 - x}$ then $f'(x)$ is

(A) 1

(B) $\dfrac{6x^2 + 1}{6x^2 - 1}$

(C) $\dfrac{-6}{(3x - 1)^2}$

(D) $\dfrac{-2x^2}{(x^2 - x)^2}$

(E) $\dfrac{36x^3 - 2x}{(x^2 - x)^2}$

19. A particle moves along the x-axis so that its position at time t, in seconds, is given by $x(t) = t^2 - 7t + 6$. For what value(s) of t is the velocity of the particle zero?

(A) 1 (B) 6 (C) 1 or 6 (D) 3.5 (E) 1 or 3.5 or 6

90. Consider the functions f and g given by $f(x) = \frac{1}{x}$ and $g(x) = \cos x$. At what value of x do the graphs of f and g have perpendicular tangent lines?

(A) -1.300

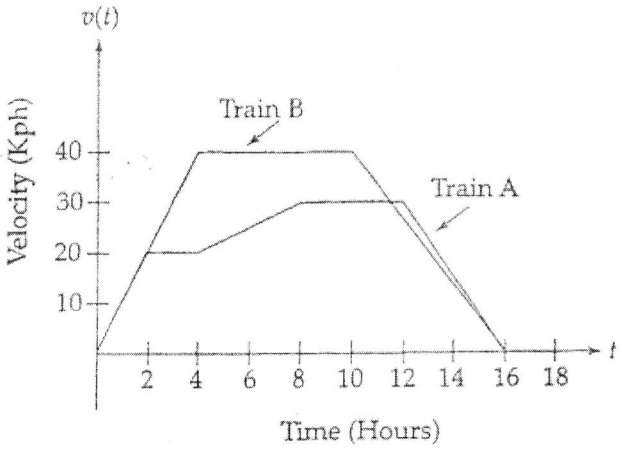
(B) -0.877

(C) 0

(D) 0.767

(E) 0.769

4.



Three trains, A, B, and C each travel on a straight track for $0 \le t \le 16$ hours. The graphs above, which consist of line segments, show the velocities, in kilometers per hour, of trains A and B. The velocity of C is given by

$$v(t) = 8t - 0.25t^2$$

(Indicate units of measure for all answers.)

(a) Find the velocities of A and C at time $t = 6$ hours.

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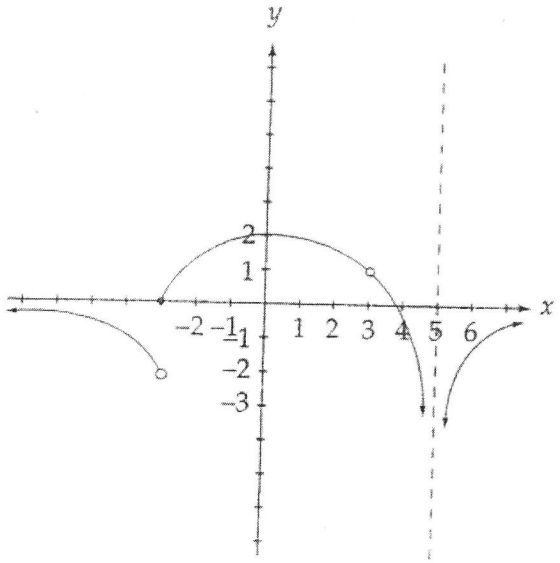
(b) Find the accelerations of B and C at time $t = 6$ hours.

(c) Find the positive difference between the total distance that A traveled and the total distance that B traveled in 16 hours.



10. Given the graph of $f(x)$ above, find:

(a) $\lim_{x \to -\infty} f(x)$

(b) $\lim_{x \to \infty} f(x)$

(c) $\lim_{x \to 3^-} f(x)$

(d) $\lim_{x \to 3^+} f(x)$

(e) $f(3)$

(f) Any discontinuities.

8. For what value(s) of k is the function $f(x) = \begin{cases} -6x - 12, & x < -3 \\ k^2 - 5k, & x = -3 \\ 6, & x > -3 \end{cases}$ continuous at $x = -3$?

C

42. If the function $f(x)$ is differentiable and $f(x) = \begin{cases} ax^3 - 6x; & \text{if } x \le 1 \\ bx^2 + 4; & x > 1 \end{cases}$, then $a =$

(A) 0 (B) 1 (C) −14 (D) −24 (E) 26