AP CALCULUS AB

HOMEWORK #2

2.3. Discontinuity Types

Supplemental Problems:
1, **2**, **3**, **4**

Section 2.3 Exercises, pg. 84
26^{1}, 30^{1}

2.3. Continuity

Supplemental Problems:
5, **6**

Section 2.3 Exercises, pg. 84
47, 48

2.4. Average and Instantaneous Rates of Change

Section 2.4 Exercises, pg. 93
1, 3, 5, $10^{2,3}$

2.4. Velocities

Section 2.4 Exercises, pg. 93
33^{4}, $35^{3,4}$

Supplemental Problems:
$\mathbf{7}^{3,5}$

Notes:

1. Cancel out the hole.

2. The slope of the function at $x = 1$ is

$$m_{\mathrm{T}}(1) = \lim_{h\to 0}\frac{f(1+h)-f(1)}{h}.$$

3. Draw the graph on the grid provided.

4. The slope of the function, as a function of x, is

$$m_{\mathrm{T}}(x) = \lim_{h\to 0}\frac{f(x+h)-f(x)}{h}.$$

5. The velocity of the car, as a function of time, is

$$v(t) = \lim_{h\to 0}\frac{x(t+h)-x(t)}{h}.$$

Supplemental Problems:

For problems **1** through **4**, state the discontinuity types and their x – locations.

1)

$$f(x) = \frac{2x^2+3x}{|x|}$$

2)

$$f(x) = \cos\left(\frac{2\pi}{x^2-4}\right)$$

3)

$$f(x) = \frac{5x+3}{5x^2+33x+18}$$

4)

$$f(x) = \frac{x+3}{2x^2+13x-7}$$

5) For $f(x) = x^2 - 8x + 17$ defined on $x \in [3\,,7]$, find the value of $c \in (3\,,7)$ guaranteed to exist via the IVTCF such that $f(c) = 6$. Verify that $f(3) < 6 < f(7)$.

6)

$$\lim_{x\to 8}(x^2-8x+17) = ?$$

7) A car completes a 0.25 – mile (1320 ft) drag race in 6 seconds. The position x of the car (in feet), as a function of time (in seconds), is given by

$$x = \frac{22}{9}(21t^2 - t^3)\,.$$

a) Calculate the velocity of the car $v = v(t)$, where v is in ft/sec, and t is in seconds.

b) Express your result from part **a** to have v being in mi/hr and t being in seconds.

c) Graph $v = v(t)$ from part **b** on the grid provided.

d) Calculate the maximum value of v, in mi/hr, which occurs during $t \in [0\,,6]$ seconds.

e) Calculate the average value of v over $t \in [0\,,6]$ seconds in mi/hr.

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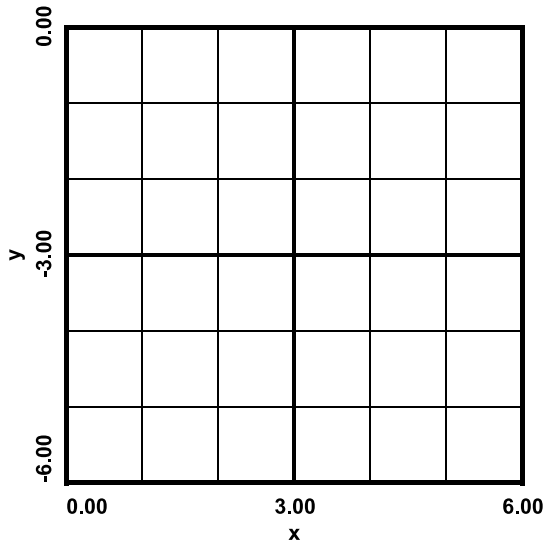
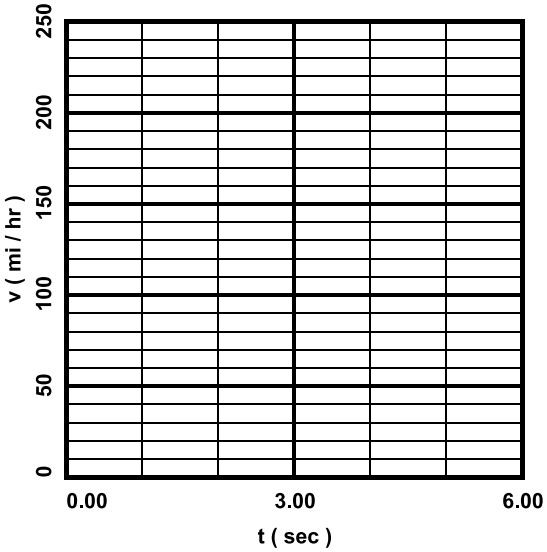
Grids:

10)



7)



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