d.1 Worksheet

1.) a) dollars / year

b) Table

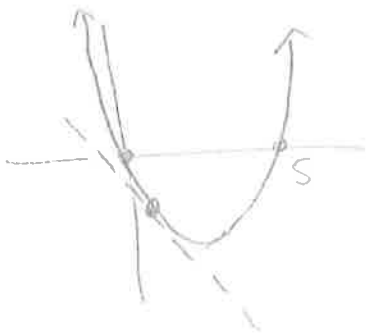
2.) a) $\approx .275$

b) Decreases. $N(t)$ is concave down.

c.) $\approx .375$

d.) Greater Than

3.) a)



b.) Negative

c.) $f'(1) = -3$

d.) $y + 4 = -3(x - 1)$

4.) Skip

5) a.) $f'(1) = 0$ $f'(2) = 0$ $f'(4) = 1/2$ $f'(7) = 0$

b.) $f'(x) < 0$ on $(7, 9)$

c.) $f'(5.5)$

d) No. Sharp turn

6.) $f'(7.5) = 0$

7.) $(1.0, 2.5) \cup (3.5, 4.5)$

8.) $6x^2 + 10x$ 9.) $\frac{2}{(x-3)^2}$ 10) $\frac{1}{2\sqrt{x+4}}$

Worksheet 2 on 2.1

1.) (i) $x=1$ (ii) $x=2$ and $x=4$

2.) F
C
E
A
B
D

3.) D, C, B, AB, I, A

4.) Pos. = A, D Neg. = C, F
Most + = A Least = F

5.) a.) 0 and 5/2 b.) -5/2 and 2

6.) $7+2x$ 7.) 3

8.) a.) must Diff. implies cont.
b.) might $f'(2)=0$ only guarantees cont. @ 2.
c.) might $f'(x)$ says nothing about y-value
d.) must Def. of continuity
e) never $f(x)$ cannot have 2 different slopes at a differentiable point.

Derivatives using data

1.) a.) $T(90) = 110°F$. At 90 minutes, the temperatur of the turkey is 110°F.

b.) $T^{-1}(150) = 30$ minutes. It took 30 minutes for the temp. of the turkey to cool down to 150°F.

c.) Yes. Since temp. is cont. and $110 < 125 < 130$. The IVT guarantees that the turkey will be 125°F at some time between $t=60$ and $t=$ minu

d.) $\frac{110-130}{90-60} = -2/3$. The temperature of the turkey is changing at a rate of $\approx -2/3$ °F/min at $t=75$ minutes.

2.) a.) $N(2) = 1886$. In 1998, there were 1886 locations.

b.) $N^{-1}(4617) = 6$. It took 6 years for the number of locations to reach 4617.

c.) $\frac{4617-3300}{6-4} = \cancel{329}\ 658.5$. The number of coffee house locations is changing at a rate of ≈ 658.5 locations/year in 2001.

5.)

a.) Yes. Since temp. is diff. $\Rightarrow$ it is cont. and $95 < 99 < 103$. The IVT guarantees that the temp. will be 99°F at some time between $t=2$ and $t=5$.

b.) $\frac{95-103}{5-2} = -8/3$. The temperature of the coffee is changing at a rate of $\approx$ ~~-8°F/min~~ at $t=3$ minutes.

$-\frac{8}{3}\frac{°F}{min}$

Sara Rodriguez found this!!

c.) $\frac{90-95}{12-5} = -5/7$

d.) $y'(3) = -2.84599$ °F/min.

e.) $\frac{y(12)-y(5)}{12-5} = \frac{90.63755 - 95.20637}{7}$

4.) a.) $w(9)=24$. The temp. of the water was $24°C$ at $t=9$ days.

b.) $w'(31)=3$. On day 3, the temp. of the water was $31°C$.

c.) $w'(7) \approx \frac{24-28}{9-6} = -4/3$

d.) Twice. The temp is diff $\Rightarrow$ it is cont. The temp. increased from 20 to 31 on the interval $t=0$ to $t=3$. The temp. decreased from 24 to 22 on the interval $t=9$ to $t=12$. Since $20<23<31$ and $22<23<24$. The IVT guarantees that the temp. was $23°C$ on the interval $t=20$ to $t=31$ and $t=22$ to $t=24$.

e.) $p'(7) = -1.29296$. At $t=7$ days, the temp. of the water was changing at a rate of $-1.29296\,°C/day$.

5.) a.) $v'(17) \approx \frac{30-25}{24-14} = 5/10$. The velocity of the car was changing at a rate of $\approx 1/2$ ft/sec^2 at $t=17$ seconds.

b.) Twice. Once on $t=0$ to $t=14$ and once on $t=33$ to $t=47$. See 4 part d for an example of sufficient justification

6.) a.) $v'(18) \approx \frac{4.5-1}{20-15} = -1/2$. The velocity of the plane was changing at a rate of $\approx -1/2$ mpm/m at $t = 18$ minutes

b.) $\frac{2.4-9.2}{25-5} = -.34$

c.) Twice. Once on the interval $t=0$ to $t=5$ and once on the interval $t=10$ to $t=15$. See #4d for an example of sufficient justification.

d.) $A(23) = v'(23) = f'(23) = -.407694 \frac{mpm}{m}$