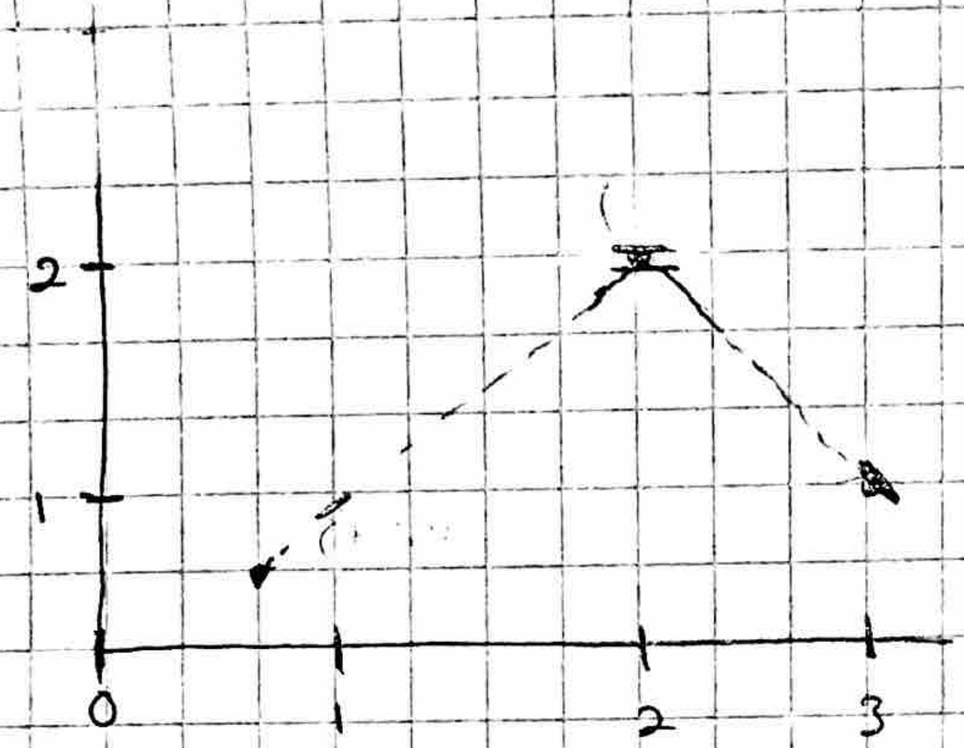
Section 0.1
Preview of Calculus

1.



$x = 1$

Positive slope at $x = 1$

$m = 1$

$x = 2$

Horizontal line at $x = 2$

$m = 0$

$x = 3$

Negative slope at $x = 3$

$m = -1$

3. $\frac{\Delta y}{\Delta x} = \frac{f(b) - f(a)}{b - a} = \frac{f(a+h) - f(a)}{h}$, where $b = a + h$, $h > 0$

3a. $[0, 10]$ $a = 0$, $f(a) = f(0) = 150$

$b = 10$, $f(b) = f(10) = 70$

$$\frac{70 - 150}{10 - 0}$$

$$\frac{-80}{10}$$

$$-8$$

Cooling 8 degrees per minute
8 deg/min

Negative sign means decrease in temperature (cooling)

3b. [7, 8]

$a = 7$, $f(a) = f(7) = 81$

$b = 8$, $f(b) = f(8) = 75$

$$\frac{75 - 81}{8 - 7}$$

$$= \frac{-6}{1}$$

$$= -6$$

Cooling 6 degrees per minute

6 deg/min

[8, 9] $a = 8$, $f(a) = f(8) = 75$

$b = 9$, $f(b) = f(9) = 74$

$$\frac{70 - 75}{9 - 8}$$

$$= \frac{-5}{1}$$

$$= -5$$

Cooling 5 degrees per minute

5 deg/min

At 8 minutes

See Above

Cooling rate at 8 minutes is about 5 deg/min

3c. [2, 3] $a = 2$, $f(a) = f(2) = 125$

$b = 3$, $f(b) = f(3) = 115$

At 2 minutes

$$\frac{115 - 125}{3 - 2}$$

$$= \frac{-10}{1}$$

$$= -10$$

Cooling rate at 2 minutes is about 10 deg/min

(5.)

Area of Rectangle = $l \cdot w$, l = length, w = width

Area 1 = A1 Area 2 = A2 Area 3 = A3 Area 4 = A4 Area 5 = A5

$A1 = (1)(2/5)$ $A2 = (1)(4/5)$ $A3 = (1)(5/5 = 1)$ $A4 = (1)(5/5 = 1)$

$A5 = (1)(3/5)$

$A1 = 2/5$

$A2 = 4/5$

$A3 = 1$

$A4 = 1$

$A5 = 3/5$

$A1 + A2 + A3 + A4 + A5$

$1 \leq x \leq 19 = 25$

$-19 \quad -19$

(5) $P = 1/2$, $F = 1$

O	P	P	P	O
O	P	P	P	P
P	P	F	P	P
P	P	P	P	P
O	O	P	P	O

There are 18 P's

There are 1 F's

$\left(\frac{1}{2}\right) 18 \cdot 1$

11

9 cm²