

## STATION ONE

- A.  $f$  HAS A REL MAX  $x = -2$  b/c  $f'$  CHANGES FROM  $+$  TO  $-$ .  
 $f$  HAS A REL MIN  $x = 0$  b/c  $f'$  CHANGES FROM  $-$  TO  $+$ .
  - $f$  IS INCREASING  $(-3, -2) \cup (0, 2) \cup (2, 3)$  b/c  $f' > 0$ .
  - $f$  IS CONCAVE UP  $(-1, 1) \cup (2, 3)$  b/c  $f'$  INCREASING.
  - $f$  HAS POINTS OF INFLECTION  $x = -1, 1, 2$  b/c  $f'$  CHANGES FROM INC/DEC AND DEC/INC.
- $f$  HAS A REL MAX  $x = 5$  b/c  $f'(5) = 0$  AND  $f''(5) = -2$   
(2nd. DERIV. TEST).
  - A.  $f$  HAS A REL MAX  $x = -5$  b/c  $f'$  CHANGES FROM  $+$  TO  $-$ .  
 $f$  HAS A REL. MIN  $x = -1$  b/c  $f'$  CHANGES FROM  $-$  TO  $+$ .
  - $f'' < 0$   $(-7, -3) \cup (2, 5)$  b/c  $f'$  DECREASING.
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## STATION TWO:

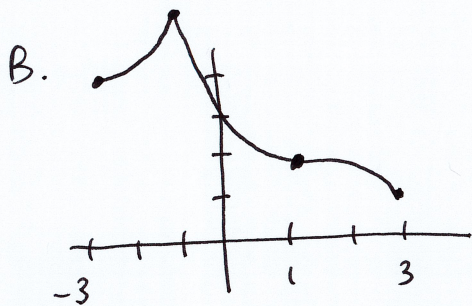
- $f$  IS INCREASING  $(-4, -1) \cup (-1, -1/5) \cup (3, 4)$  b/c  $f' > 0$ .
- $f$  HAS A LOCAL MAX  $x = -4$  b/c  $f'$  CHANGES FROM  $+$  TO  $-$ .
- ABSOLUTE MAX VALUE  $5/4$   
ABSOLUTE MIN VALUE  $-1$
- $f$  HAS REL. MAX  $x = -2$  b/c  $f'$  CHANGES FROM  $+$  TO  $-$ .  
REL MAX  $(-2, 4)$   
 $f$  HAS REL. MIN  $x = 2$  b/c  $f'$  CHANGES FROM  $-$  TO  $+$ .  
REL MIN  $(2, 4)$

### STATION THREE

1. A.  $f$  IS CONCAVE DOWN  $(-\infty, 5/3)$  b/c  $f'' < 0$ .

B.  $K=20$

2.  $f$  HAS POINT OF INFLECTION  $x=1$  b/c  $f''$  CHANGES SIGN.



3.  $(-1, 1/4)$  AND  $(1, 1/4)$  b/c  $f''$  CHANGES SIGNS AT  $x=-1$  &  $x=1$ .

4.  $f$  IS CONCAVE UP  $(0, \infty)$  b/c  $f'' > 0$ .

### STATION FOUR

1.  $f(x)$  IS CONT  $[0, 1]$  ✓

$f(x)$  IS DIFF.  $(0, 1)$

$$c = 8/27$$

2.  $G(x)$  IS CONT.  $[-1, 2]$  ✓

$G(x)$  IS DIFF  $(-1, 2)$  ✓

$$c = 0$$

3.  $x = 1$

4. B

## STATION FIVE:

1.  $\frac{dy}{dt} = -\frac{3}{8} \text{ ft/s}$  THE SHADOW IS DECREASING AT RATE OF  $\frac{3}{8} \text{ ft/s}$ .

2.  $\frac{dr}{dt} = \frac{125}{196\pi} \text{ cm/month}$

3. A.  $\frac{dx}{dt} = \frac{4\sqrt{10}}{3} \text{ ft/s}$  B.  $\frac{dA}{dt} = 20\frac{2}{3} \text{ ft}^2/\text{s}$  C.  $\frac{d\theta}{dt} = -\frac{1}{3} \text{ rad/s}$ .

4.  $\frac{dr}{dt} = -\frac{9}{8\pi} \text{ in/s}$

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