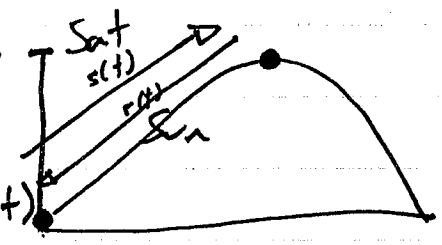
# 2.3

**78** $s(t)$ - run up  $r(t)$ - run down




$f(t) = s(t) - r(t) = 0$ $\quad s(t) = r(t)$

$0 \to b$

$[0,10]$ , $[0,20]$

$f(0) = -b$ $\qquad f(\text{end}) = b$

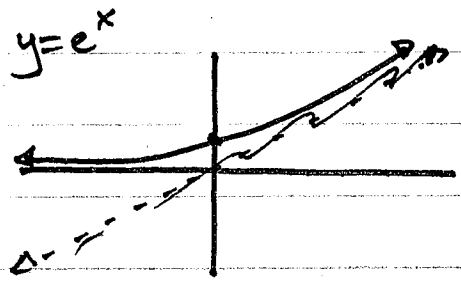
**73** $f(x) = x^3 - x^2 + x - 2$ $\quad [0,3]$ , $f(c) = 4$

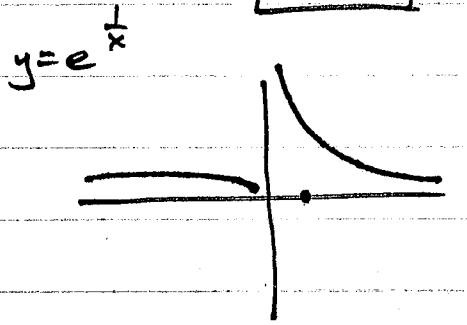
$f(0) = 0^3 - 0^2 + 0 - 2 = -2$ $\qquad x^3 - x^2 + x - 2 = 4$

$f(3) = 3^3 - 3^2 + 3 - 2 = 19$ $\qquad x^3 - x^2 + x - 6 = 0$

$\boxed{c = 2}$

**9**




**28** 1. $\frac{\sin 4x}{x}$

$f(x) = \frac{\sin 4x}{x}$ , $x = 0$

$= \frac{4}{4} \frac{\sin 4x}{x}$

$= 4 \left| \frac{\sin 4x}{4x} \right|$

$= 4 \cdot 1 = \boxed{4}$

$\lim_{x \to 0} \frac{\sin 4x}{x} = 1$

**30** $f(x) = \frac{x^3 - 4x^2 - 11x + 30}{x^2 - 4}$

$(x-2)(x+2)$

$= \frac{(x-2)(x^2 - 2x - 15)}{(x-2)(x+2)}$

$x - 2 \overline{)\, x^3 - 4x^2 - 11x + 30}$

$x^2 - 2x - 15$

$-(x^3 - 2x^2)$

$-2x^2 - 11x$

$-(-2x^2 + 4x)$

$-15x + 30$

$-15x + 30$

$0$

# 2.3

33 $f(x)$ : $g(x) = \sqrt{x}$ $h(x) = \frac{x}{x+1}$

$$g(h(x)) = \sqrt{\frac{x}{x+1}}$$

pg 82 1 is continuous → linear function

37 $y = x + 2$ is continuous → linear function

$y = \sqrt{x}$ is continuous → square root function

$\sqrt{x+2}$ Theorem 7

$\frac{1}{\sqrt{x+2}}$ quotient property

39 $y = x^2$ is continuous → quadratic function

$y = 4x$ is continuous → linear function

$y = |x|$ is continuous → absolute value function

$y = x^2 - 4x$ is continuous → difference property

$y = |x^2 - 4x|$ is continuous → Theorem 7

45 $x = x^4 - 1$ $0^4 - 0 - 1 = -1$ $[0, 2]$

$0 = x^4 - x - 1$ $2^4 - 2 - 1 = 13$