

9)  $g(1) = \int_1^1 f(t) dt = 0$

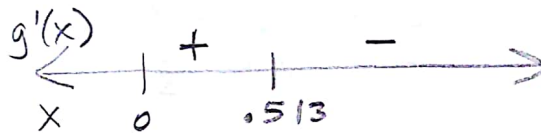
C  $g(0) = \int_1^0 f(t) dt = \text{neg}$

$g(2) = \int_1^2 f(t) dt = \text{pos}$   
smaller

30)  $g(x) = f(x^3 + e^{-x^2})$

E  $g'(x)$  goes pos to neg  $\rightarrow$  max

$g'(x) = \underbrace{f'(x^3 + e^{-x^2})}_{\text{neg}} \cdot (3x^2 + -2xe^{-x^2}) = 0$   
 $x = .513$



31)  $y = x^3 - e^x$

D  $y' = 3x^2 - e^x$

$\frac{f(2) - f(0)}{2 - 0} = \frac{(8 - e^2) - (-1)}{2}$

$3x^2 - e^x = \frac{9 - e^2}{2}$

$x = 1.149$

32) A

33)  $\lim_{x \rightarrow 0} \frac{\sin 3x + ax + bx^3}{x^3} = 0$

E

$\frac{0}{0} \therefore$  L'H

$\lim_{x \rightarrow 0} \frac{3 \cos 3x + a + 3bx^2}{3x^2}$

$-27 \cos 0 + 6b = 0$

$-27 + 6b = 0$

$6b = 27$

$b = \frac{27}{6} = \frac{9}{2}$

$\lim_{x \rightarrow 0} \frac{-9 \sin 3x + 6bx}{6x}$

$3 \cos 3x + a + 3\left(\frac{9}{2}\right)x^2 = 0$

$3 + a = 0$

$a = -3$

$\lim_{x \rightarrow 0} \frac{-27 \cos 3x + 6b}{6} = 0$

34) I. LRAM above (increasing)  
C II. TAM above (CC ↑)

35) 
$$\lim_{n \rightarrow \infty} \left| \frac{(n+1)(6x-5)^{n+1}}{3^n \cdot 3} \cdot \frac{3^n}{n(6x-5)^n} \right|$$

$$\lim_{n \rightarrow \infty} \left| \frac{(6x-5)}{3} \cdot \frac{(n+1)}{n} \right|$$

$$-1 < \frac{6x-5}{3} < 1$$

$$-3 < 6x-5 < 3$$

$$2 < 6x < 8$$

$$\frac{1}{3} < x < \frac{4}{3}$$

$$\frac{\frac{4}{3} - \frac{1}{3}}{2} = \frac{1}{2} = \text{ROC}$$

36) 
$$2(130 + 118 + 108 + 120)$$

E

37) 
$$\int_2^{\infty} \frac{1}{x(\ln x)^p} dx \quad \begin{array}{l} u = \ln x \\ du = \frac{1}{x} dx \end{array}$$

B

$$\int \frac{1}{u^p} du \quad \text{conv if } p > 1$$

38)  $m'(x) = \cos(1-x^2) \quad m(2) = 1 \quad m(3) = ?$

D 
$$m(3) = m(2) + \int_2^3 \cos(1-x^2) dx$$

$$1.104$$

39)  $x(t) = 2\cos t + \cos^2 t = 2\cos t + (\cos t)^2$   
 $y(t) = 2\sin t + \sin t \cos t$

B

$$x'(t) = -2\sin t - 2\sin t \cos t$$

$$y'(t) = 2\cos t + (\sin t(-\sin t) + \cos t \cdot \cos t)$$

$$2\cos t - \sin^2 t + \cos^2 t$$

40)  $F'(x) = G(x) \quad F(x) = \int G(x) dx$

C

$$\int_3^5 G(x) dx = F(5) - F(3)$$

$$4 - (-2) = 6$$

41)  $f(0) = \int_2^0 g(t) dt \quad 1.7 = \text{neg}(\text{under } x\text{-axis})$

A

$$f(1) = \int_2^1 g(t) dt \quad 0$$

$$f(2) = \int_2^2 g(t) dt \quad 0$$

$$f(3) = \int_2^3 g(t) dt \quad 1.3$$

$$f(4) = \int_2^4 g(t) dt \quad 2$$

42)  $A_{\text{rect}} = b \cdot h$

D  $A = (3^{-x^2} - \frac{1}{3})(2 + 3^{-x^2} - \frac{1}{3})$

$$V = \int_0^1 A(x) dx$$

.992

$$43) f''(x) = 2^{-\frac{x^2}{5}} \cdot \cos x + \frac{x}{6} - 0.1 = 0$$

C  $f''(x)$  changes signs

$$44) \quad h(x) = f^{-1}(x) \quad f(-1, 2)$$

B  $h'(2) = (f^{-1}(2))'$   $f^{-1}(2, -1)$

$$\frac{1}{f'(f^{-1}(2))} = \frac{1}{f'(-1)} = \frac{1}{-\frac{1}{2}} = -2$$

45) C