

Set A:

- 1) E
- 4) B
- 9) C
- 6) D

Set B:

- 7) A
- 5) C
- 10) B

Set C:

- 11) C
- 12) B
- 13) E

Set D:

- 14) D
- 1108) B
- 1107) B
- 1112) C

Set E:

- 1113) B
- 1114) C
- 1116) D
- 1117) C

1099)  $t=0, x(0)=15$

- a) -23
- b) 33
- c) 11, 16, -8
- d) a

Set F:

1098) 1991 BC

$$v(t) = 12t^2 - 36t + 15$$

a)  $x(t) = 4t^3 - 18t^2 + 15t + C$

$$0 = 4 - 18 + 15 + C$$

$$0 = 1 + C$$

$$C = -1$$

$$x(t) = 4t^3 - 18t^2 + 15t - 1$$

b)  $0 = 12t^2 - 36t + 15$

$$0 = 3(4t^2 - 12t + 5)$$

$$0 = 3(2t - 5)(2t - 1)$$

$$t = \frac{5}{2}, \frac{1}{2}$$

c)  $v'(t) = 24t - 36 = 0$

$$= 12(2t - 3) = 0$$

$$t = \frac{3}{2}$$

t	v(t)
0	15
3/2	-12
2	-9

max velocity = 15

BT:  $\int v(t) dt = x(t)$

-095) 1999 AB

$$v(t) = t \sin(t^2)$$

a)  $v(1.5) = 1.5 \sin(1.5^2) = 1.167$   
Up b/c  $v(1.5) > 0$

b)  $a(t) = v'(t) = \sin t^2 + t \cos(t^2) \cdot 2t$   
 $a(1.5) = -2.049$   
No,  $v$  is decreasing b/c  $v'(1.5) < 0$

c)  $y(t) = \int v(t) dt$      $y(0) = 3$ ,  $y(2) = ?$

$u = t^2$   
 $du = 2t dt$   
 $\frac{1}{2} du = t dt$

$$= \int t \sin(t^2) dt = -\frac{1}{2} \int \sin u du$$
$$= -\frac{1}{2} \cos u = -\frac{1}{2} \cos t^2 + C$$

$$3 = -\frac{1}{2} + C \quad C = \frac{7}{2}$$

$$y(t) = -\frac{1}{2} \cos t^2 + \frac{7}{2}$$

$$y(2) = -\frac{1}{2} \cos 4 + \frac{7}{2} = 3.827$$

d) TDT:

$$\int_0^2 |v(t)| dt = 1.174$$

1097) 1994 AB

$$F(x) = \int_0^x \sin(t^2) dt \quad 0 \leq x \leq 3$$

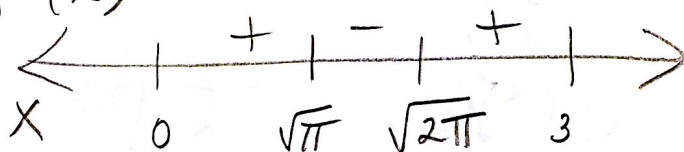
$$a) \quad \frac{1}{2}(0.25) \left( \sin 0^2 + 2 \sin\left(\frac{1}{4}\right)^2 + 2 \sin\left(\frac{1}{2}\right)^2 + \sin 1^2 \right) \\ = 0.316$$

$$b) \quad F'(x) = \sin x^2$$

$$F'(x) = 0 = \sin(x^2)$$

$$x^2 = 0, \pi, 2\pi$$

$$F'(x) \quad x = 0, \sqrt{\pi}, \sqrt{2\pi}$$



Inc:  $(0, \sqrt{\pi})$ ,  $(\sqrt{2\pi}, 3)$

c) avg ROC = K on  $[1, 3]$  of F

$$\int_1^3 \sin t^2 dt$$

$$K = \frac{F(3) - F(1)}{3 - 1} =$$

$$\frac{\int_0^3 \sin(t^2) dt - \int_0^1 \sin(t^2) dt}{2}$$

$$K = \frac{\int_1^3 \sin(t^2) dt}{2}$$

2K