

$$1. f' = \int 5 \cos x + 2 \sin x \, dx = 5 \sin x - 2 \cos x + \overset{6}{c} \quad f'(0) = 4$$

$$4 = -2 + c \quad c = 6$$

$$f = \int (5 \sin x - 2 \cos x + 6) \, dx = -5 \cos x - 2 \sin x + 6x + c, \quad f(0) = 3$$

$$3 = -5 + c, \quad c = 8$$

$$f = -5 \cos x - 2 \sin x + 6x + 8$$

$$2. f = \int (6x^2 + x - 5) \, dx = 2x^3 + \frac{1}{2}x^2 - 5x + c$$

$$f(0) = 2 = c \quad f(x) = 2x^3 + \frac{1}{2}x^2 - 5x + 2$$

$$3. s(0) = 144 \quad v(0) = 96$$

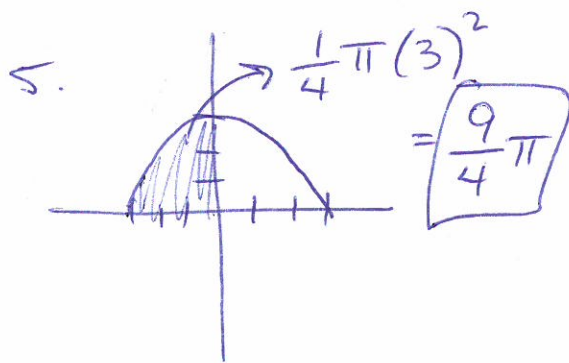
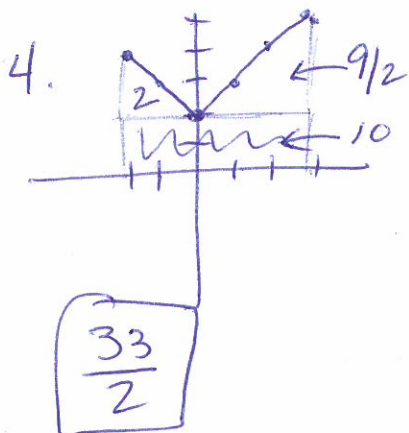
$$a(t) = -32 \quad v(t) = \int -32 \, dt = -32t + c$$

$$v(0) = 96 = c \quad v(t) = -32t + 96$$

$$s(t) = \int (-32t + 96) \, dt = -16t^2 + 96t + c,$$

$$s(0) = 144 = c, \quad s(t) = -16t^2 + 96t + 144$$

$$b) s(t) = 0 \Rightarrow t = 7.2426 \text{ sec} \quad v(7.2426) = -135.76 \text{ ft/s}$$



$$6. \int \sec x \tan x \, dx = \sec x + c$$

$$7. \int \frac{x^4 - 2x^2 + 1}{x^2} \, dx = \int x^2 - 2 + x^{-2} \, dx = \frac{1}{3}x^3 - 2x - \frac{1}{x} + c$$

8.

2	1	3	-9	-2
		2	10	2
	1	5	1	0

$$\int_{-1}^1 (x^2 + 5x + 1) \, dx = \left. \frac{1}{3}x^3 + \frac{5}{2}x^2 + x \right|_{-1}^1 = \frac{8}{3}$$

$$9. -\frac{1}{2\sqrt{x}} \left((\sqrt{x})^2 \sin \sqrt{x} \right) = -\frac{\sqrt{x}}{2} \sin \sqrt{x}$$

$$10. \sec x \tan x \left(\sec x \sqrt{1 - \sec^2 x} \right) - 3x^2 \left(x^3 \sqrt{1 - x^6} \right)$$

$$11. \text{Avg val} = \frac{1}{3-1} \int_{-1}^3 (3x^2 - 2x + 3) dx = \boxed{8}$$

$$\text{MVT: } 3x^2 - 2x + 3 = 8 \Rightarrow \boxed{x = \frac{5}{3}} \text{ and } \boxed{x = 1}$$

$$12. \frac{1}{4-1} \int_1^4 (2 + 3\sqrt{x}) dx = \frac{1}{3} \left[2x + 2x^{3/2} \Big|_1^4 \right] = \frac{1}{3}(20) = \boxed{\frac{20}{3}}$$

$$\text{MVT: } 2 + 3\sqrt{x} = \frac{20}{3}$$

$$3\sqrt{x} = \frac{14}{3}$$

$$\sqrt{x} = \frac{14}{9} \Rightarrow \boxed{x = \frac{196}{81}}$$

$$13. \Delta x = \frac{4-1}{6} = \frac{1}{2}$$

$$a) \frac{1}{2} \left[f(1) + f\left(\frac{3}{2}\right) + f(2) + f\left(\frac{5}{2}\right) + f(3) + f\left(\frac{7}{2}\right) \right] = \boxed{\frac{223}{140}} \quad 1.5929$$

$$b) \frac{1}{2} \left[f\left(\frac{3}{2}\right) + f(2) + f\left(\frac{5}{2}\right) + f(3) + f\left(\frac{7}{2}\right) + f(4) \right] = 1.2179 \Rightarrow \boxed{\frac{341}{280}}$$

$$c) \frac{1}{2} \left[f\left(\frac{5}{4}\right) + f\left(\frac{7}{4}\right) + f\left(\frac{9}{4}\right) + f\left(\frac{11}{4}\right) + f\left(\frac{13}{4}\right) + f\left(\frac{15}{4}\right) \right] = \boxed{1.3769}$$