1998

76. D

77. E

78. B

79. A

80. B

81. B

82. B

83. C

84. B

85. C

86. C

87. D

88. C

89. A

90. A

91. E

92. D

76.

$$\sum \left(\frac{k}{4}\right)^n$$

has to be odd

$k_n$

$$\sum \frac{(-1)^{k_n}}{n}$$

78.

$\frac{dr}{dt} = -.1 \frac{cm}{sec}$

$A = \pi r^2$

$\frac{dA}{dt} = \boxed{2\pi r} \frac{dr}{dt}$

$\frac{dA}{dt} = -.1C$

81.

$\frac{dy}{dx} = (1-y^2)^{\frac{1}{2}}$

$\frac{d^2y}{dx^2} = \frac{1}{2}(1-y^2)^{-\frac{1}{2}}\left(-2y \frac{dy}{dx}\right)$

$-y(1-y^2)^{-\frac{1}{2}}(1-y^2)^{\frac{1}{2}}$

$= -y$

82. $f(x) = g(x) + 7 \qquad 3 \le x \le 5$

$$\int_3^5 [f(x) + g(x)]\,dx$$

$$\int_3^5 [g(x) + 7 + g(x)]\,dx$$

$$\int_3^5 2g(x) + 7$$

$$\int_3^5 2g(x)\,dx + \int_3^5 7\,dx$$

$$2\int_3^5 g(x)\,dx + 7x\Big|_3^5$$

$$7(5-3)$$

83. $|\ln x - F(x)|$

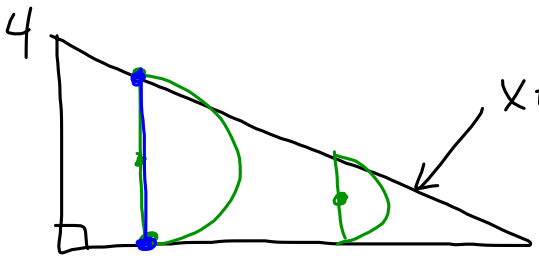
$$\sum_{n=1}^{\infty} (-1)^{n+1} \frac{(x-1)^n}{n}$$

$$\ln(x) - \left((x-1) - \frac{(x-1)^2}{2} + \frac{(x-1)^3}{3}\right)$$

$$\ln(1.7) - \left(.7 - \frac{(.7)^2}{2} + \frac{(.7)^3}{3}\right)$$

check @ $x = .3$

86.




$y = \frac{8}{2} - \frac{x}{2}$

$8y = 4 - \frac{1}{2}x$

$r = \frac{1}{2}\left(4 - \frac{1}{2}x\right)$

$\int \frac{\pi r^2}{2}$

$\frac{\pi}{2}\int_0^8 \left(\frac{1}{2}\left(4-\frac{1}{2}x\right)\right)^2$

87.

$m = 1$

$f'(x) = 1$

$f(x) = x^4 + 2x^2$

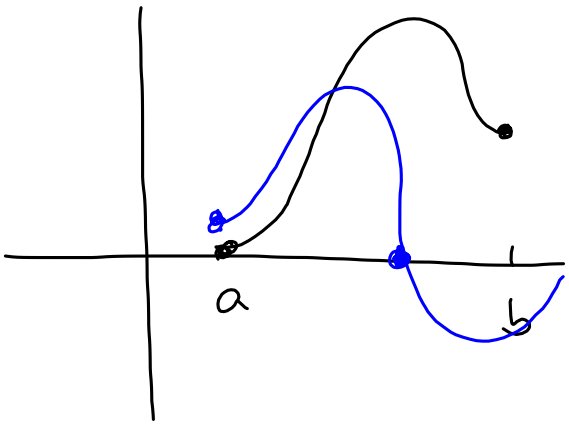
$4x^3 + 4x = 1$

$4x^3 + 4x - 1 = 0$

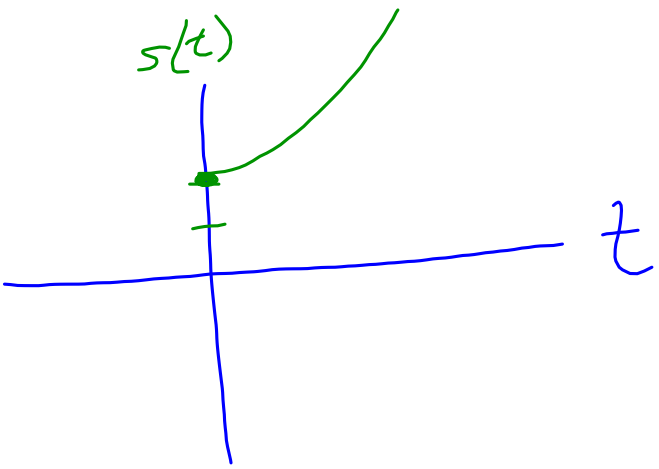
$x = .2367$

$y = .11519$

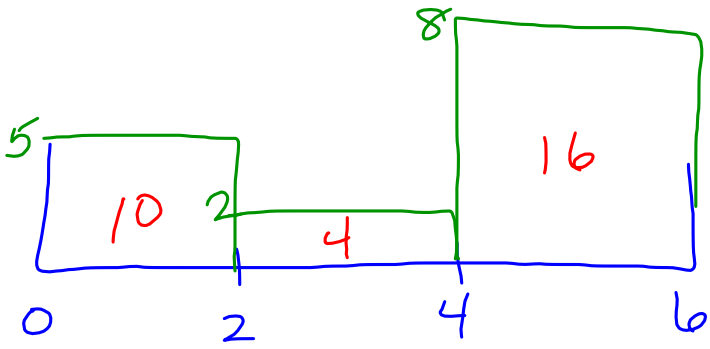
88.




90. @ $t = 0$ 2 units from origin



91.




$$11 + \int_0^6 a(t)\,dt = 41 \ \frac{ft}{sec.}$$

92.

$$f(x) = x^2 - 2x + 3 \quad @x = 2$$

$$f'(x) = 2x - 2\Big|_{x=2} = 2$$

$$y = 2(x-2) + 3 = 2x - 1$$

$$E = (x^2 - 2x + 3) - (2x - 1) < .5$$

$$x^2 - 4x + 3.5 < 0$$

76.

$$\sum \left(\frac{k}{4}\right)^n \quad k < 4$$

$$\sum \frac{(-1)^{kn}}{n} \quad \text{odd}$$

78.

$$\frac{dr}{dt} = -.1 \ \frac{cm}{sec.}$$

$$A = \pi r^2$$

$$\frac{dA}{dt} = \boxed{2\pi r}\frac{dr}{dt}$$

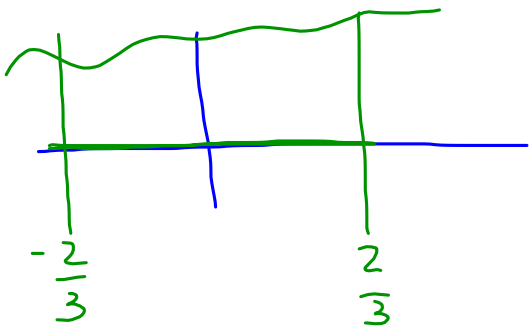
$C$

$$\frac{dA}{dt} = -.1\,C$$

79.

$$\overline{x^2 - 163}$$

80.




$$\int_{-\frac{2}{3}}^{\frac{2}{3}} 1 + \ln(\cos^4 x)$$

81.

$$\frac{dy}{dx} = (1-y^2)^{\frac{1}{2}}$$

$$\frac{d^2y}{dx^2} = \frac{1}{2}(1-y^2)^{-\frac{1}{2}}\left(-2y\frac{dy}{dx}\right)$$

$$-y(1-y^2)^{-\frac{1}{2}}(1-y^2)^{\frac{1}{2}}$$

$$= -y$$

82.

$f(x) = g(x) + 7 \qquad 3 \le x \le 5$

$$\int_3^5 [f(x) + g(x)]\,dx$$

$$[g(x) + 7 + g(x)]$$

$$\int_3^5 (2g(x) + 7)\,dx$$

$$2\int_3^5 g(x)\,dx + \int_3^5 7\,dx$$

$$7x\Big|_3^5$$

$$2\int_3^5 g(x)\,dx + 14$$

83.

$$E < M(x-1)$$

$$\frac{(-1)^2(x-1)^1}{1} + \frac{(-1)^3(x-1)^2}{2} + \frac{(-1)^4(x-1)^3}{3}$$

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

$.3 \le x \le 1.7$

$$|\ln x - f(x)|$$

$$\ln .3 - \left( (-.7) - \frac{(.7)^2}{2} - \frac{(.7)^3}{3} \right)$$

84.

$$\frac{(x+2)^n}{\sqrt{n}}$$

$$\frac{(x+2)^{n+1}}{(n+1)^{\frac{1}{2}}} \cdot \frac{n^{\frac{1}{2}}}{(x+2)^n} = x+2$$

$$-1 < x+2 < 1$$

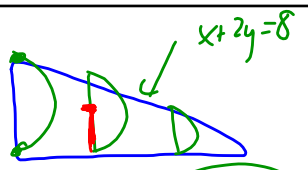
$$-3 \le x < -1$$

$$\frac{(-3+2)^n}{\sqrt{n}} = \frac{(-1)^n}{\sqrt{n}}$$

$$\frac{(-1+2)^n}{\sqrt{n}}$$

$$p = \frac{1}{2}$$

86.




$$\int \frac{1}{2}\pi r^2$$

$$y = 4 - \frac{1}{2}x$$

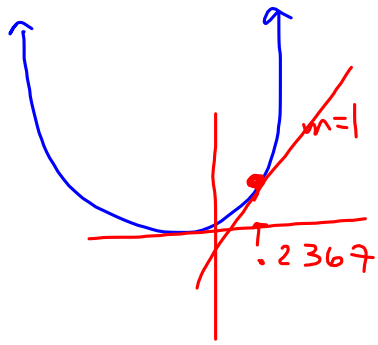
$$\int_0^8 \frac{1}{2}\pi\left(\frac{1}{2}\left(4-\frac{1}{2}x\right)\right)^2 dx$$

$$\frac{1}{2}\pi\int_0^8 \left(2-\frac{1}{4}x\right)^2 dx$$

87.

$x^4 + 2x^2$

$f'(x) = 4x^3 + 4x = 1$ $\quad m = 1$




$4x^3 + 4x - 1 = 0$

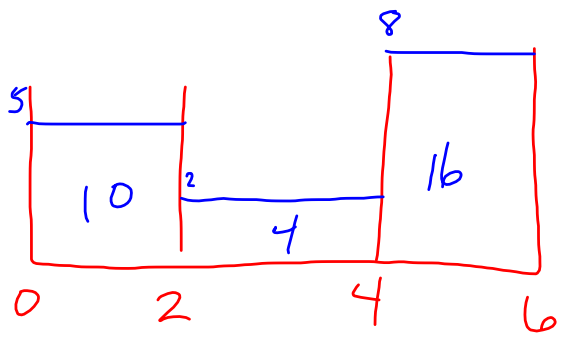
$x = .2367$

$y = .11519$

$y = 1(x - .2367) + .11519$

89. $1 - x + \frac{x^2}{2!} - \frac{x^3}{3!}$ $x^3$

91.




displacement = initial velocity + $\int_0^6 a(t)\,dt = 41 \frac{ft}{sec}$.

11 + 30

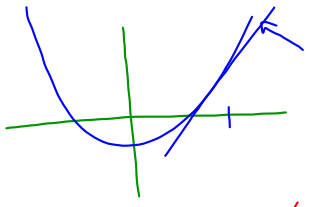
92. $f(x) = x^2 - 2x + 3$ @ $x = 2$

$f'(x) = 2x - 2\Big|_{x=2}$

tangent line

$y = 2(x-2) + 3$

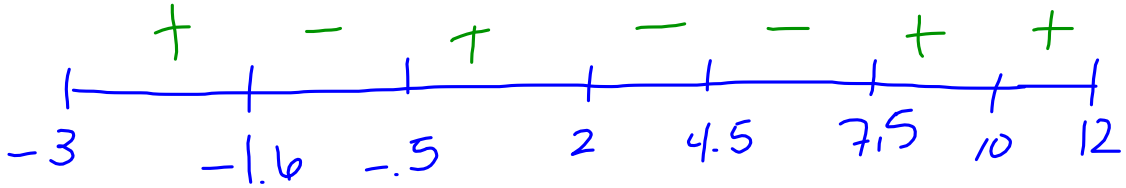
$2x - 4 + 3 = 2x - 1$

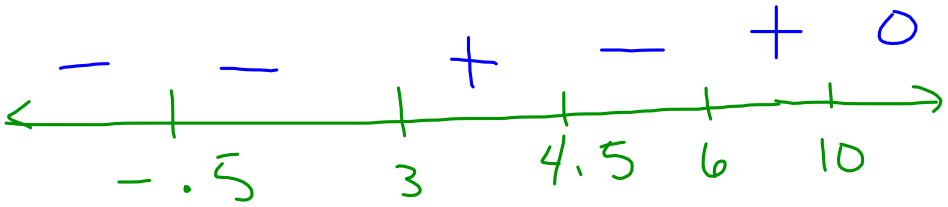


$x^2 - 2x + 3 - (2x - 1) < .5$

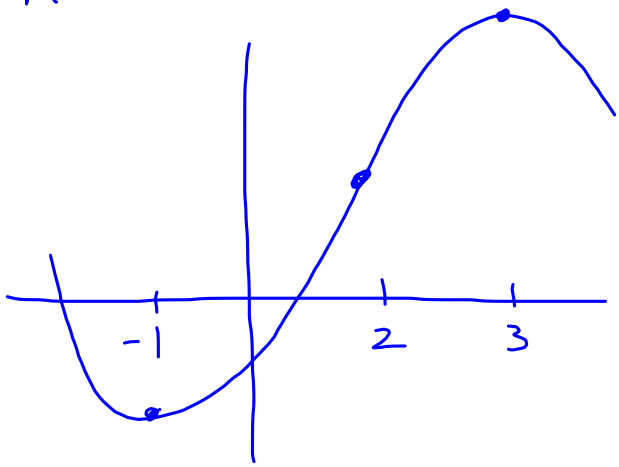
$x^2 - 4x + 4 < .5$

$x^2 - 4x + 3.5 < 0$

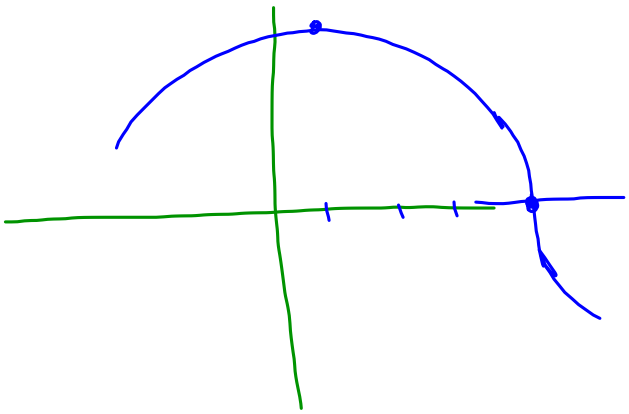


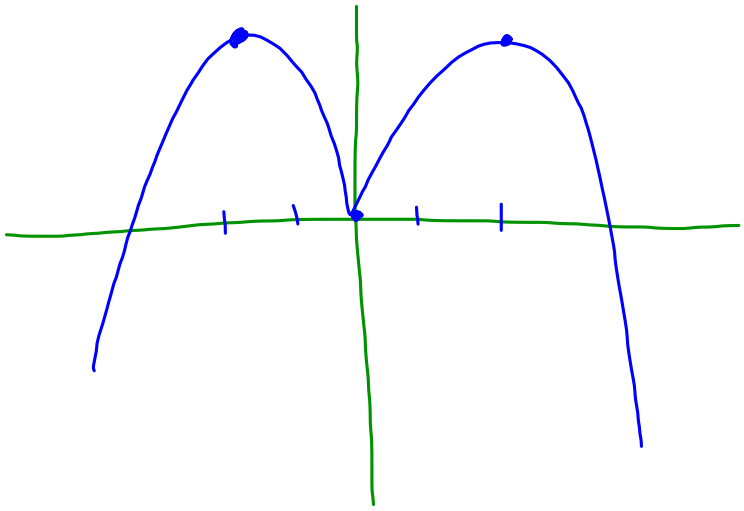
3. A




B.



C.



4 c.

$f'(x) = 2 + 2x^{-\frac{1}{3}}$

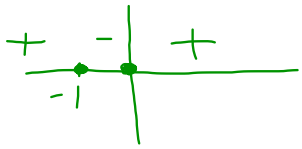
$2 + \frac{2}{x^{\frac{1}{3}}} = 0$

$\frac{2}{x^{\frac{1}{3}}} = -2$

$\frac{x^{\frac{1}{3}}}{2} = -\frac{1}{2} \cdot 2$

$x = -1$

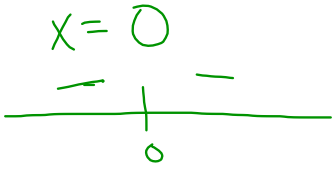
$x = 0, -1$



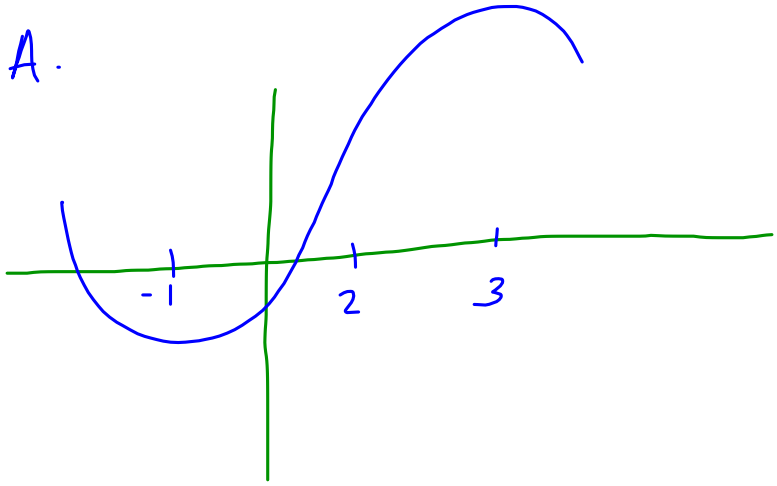

min @ x = 0

max @ x = -1

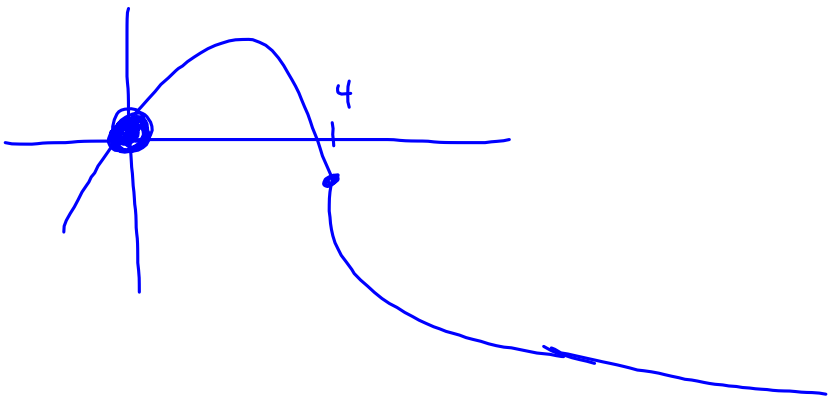
$f''(x) = -\frac{2}{3}x^{-\frac{4}{3}} = -\frac{2}{3x^{\frac{4}{3}}}$



3A.




3B.




3C.