Ch. 7 Quit Practice

1. $f'(x) = \ln(x^4+5x^3+x^2-7x+28)$

$f'(x) = 0$

$x_1 = -3.623$, $x_2 = -3.284$

A

max at $x_1 = -3.623$

2. $\text{Temp}(4) = T(0) + \int_0^4 R(t)\,dt$

$= 200 + (-24.834$

A $= 175.165°$

3. $f'(x) = \dfrac{\sqrt{x}}{1+x+x^3}$

option 1: graph f' and see where slope changes sign.

option 2: graph $f''(x)$ and see where $f''(x)$ changes sign.

* you should not have to find $f''(x)$.

$x = 0.473$ B

4. $f(x) = 2e^{4x^2}$

$f'(x) = 3$

$2 \cdot e^{4x^2} \cdot 8x = 3$

$16x e^{4x^2} = 3$

$x = 0.168$

A

$\frac{\text{dollars}}{\text{gallon}} \cdot \frac{\text{gallons}}{\text{hr}}$

dollars

5. $H(2) = H(1) + \int_1^2 r(t)\,dt$

$= .75 + 1.361188\ldots$

$= 2.111$ D

6. $a(t) = t + \sin(t)$

$v(0) = -2$

$v(t) = \frac{1}{2}t^2 - \cos(t) + C$ B

$-2 = 0 - 1 + C$

$-1 = C$

$v(t) = \frac{1}{2}t^2 - \cos(t) - 1 \rightarrow v(t) = 0$

$t = 1.478$

7. $v(t) = 3t^4 - 11t^2 + 9t - 2$

$-3 \le t \le 3$

$v(t) = 0$ and $v(t)$ must change sign. twice

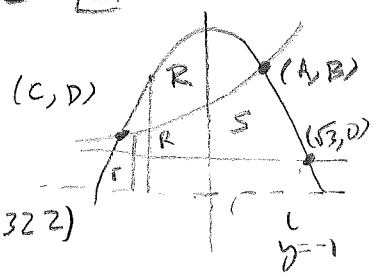
C

8. $\int \frac{1}{x^2-10x+20}\,dx = \int \frac{1}{x^2-10x+25+1}\,dx$

$\int \frac{1}{(x-5)^2+1}\,dx$

$\tan^{-1}(x-5) + C$ E

FRQ:



9. $(A, B) = (1, 2)$

$(C, D) = (-1.637, .322)$

a) $\int_0^1 2^x\,dx + \int_1^{\sqrt{3}} (3-x^2)\,dx =$ 2.240

b) $R = 3 - x^2 - (-1)$

$= 4 - x^2$

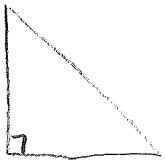
$r = 2^x - (-1)$

$= 2^x + 1$

$A = \pi R^2 - \pi r^2$

$\pi \int_c^1 R^2 - r^2\,dx = 20.087\pi =$ 63.107

c)



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

$V = \frac{1}{2}\int_a^1 (3-x^2-2^x)^2\,dx$

$= 3.102$

10. $E(t)$ enter

$L(t) = 645$ gallons/hr leaking tank

a) $\int_0^4 E(t)\,dt =$ 3981 gallons

b) Let $v(t)$ be the amount sewage in the tank at time t.

$v(t) = 0 + \int_0^t E(x) - 645\,dx$

$v'(t) = E(t) - 645 = 0$

$t = 2.309$ $t = 3.559$

Max $t = 2.309$ $V = 1637$

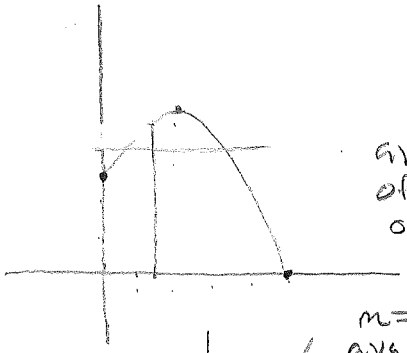
t	$V(t)$
0	0
2.309	1637.178
3.559	1228.520
4	1401.022

c) $\int_0^4 (.15 - .02t) E(t)\,dt =$ 474.32

11. $f(x) = -\frac{1}{4}x^2 + 2x + 5 \quad [0,3]$

$$\frac{1}{3-0}\int_0^3 -\frac{1}{4}x^2 + 2x + 5\,dx$$

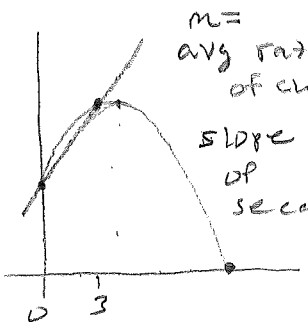
$$\frac{1}{3}\left[\frac{87}{4}\right] = \frac{29}{4} = 7.25$$



avg height of $f(x)$ on $[0,3]$

12. $f(x) = -\frac{1}{4}x^2 + 2x + 5$

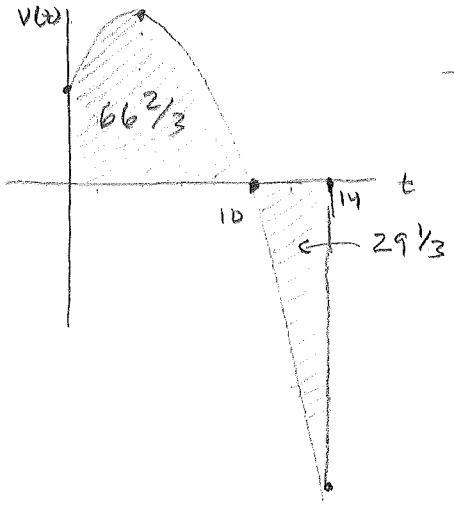
$$\frac{f(3)-f(0)}{3-0} = \frac{8.75-5}{3} = \frac{3.75}{3} = \frac{5}{4} = 1.25$$



13. $v(t) = -\frac{1}{4}t^2 + 2t + 5$

Total Dist Traveled

$$\int_0^{14} |v(t)|\,dt = 96$$



14. $\frac{dy}{dx} = \frac{1}{y^4}$

$y^4\,dy = 1\,dx$

$\int y^4\,dy = \int 1\,dx$

$\frac{1}{5}y^5 = x + C$

$y^5 = 5x + C \qquad (1,2)$

$2^5 = 5(1) + C$

$32 = 5 + C$

$27 = C$

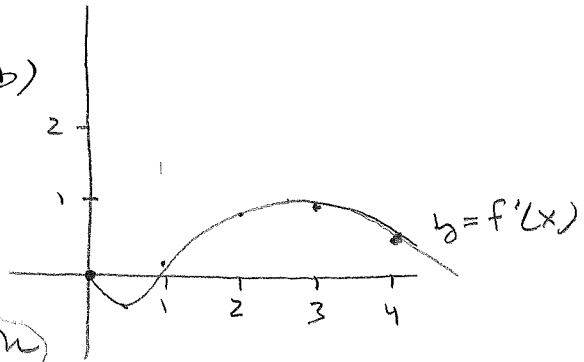
$y^5 = 5x + 27$

$y = \sqrt[5]{5x+27}$

15. $f(x) = \int_5^x 3\ln(t^2+1) - 2t\,dt$

a) $f'(x) = 3\ln(x^2+1) - 2x$

b)



c) i $f'(4) > 0$ $f(x)$ increasing

the y-value on the graph of $y = f'(x)$ is positive.

ii) $f''(2) > 0$ $f(x)$ is concave up

the slope on $y = f'(x)$ is positive

you don't have to write this. I wrote it to help you.