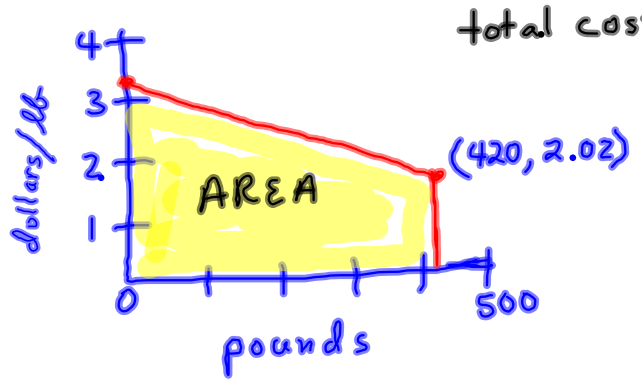
① the marginal cost of producing x pounds of bread is $C'(x) = -0.003x + 3.28$ ($/lb). What is the total cost of producing 420 pounds of bread?

② Using left endpoints and 3 rectangles, estimate the area between f(x) and the x-axis on [2, 8] if $f(x) = \ln(x^3 - 3x + 10)$

①



total cost is the AREA =

$\frac{1}{2}(420)(3.28+2.02) =$

$\boxed{\$1113.00}$

$$\int_0^{420} (-0.003x + 3.28)\,dx = -0.0015x^2 + 3.28x \Big|_0^{420}$$

$$= -0.0015(420)^2 + 3.28(420)$$

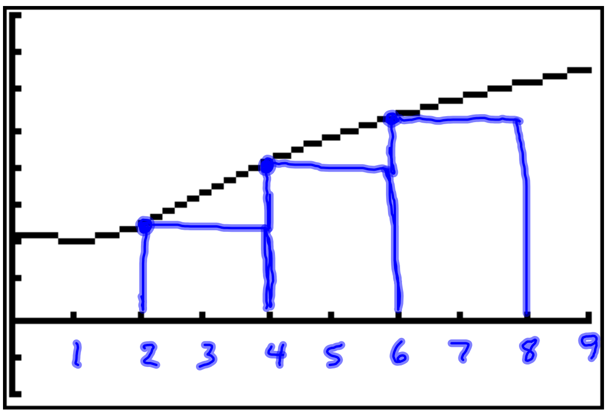
$$\approx \boxed{1113.00}$$

②

```
Plot1 Plot2 Plot3
\Y1=ln(X^3-3X+10
)
\Y2=
\Y3=
\Y4=
\Y5=
\Y6=
```

```
EXEC EDIT NEW
1:AREA
2:BELL
3:DICE
4:NORMLTY
5:QUAD3
6:TINV
```

```
L,R OR M
?L
A=?2
B=?8
N=?3
        23.89915823
               Done
```



$\Delta x = \frac{8-2}{3} = 2$

X	Y1	Areas
2	2.4849	4.9698
4	4.1271	8.2543
6	5.3375	10.675
	heights	23.8991

X=

③ $\int \frac{x^3 - 2x + \sqrt{x} - 4}{x^2}\, dx$

④ If a rocket is shot straight up from atop a 300-ft tower with an initial velocity of 800 ft/sec, find the function that describes its height above the ground.

③ $\int \left(x - 2x^{-1} + x^{-3/2} - 4x^{-2}\right) dx =$

$\frac{x^2}{2} - 2\ln|x| + \frac{x^{-\frac{1}{2}}}{-\frac{1}{2}} - \frac{4x^{-1}}{-1} + C =$

$\frac{1}{2}x^2 - 2\ln|x| - \frac{2}{\sqrt{x}} + \frac{4}{x} + C$

④ $a(t) = -32 \text{ ft/sec}^2$; $v(0) = 800 \text{ ft/sec}$

$s(0) = 300 \text{ ft}$

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

Since $v(0) = 800$, $C = 800$

$v(t) = -32t + 800$

$s(t) = \int v(t)\, dt = \int (-32t + 800)\, dt$

$= -\frac{32t^2}{2} + 800t + k = -16t^2 + 800t + k$

Since, $s(0) = 300$, $k = 300$

THUS, $s(t) = -16t^2 + 800t + 300$

⑤ If a car accelerates uniformly from 0 to 60 mph in 10 seconds, how far does the car travel in miles during this time?

⑥ Find the area bounded by $f(x) = x^2 - 14$ and $g(x) = 4 - x^2$

⑤ $a(t) = \dfrac{v(10) - v(0)}{10 - 0} = \dfrac{60 - 0}{10}$

$= \dfrac{6 \text{ mph}}{\text{sec}} = \dfrac{6 \text{ mi}}{\text{hr} \cdot \text{sec}} \cdot \dfrac{1 \text{ hr}}{3600 \text{ sec}}$

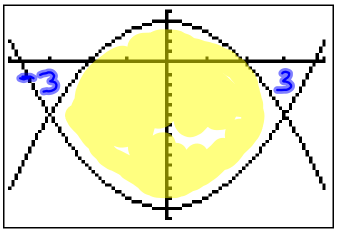
$= \dfrac{\frac{1}{600} \text{ mile}}{\text{sec}^2}$

$v(t) = \int a(t)\,dt = \int \frac{1}{600}\,dt = \frac{1}{600} t + 0$

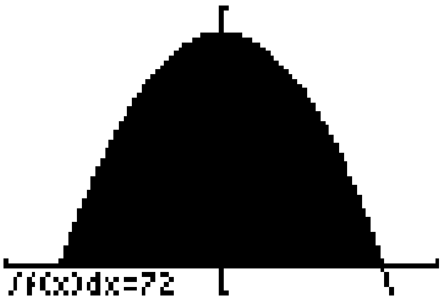
$s(t) = \int v(t)\,dt = \frac{1}{600} \cdot \frac{t^2}{2} + 0$

$s(t) = \dfrac{t^2}{1200}$; $s(10) = \dfrac{100}{1200} = \dfrac{1}{12}$ mile

⑥



Plot1 Plot2 Plot3
\Y1=X²−14
\Y2=4−X²
\Y3=Y2−Y1
\Y4=
\Y5=
\Y6=
\Y7=



⑦ Find $\int_{-4}^{5} f(x)\,dx$ if $f(x) = \begin{cases} 10, & x \le 2 \\ x^3+1, & x > 2 \end{cases}$

⑧ Find the average value of $f(x) = 100 - x^2$ on $[-2, 5]$

⑦ $$\int_{-4}^{2} 10\,dx + \int_{2}^{5} (x^3+1)\,dx =$$

$$10x \Big|_{-4}^{2} + \frac{x^4}{4} + x \Big|_{2}^{5} =$$

$$\left[20 - (-40)\right] + \left[\left(\frac{625}{4} + 5\right) - (4+2)\right] =$$

$$\frac{240}{4} + \frac{625}{4} + \frac{20}{4} - \frac{8}{4} = \frac{877}{4}$$

⑧ $$y_{AV} = \frac{\int_a^b y\,dx}{b-a} = \frac{\int_{-2}^{5} (100 - x^2)\,dx}{5-(-2)}$$

$$= \frac{100x - \frac{x^3}{3} \Big|_{-2}^{5}}{7} = \frac{\left[\left(500 - \frac{125}{3}\right) - \left(-200 + \frac{8}{3}\right)\right]}{7}$$

$$= \frac{\frac{1500}{3} - \frac{125}{3} + \frac{600}{3} - \frac{8}{3}}{7}$$

$$= \frac{\frac{1967}{3}}{7} = \frac{1967}{21}$$

⑨ Find $\int \frac{x^4}{x^5+8}\,dx$

⑩ Find $\int_1^e \frac{(\ln x)^7}{x}\,dx$

⑨ let $u = x^5+8 \implies \frac{du}{dx} = 5x^4$

$\implies dx = \frac{du}{5x^4}$

$$\int \frac{x^4}{u}\cdot\frac{du}{5x^4} = \frac{1}{5}\int \frac{du}{u} = \frac{1}{5}\ln|u| + C$$

$$= \frac{1}{5}\ln|x^5+8| + C$$

⑩ let $u = \ln x \implies \frac{du}{dx} = \frac{1}{x}$

$\implies dx = x\,du$

$$\int_1^e \frac{(\ln x)^7}{x}\,dx = \int_{\ln 1}^{\ln e} \frac{u^7}{x}\cdot x\,du$$

$$= \int_0^1 u^7\,du = \frac{u^8}{8}\Big|_0^1$$

$$= \frac{1}{8} - 0 = \frac{1}{8}$$

Apr 18-10:21 AM