AGENDA

Review Quizzes

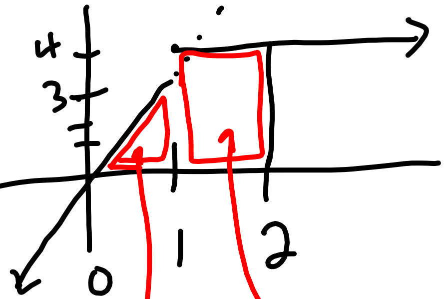
Finish Project Worksheet

Review Quizzes

Write your answer in decimal form.

Compute the area of $\boxed{\int_0^2 f(x)\ dx}$ **for** $f(x) = 3x$ **if** $x < 1$**, and** $f(x) = 4$ **if** $x \geq 1$**.**

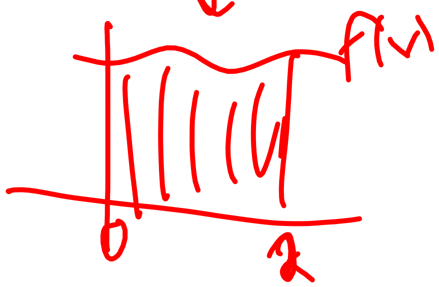
$$f(x) = \begin{cases} 3x & x < 1 \\ 4 & x \geq 1 \end{cases}$$



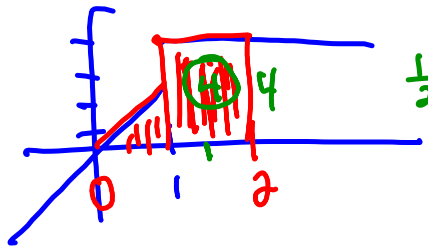
$\frac{1}{2}(1)(3) + (1)(4) = 1.5 + 4 =$
5.5

Write your answer in decimal form.

Compute the area of $\int_0^2 f(x)\ dx$ **for** $\boxed{f(x) = 3x \text{ if } x < 1, \text{ and } f(x) = 4 \text{ if } x \geq 1.}$



$$f(x) = \begin{cases} 3x & x < 1 \\ 4 & x \geq 1 \end{cases}$$



$\frac{1}{2}(3)(1) = \frac{3}{2}$

$4(1) = 4$

$5\frac{1}{2}$

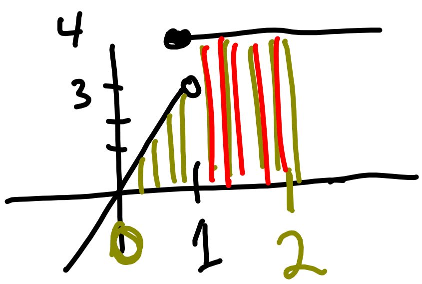
Write your answer in decimal form.

Compute the area of $\boxed{\int_0^2 f(x)\ dx}$ **for** $f(x) = 3x$ **if** $x < 1$**, and** $f(x) = 4$ **if** $x \geq 1$**.**

Piecewise

$$f(x) = \begin{cases} 3x & x < 1 \\ 4 & x \geq 1 \end{cases}$$

Definite
Area
Under f(x)
between
0 & 2



$A1 = \frac{1}{2}(1)(3) = \frac{3}{2}$

$A2 = 1 \times 4 = 4$

$5\frac{1}{2}$

Round your answer to the nearest whole number.

Compute the average value of the function $f(x) = x^2 - 7$ on the interval [0,3].

$$\frac{\int_0^3 x^2 - 7\, dx}{(3-0)} = \frac{\left.\frac{x^3}{3} - 7x\right|_0^3}{3} = \frac{\frac{9-63}{3}}{3}$$

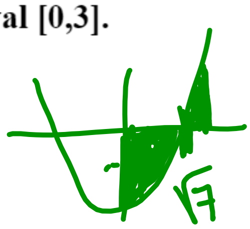
$$= 3 - 21$$

$$= -14$$

Round your answer to the nearest whole number.

Compute the average value of the function $f(x) = x^2 - 7$ on the interval [0,3].

$$\frac{\int_0^3 x^2-7}{3-0} = \frac{\frac{x^3}{3}-7x\Big|_0^3}{3} = \frac{9-21}{3} = -14$$



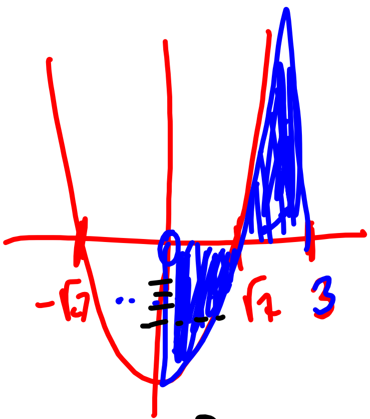
Round your answer to the nearest whole number.

Compute the average value of the function $f(x) = x^2 - 7$ on the interval [0,3].

$$\int_0^3 x^2 - 7\,dx = \frac{x^3}{3} - 7x \Big|_0^3$$

$$= \frac{3^3}{3} - 7(3) - \left(\frac{0^3}{3} - 7\cdot 0\right)$$

$$= 9 - 21 = -12$$



$$\text{Ave Value} = -4 = \frac{-12}{3} = \frac{\int_0^3 f(x)\,dx}{3-0}$$

Use Part I of the Fundamental Theorem to compute the integral exactly.

$$\int_0^4 x(x-10)\,dx$$

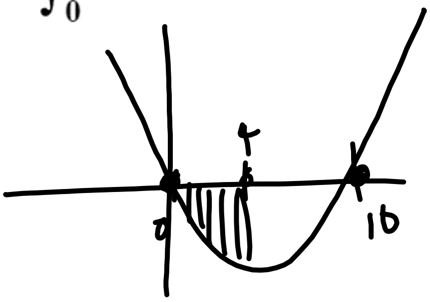
$$= \int_0^4 x^2 - 10x \, dx$$

$$= \frac{x^3}{3} - \frac{10x^2}{2} \Big|_0^4 = \frac{64}{3} - 80 - 0$$

$$= -58\tfrac{2}{3}$$

Use Part I of the Fundamental Theorem to compute the integral exactly.

$$\int_0^4 x(x-10)\,dx$$




```
                              -12
fnInt(X(X-10),X,0,4)
                     -58.66666667
```

$$\int_0^4 x^2 - 10x \, dx$$

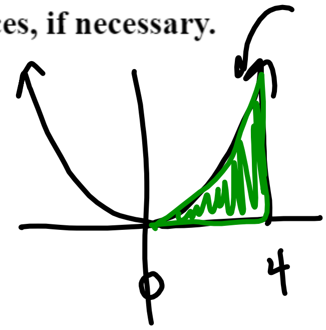
$$\frac{x^3}{3} - \frac{10x^2}{2} \Big|_0^4 =$$

$$\frac{64}{3} - 80 = -58\tfrac{2}{3}$$

Find the area of the region bounded by $y = 2x^2$, $x = 4$, and the x-axis. Express your answer as a decimal rounded to three places, if necessary.

Your Answer:

$$\int_0^4 2x^2\,dx$$



$$\frac{2x^3}{3}\Big|_0^4 = \frac{128}{3} = 42\tfrac{2}{3}$$

$$= 42.667$$

Find the area of the region bounded by $y = 2x^2$, $x = 4$, and the x-axis. Express your answer as a decimal rounded to three places, if necessary.

Your Answer:

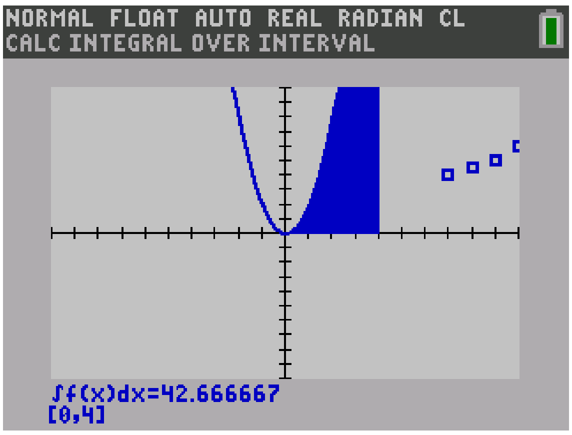
$$\int_0^4 2x^2\,dx$$

$y_1 = 2x^2$

Calc 7

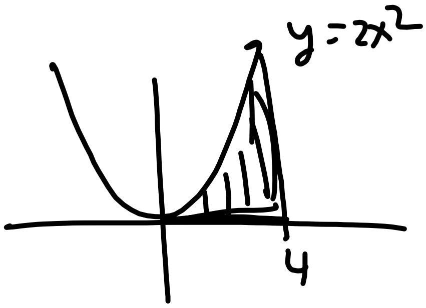
lower 0 upper 4

$\int f(x)dx = 42.666667$

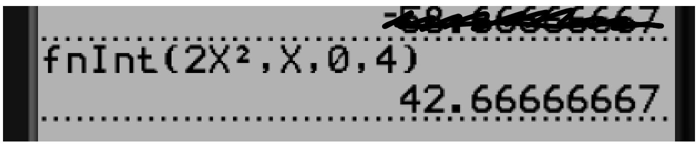


Find the area of the region bounded by $y = 2x^2$, $x = 4$, and the x−axis. Express your answer as a decimal rounded to three places, if necessary.

Your Answer:



$$\int_0^4 2x^2\,dx =$$



Find the position function $s(t)$ given the acceleration function and an initial value.

$a(t) = 6 - t$, $v(0) = 4$, $s(0) = 0$

$a = 6 - t$

$\int s'' \, dt = \int 6 - t \, dt$

$v = s' = 6t - \frac{t^2}{2} + C_1$

$v(0) = s'(0) = \cancel{6 \cdot 0} - \cancel{\frac{0}{2}} + \boxed{C = 4}$

$\int s' \, dt = \int 6t - \frac{t^2}{2} + 4 \, dt$

$\boxed{s = \frac{6t^2}{2} - \frac{t^3}{6} + 4t} + C_2$

$s(0) = 0 = 0 - 0 + 0 + C_2 \rightarrow \boxed{0 = C_2}$

$s(t)$
$v(t) = s'(t)$
$a(t) = v'(t) = s''(t)$

- velocity
- instantaneous rate
- slope of tan. line.
- derivative

- antiderivative
- indefinite Integral

Find the position function $s(t)$ given the acceleration function and an initial value.

$a(t) = 6 - t$, $v(0) = 4$, $s(0) = 0$

$\int S'' \, dt = \int 6 - t \, dt$

$v = S'(t) = 6t - \frac{t^2}{2} + C$

$V(0) = S'(0) = 0 - 0 + C = 4$

$\int S' = V \, dt = \int 6t - \frac{t^2}{2} + 4 \, dt$

$S = \frac{6t^2}{2} - \frac{t^3}{6} + 4t + C$

$S(0) = 0 - 0 + 0 + \boxed{C = 0}$

0 – $\boxed{60 \text{ mph}}$

5 sec

$\boxed{12 \text{ mph/sec}}$

S

~~$\int f(t)\,dt$~~ $\int f(t)\,dt$

Anti Anti

Velocity $= S'$

Acceleration $= S''$

- instantaneous rate.
- slope of tangent line
- derivative
- velocity

Find the position function $s(t)$ given the acceleration function and an initial value.

$a(t) = 6 - t$, $v(0) = 4$, $s(0) = 0$

$$v = \int 6 - t \, dt = 6t - \frac{t^2}{2} + C$$

$$v(0) = 4 = C$$

$$v = 6t - \frac{t^2}{2} + 4$$

$$s = \int 6t - \frac{t^2}{2} + 4 \, dt =$$

$$\boxed{S = \frac{6t^2}{2} - \frac{t^3}{6} + 4t} + \cancel{C}$$

Find the position function $s(t)$ given the acceleration function and an initial value.

$a(t) = 6 - t$, $v(0) = 4$, $s(0) = 0 = C_2 = 0$

$S =$

$V = S'$

$a = V' = S''$

$$v = \int 6 - t \, dt$$

$$v = 6t - \frac{t^2}{2} + C$$

$$V(0) = 6 \cdot 0 - \frac{0^2}{2} + c = 4 \longrightarrow C = 4$$

$$V = 6t - t^2/2 + 4$$

$$S = \int v \, dt = \int 6t - t^2/2 + 4 \, dt$$

Evaluate $\int \frac{8\sin x}{7\sqrt{\cos x}}\,dx$.

$u = \cos x$

$du = -\sin x\,dx$

$$\int \frac{8\sin x}{7\sqrt{\cos x}}\,dx = \square + c$$

$$\frac{8}{7}\int \frac{-du}{\sqrt{u}} = -\frac{8}{7}\int u^{-1/2}\,du = -\frac{8}{7}\frac{u^{1/2}}{1/2} + c$$

$-\frac{1}{2}+1$

$$= -\frac{16}{7}\sqrt{u} + C$$

$$= \boxed{-\frac{16}{7}\sqrt{\cos x} + C}$$

Evaluate $\int \frac{8\sin x}{7\sqrt{\cos x}}\,dx$. $= \frac{8}{7}\int \frac{1}{\sqrt{u}}(-du)$

$\int \frac{8\sin x}{7\sqrt{\cos x}}\,dx = \square + c$ $= -\frac{8}{7}\int u^{-1/2}\,du$

$u = \cos x$ $= -\frac{8}{7}\frac{u^{1/2}}{1/2} + C$

$du = -\sin x\,dx$

$= -\frac{16}{7}\sqrt{u} + C$

$= -\frac{16}{7}\sqrt{\cos x} + C$

$u = \cot x$

Evaluate $\displaystyle\int -4\csc^2 x \,\sin(\cot x)\, dx$.

$du = -\csc^2 x \, dx$

$\displaystyle\int -4\csc^2 x \,\sin(\cot x)\, dx = \square + c$

$4\displaystyle\int \sin(u)\, du = -4\cos(u) + C$

$\boxed{= -4\cos(\cot x) + C}$

Evaluate $\int -4\csc^2 x \sin(\cot x)\, dx$.

$\int -4\csc^2 x \sin(\cot x)\, dx = \square + c$

$= 4 \int \sin(u) \cdot du$

$= -4 \cos(u) + C$

$= -4 \cos(\cot x) + C$

$u = \cot x$

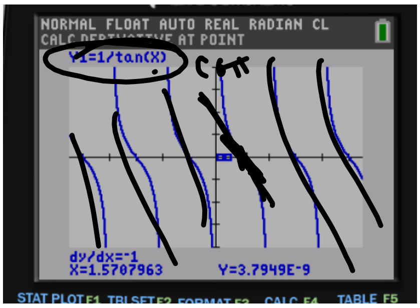
$du = -\csc^2 x\, dx$

Evaluate $\int -4\csc^2 x \sin(\cot x)\, dx$.

$$\int -4\csc^2 x \sin(\cot x)\, dx = \boxed{} + c$$

$u = \cot x$

$du = -\csc^2 x \, dx$



at $\pi/2$ $u' = -1$

$\csc^2(\pi/2) = 1$

$= 4 \int \sin u \, du$

$= -4 \cos u + C$

$= \boxed{-4\cos(\cot x) + C}$

Evaluate $\displaystyle\int_{x=-4}^{4} \frac{x}{(x^2+4)^2}\,dx$. definite

Substitution

$u = x^2 + 4$

$du = 2x\,dx$

$$\int_{u=20}^{20} \frac{du/2}{u^2} = 0$$

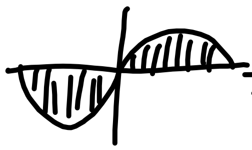
Evaluate $\displaystyle\int_{x=-4}^{4} \frac{x}{\left(x^2+4\right)^2}\,dx.$ $= \displaystyle\int_{u=\boxed{20}}^{\boxed{20}} \frac{1}{u^2}\,\frac{du}{2} = 0$

$u = x^2+4$

$du = 2\,x\,dx$

$u(-4) = 16+4 = 20$

$u(4) = 16+4 = 20$



$= 0$

Make the indicated substitution for an unspecified function $f(x)$.

$u = \cos x$ for $\displaystyle\int_{3\pi/2}^{2\pi} 4(-\sin x)f(\cos x)\,dx$

A. $\displaystyle\int_0^{1/2} f(u)\,du$

✓ B. $\displaystyle\int_0^{1} 4f(u)\,du$

C. $\displaystyle\int_0^{1} f(u)\,du$

D. $\displaystyle\int_0^{1/2} 4f(u)\,du$

$u = \cos x$

$u(2\pi) = \cos(2\pi) = 1$

$x = 3\pi/2$

$u(3\pi/2) = 0$

Make the indicated substitution for an unspecified function $f(x)$.

$u = \cos x$ for $\int_{x=3\pi/2}^{2\pi} 4(-\sin x) f(\cos x)\, dx$ =

$u = \cos x$

$\int_{u=\boxed{0}}^{\boxed{1}} 4 f(u)\, du$

A. $\int_0^{1/2} f(u)\, du$

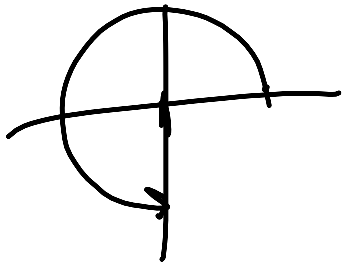
✓ B. $\int_0^{1} 4f(u)\, du$

C. $\int_0^{1} f(u)\, du$

D. $\int_0^{1/2} 4f(u)\, du$

$u(3\pi/2) = \cos(3\pi/2)$

$u(2\pi) =$



Round your final answer to four decimal places.

Approximate the area under the curve on the given interval using n rectangles and using the left endpoint of each subinterval as the evaluation points.

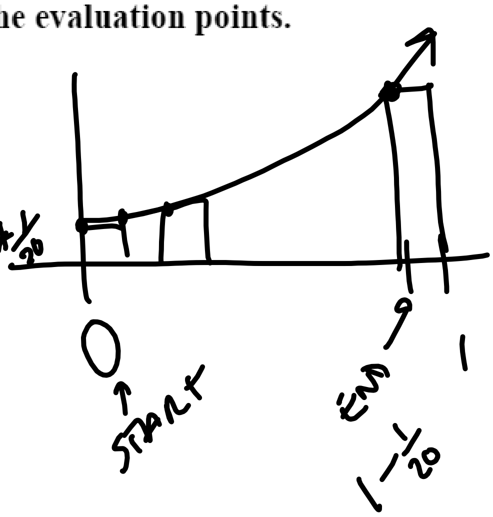
$y = x^2 + 2$ **on [0, 1],** $n = 20$

Step

$\frac{b-a}{n}$

$\frac{1-0}{20} = \frac{1}{20}$

Sum(seq(x^2+2,x,0,19/20,1/20))*1/20

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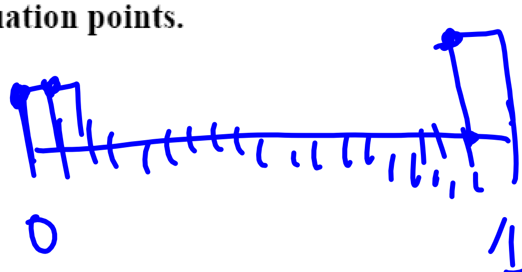
NORMAL FLOAT AUTO a+bi RADIAN CL
Ans▸Frac
                    1847/40
Ans▸Frac
                    1847/40
sum(seq(X²+2,X,0,19/20,1/2
0)*1/20
                    2.30875
Ans▸Frac
                   1847/800
```

2.3088

Round your final answer to four decimal places.

Approximate the area under the curve on the given interval using n rectangles and using the left endpoint of each subinterval as the evaluation points.

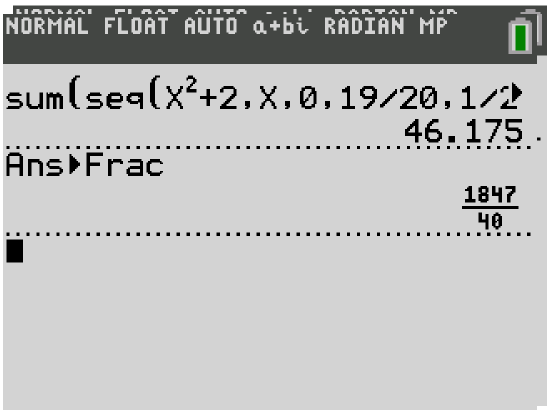
$y = x^2 + 2$ on $[0, 1]$, $n = 20$



$\text{sum}(\text{seq}(x^2+2, x, 0, 1-\frac{1}{20}, \frac{1}{20}))\cdot\frac{1}{20}$

VAR START END STEP

$\text{Step} = \frac{1-0}{20}$



Groupwork and Project Worksheet

Blackboard Discussions

Lessons

MVT.

Ave Rate = Instant.

$$\frac{f(b)-f(a)}{b-a} = f'(x)$$

Newtons $\boxed{EQ = 0}$

$36 = f'(x)$

$f'(x) - 36 = 0$

```
\Y2=nDeriv(Y1,X,X)-36
\Y3=8.9999999999998*cos(6
.2831853071796X+-1.5707963
26795)*(-1.570796326795)-3
6
```

$$y = A\sin(Bx + c) + D$$

$$y' = A\cos(Bx + c)\cdot B$$

$$\frac{d}{dx}(Bx + c)$$