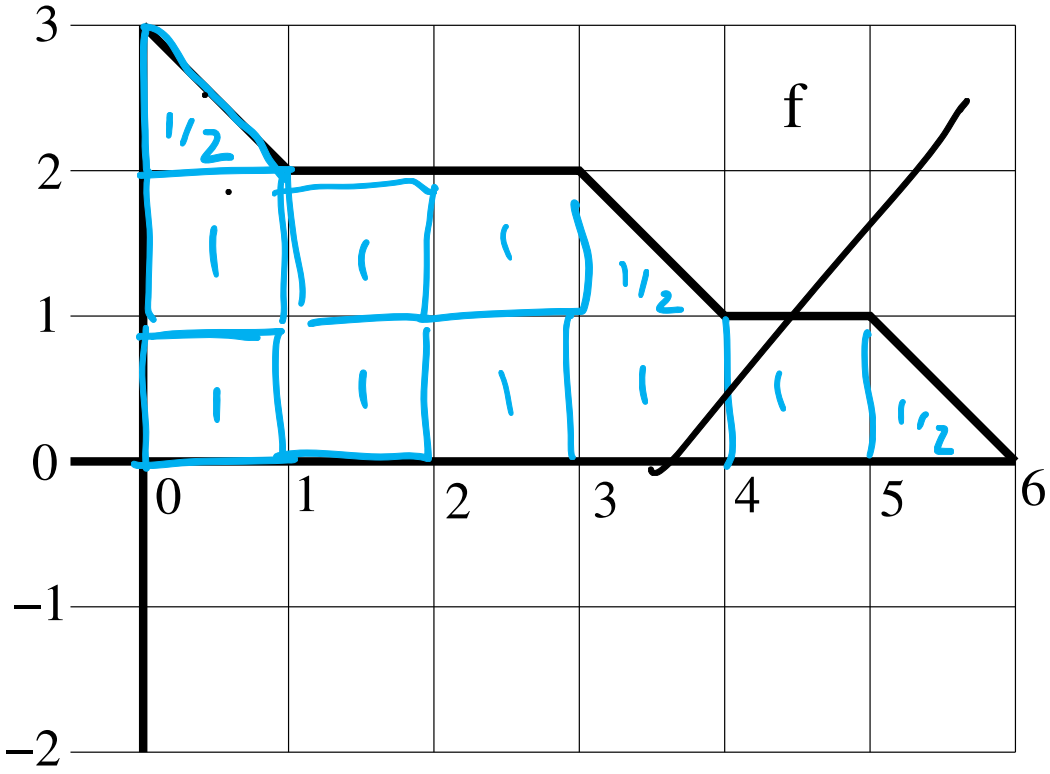
MAT 126, Lecture 1, Sept 3, 2020

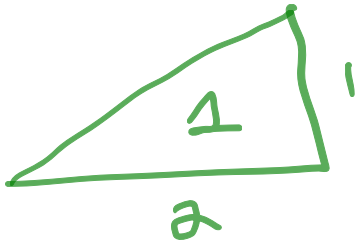
marked copy.

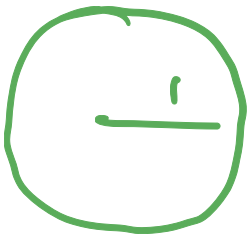
Find $\int_0^6 f(x)dx$ exactly using areas.



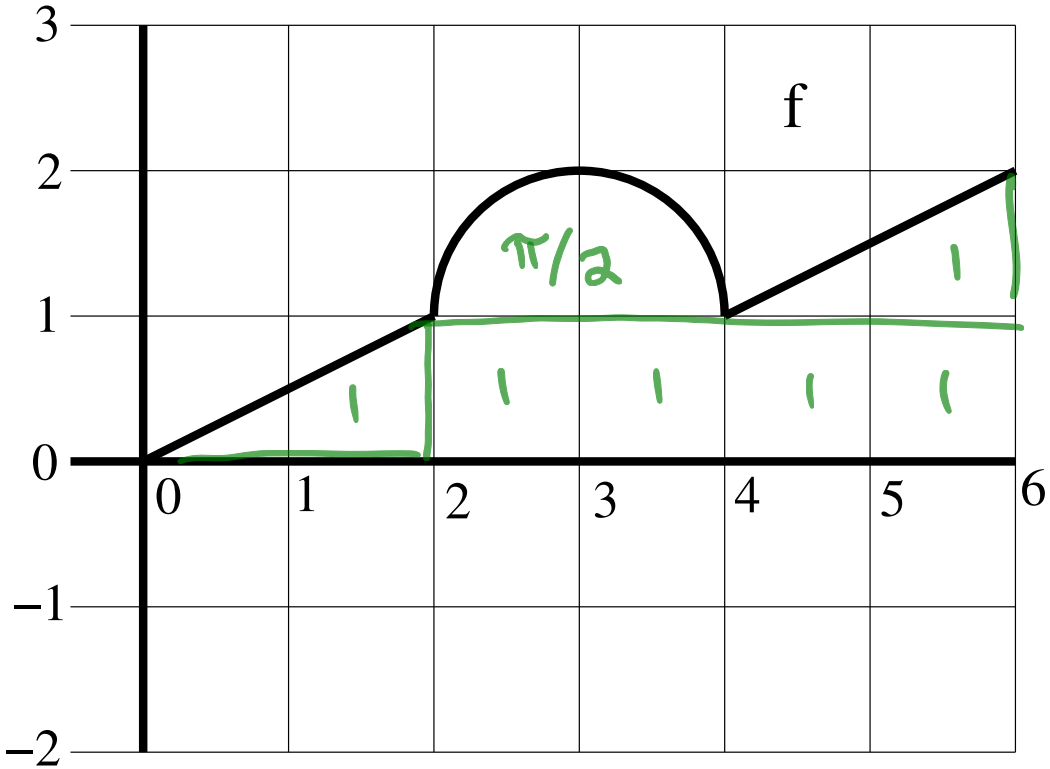
$\int_0^6 f(x)dx = 9.5$

Find $\int_0^6 f(x)dx$ exactly using areas.



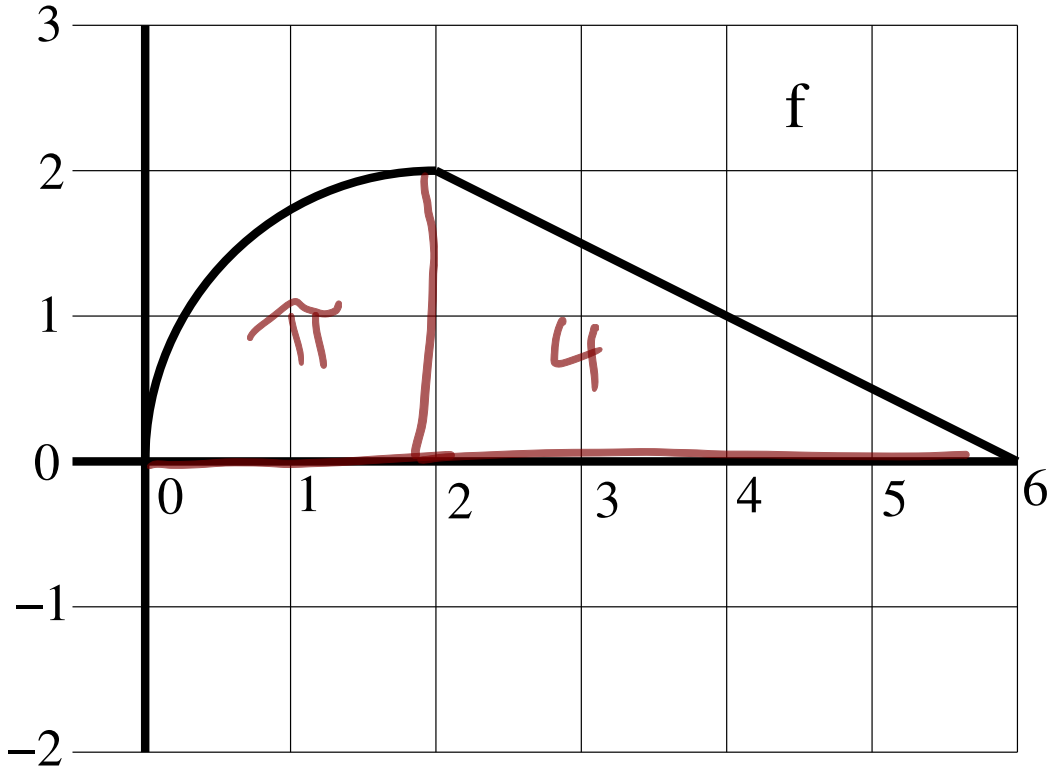


area = π



$\int_0^6 f(x)\,dx = 6 + \pi/2$

Find $\int_0^6 f(x)dx$ exactly using areas.



$A = 4\pi$

$A = 4$

π

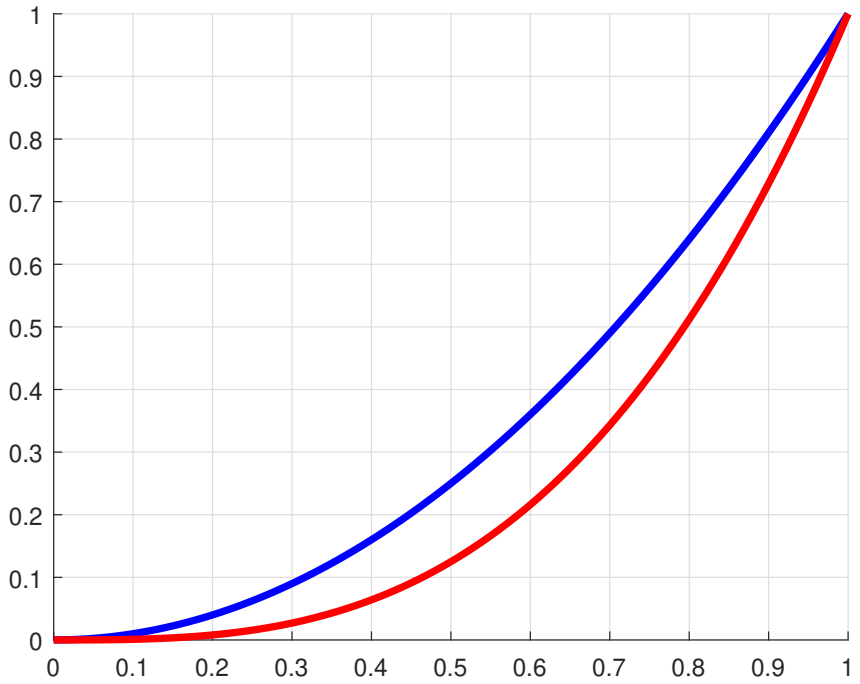
4

$\int_0^6 f(x)dx = 4 + \pi$

Which is larger $\int_0^1 x^2 dx$ or $\int_0^1 x^3 dx$?

$x^2 > x^3$ on $[0,1]$, so

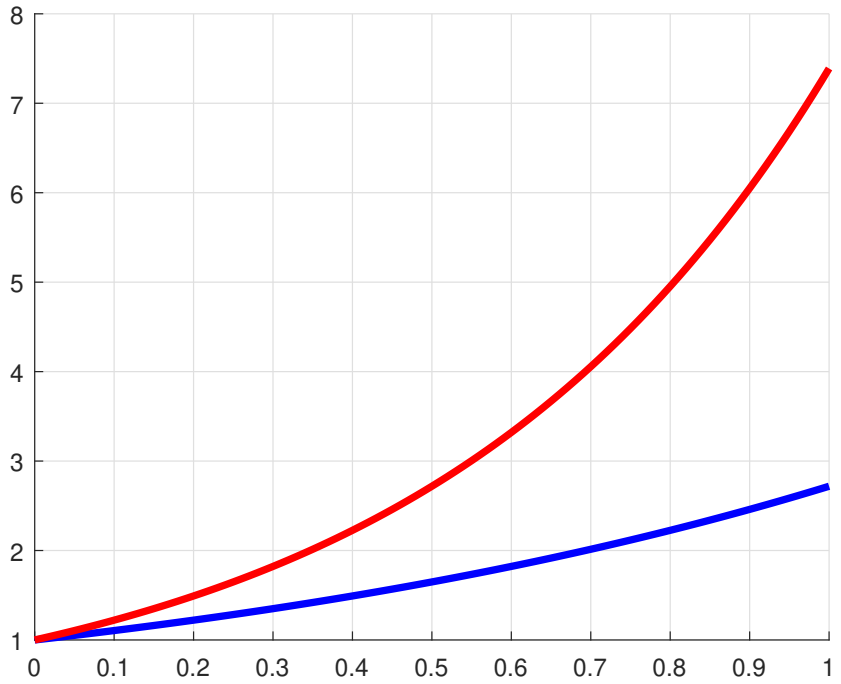
$\int_0^1 x^2 > \int_0^1 x^3$



Which is larger $\int_0^1 e^x dx$ or $\int_0^1 e^{2x} dx$?

$e^x < e^{2x}$ on $[0,1]$ so

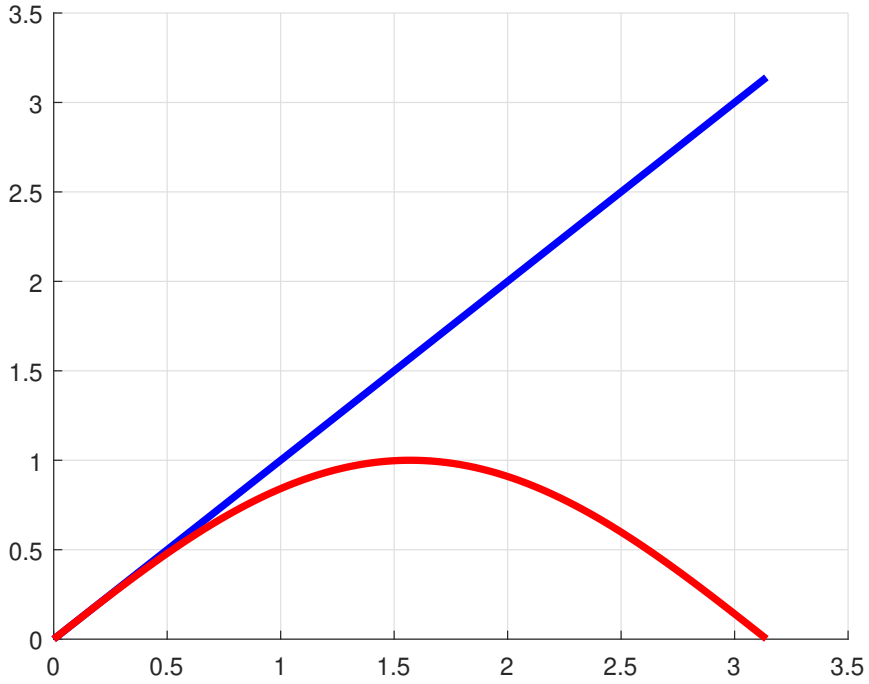
$\int_0^1 e^x < \int_0^1 e^{2x}$



Which is larger $\int_0^\pi x$ or $\int_0^\pi \sin(x)$?

$\sin(x) \le x$ on $[0,\pi]$ so

$$\int_0^\pi \sin x\,dx \le \int_0^\pi x\,dx$$

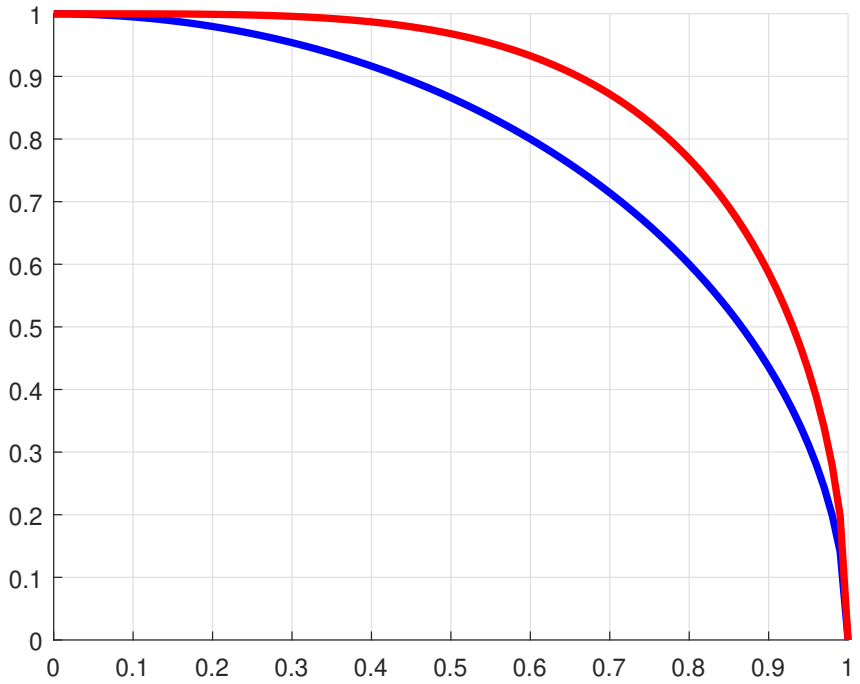


Which is larger $\int_0^1 \sqrt{1-x^2}dx$ or $\int_0^1 \sqrt{1-x^4}dx$?

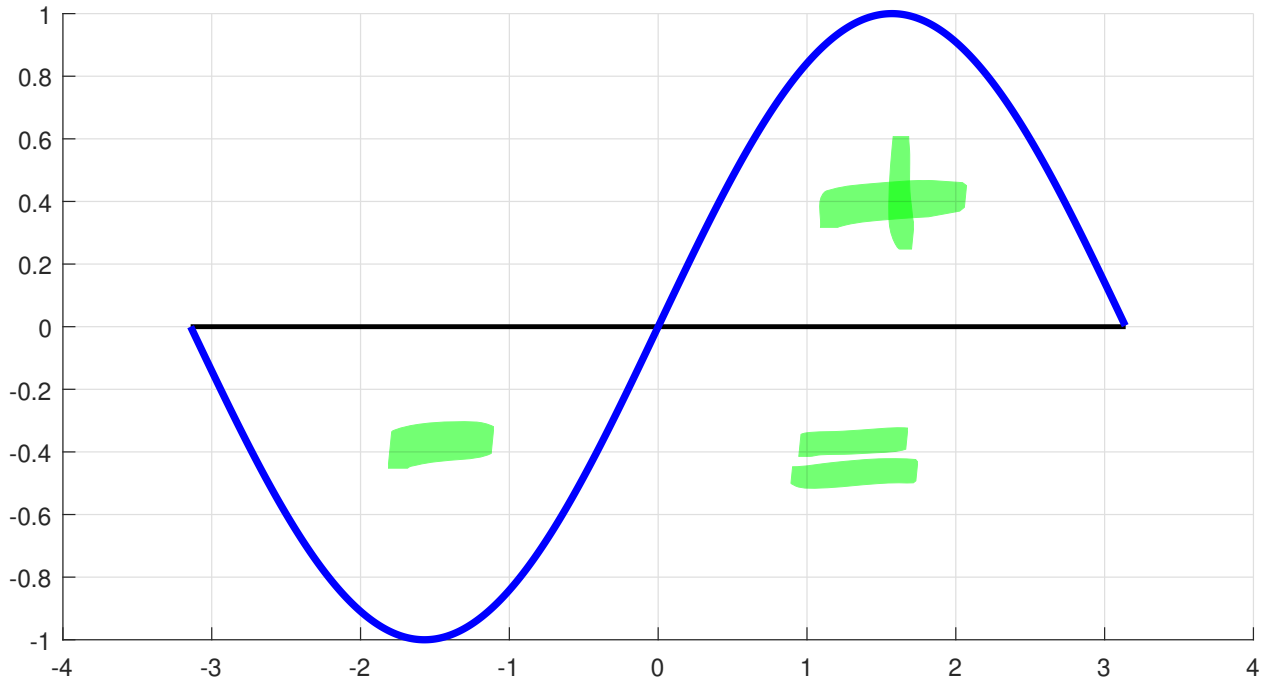
on $[0,1]$ $x^4 \le x^2$, so

$1-x^4 \ge 1-x^2$, so $\sqrt{1-x^4} \ge \sqrt{1-x^2}$

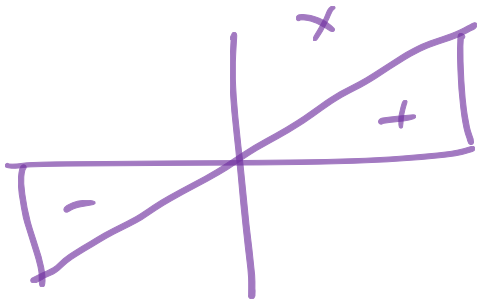
Hence $\int_0^1 \sqrt{1-x^2}\,dx \le \int_0^1 \sqrt{1-x^4}\,dx$



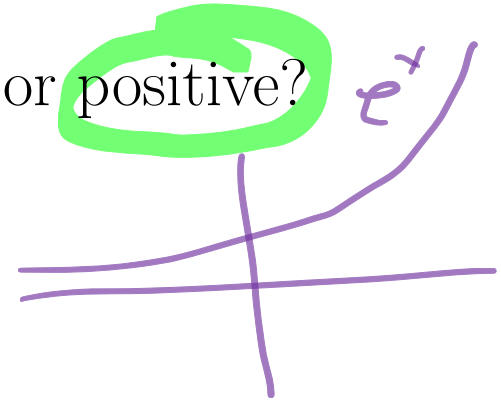
Is $\int_{-\pi}^{\pi} \sin(x)dx$ zero, negative or positive?



Is $\int_{-1}^{1} xe^x dx$ zero, negative or positive?

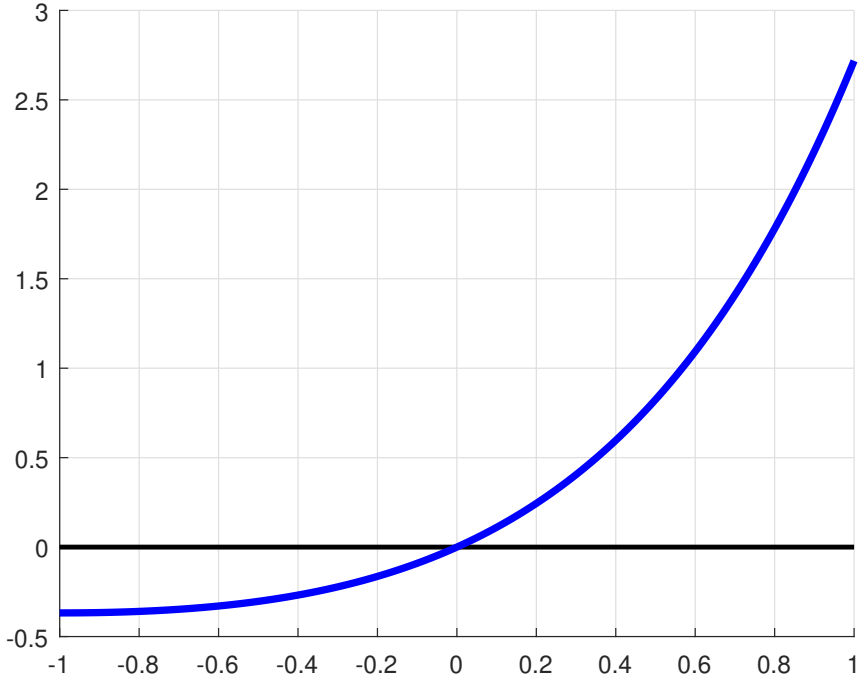


equal



larger on right

$\Rightarrow \int_{-1}^{1} xe^x > 0$



Is $\int_0^{2\pi} x \sin(x) dx$ zero, negative or positive?