MAT 126.01, Prof. Bishop, Thursday, Sept. 24, 2020
Section 2.1, Area between curves

If $g \leq f$ on $[a, b]$ then the area between the graphs of f and g and the lines $x = a$, $x = b$ is

$$\int_a^b f(x) - g(x)dx.$$

If $f < g$ we have to reverse summation.

If f and g cross inside $[a, b]$ we have to break integral into pieces (compound region).

Find area between x^2 and x^3 for $0 \leq x \leq 1$.

Find area between $\sin x$ and $\cos x$ for $0 \leq x \leq \pi/4$.

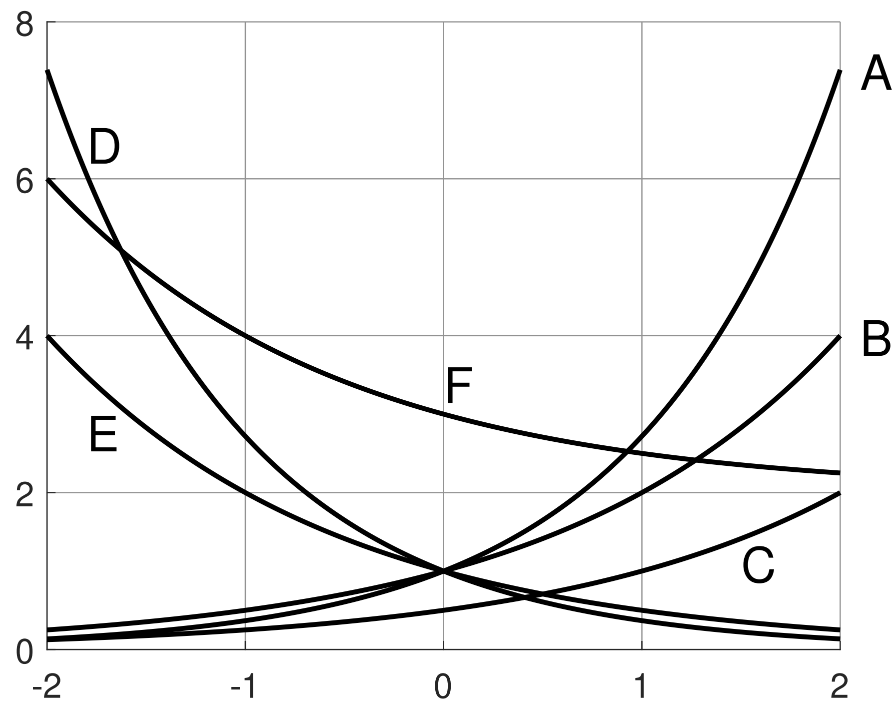
Find area of region between $6x$ and above x^2.
First find where these graphs cross.

Find the total area of region between $4x$ and above x^3.
Total area $=$ all regions count as positive.

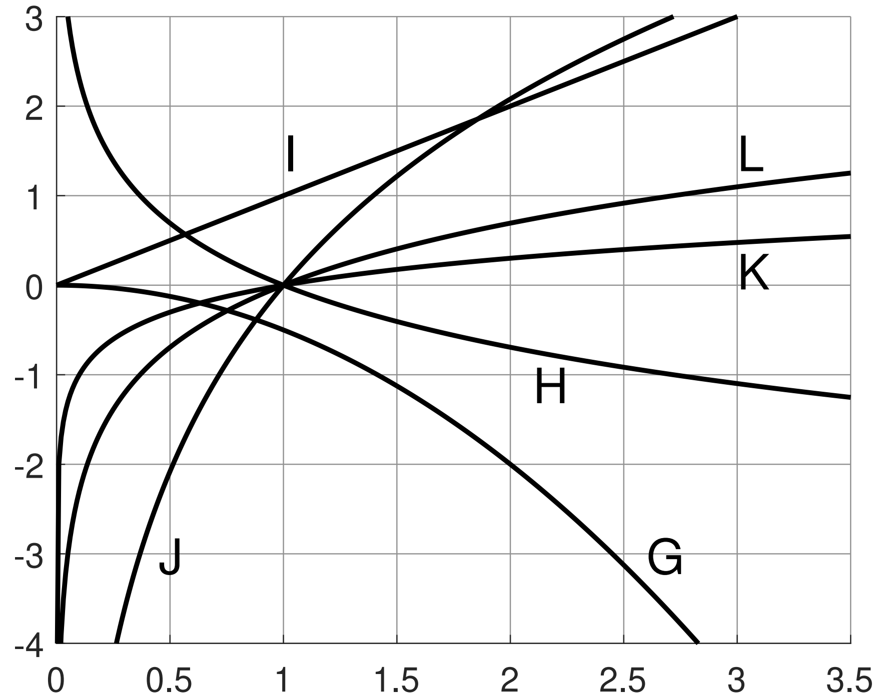
Find area of region $\{(x, y) : 1 \leq y \leq 4/(1 + x^2)\}$.

Quiz 4 review:

Find e^{-x} in the graph below.

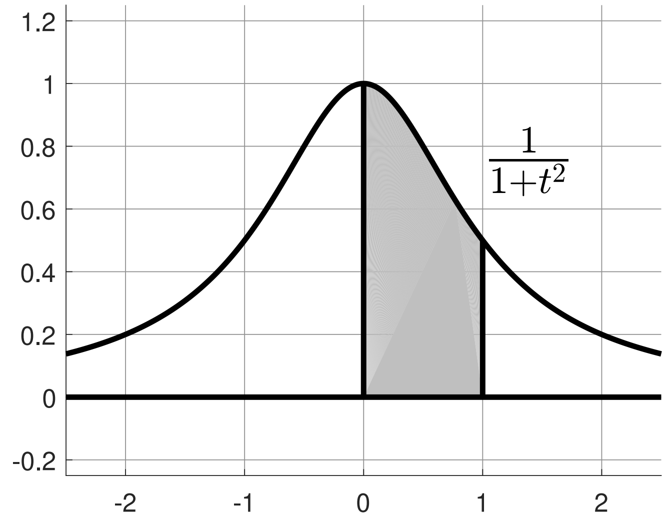


Find $\ln e^{x}$ in the graph below.

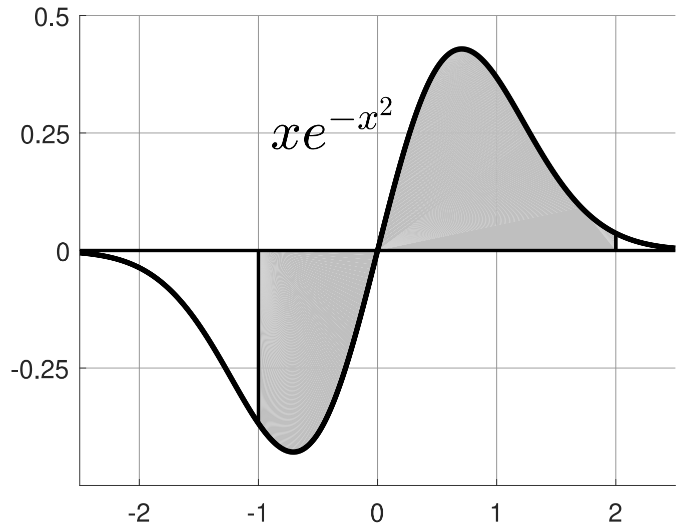


Compute the area of the shaded region.

(a) $\pi/6$
(b) $\pi/4$
(c) $\pi/3$
(d) $\pi/2$
(e) $2\pi/3$
(f) $3\pi/4$
(g) π
(h) $\frac{1}{2}\tan^{-1}(2)$
(i) $\tan^{-1}(2)$
(j) $2\tan^{-1}(2)$



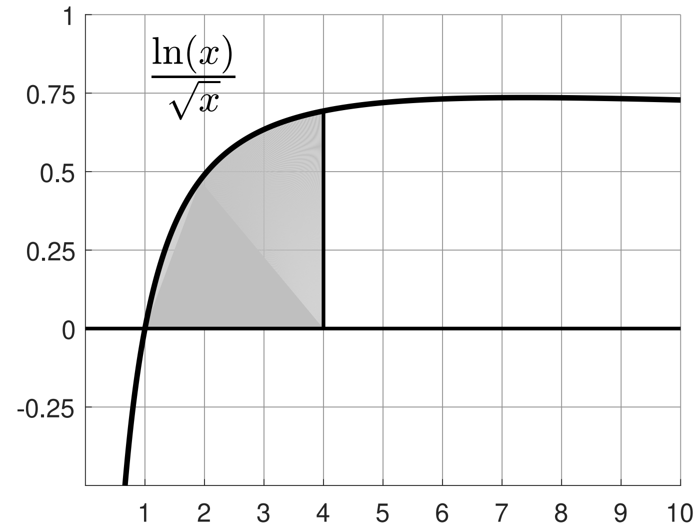
Compute the total area of the shaded region (all regions count as positive area).



Compute the area of the shaded region on the right.

(a) $2\ln(2)$
(b) $2\ln(3)$
(c) $4\ln(2)$
(d) $8\ln(2) - 4$
(e) $4\ln(4) - 3$

(f) $12\ln(3) - 8$
(g) $6\ln(3) - 6$
(h) $9\ln(9) - 8$
(i) $8\ln(8) - 4$



Compute the area of the shaded region on the right.

(a) $e^{-a^2} - 1$

(b) e^{-a^2}

(c) $e^{a} - 1$

(d) $\frac{1}{2}(e^{a} - 1)$

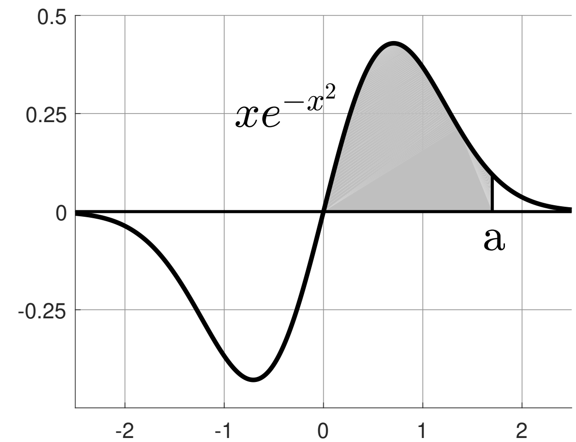
(e) e^{a^2}

(f) $\frac{1}{2}e^{-a^2}$

(g) $\frac{1}{2}(e^{-a^2} - 1)$

(h) $\frac{1}{2}(1 - e^{a^2})$

(i) $\frac{1}{2}e^{-a^2} - 1$



Match each formula for the area to the region it describes.

$$\int_{-\sqrt{2}}^{\sqrt{2}} x^2 dx$$

$$\int_0^2 2x - x^2 dx$$

$$2\int_0^2 2 + x - x^2 dx$$