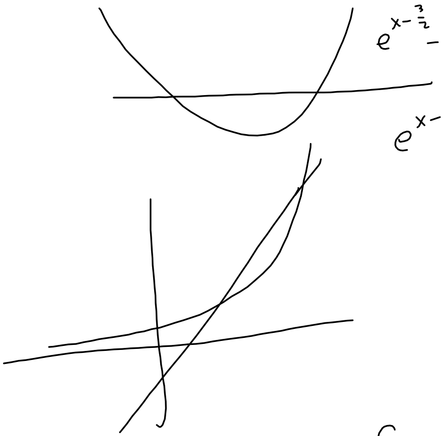


$e^{x-\frac{3}{2}} - 3x + 2$

$e^{x-\frac{3}{2}} = 3x - 2$

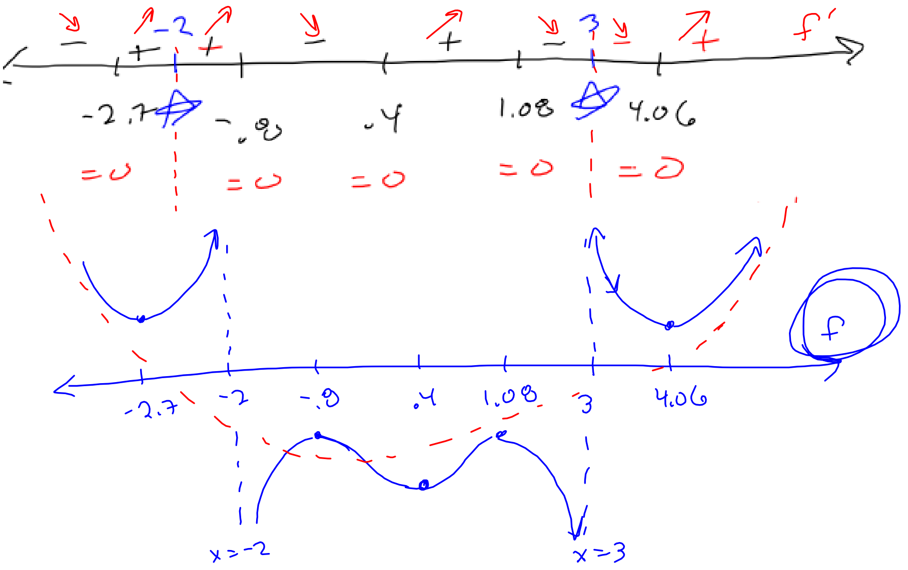
3.9 List of antiderivatives.

Always check by taking the derivative!

Applications?

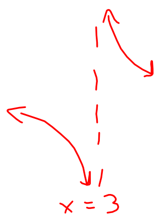
0.4110790456, 1.082024449, 4.058901063, -0.807190

$(x-.4\ldots)^{\prime}(x-1.08\ldots)^{\prime}(x-4.059\ldots)^{\prime}(x+.807\ldots)^{\prime}(x+2$



From $f' < 0$

$E|f'| \to \infty$



$g(0)=4, g(1)=2, g(2)=1, g(3)=0, g(4)=2,$

$g'(1)=g'(3)=0,$

$g'(x)<0 \text{ on } (-\infty,1)\cup(1,3),$

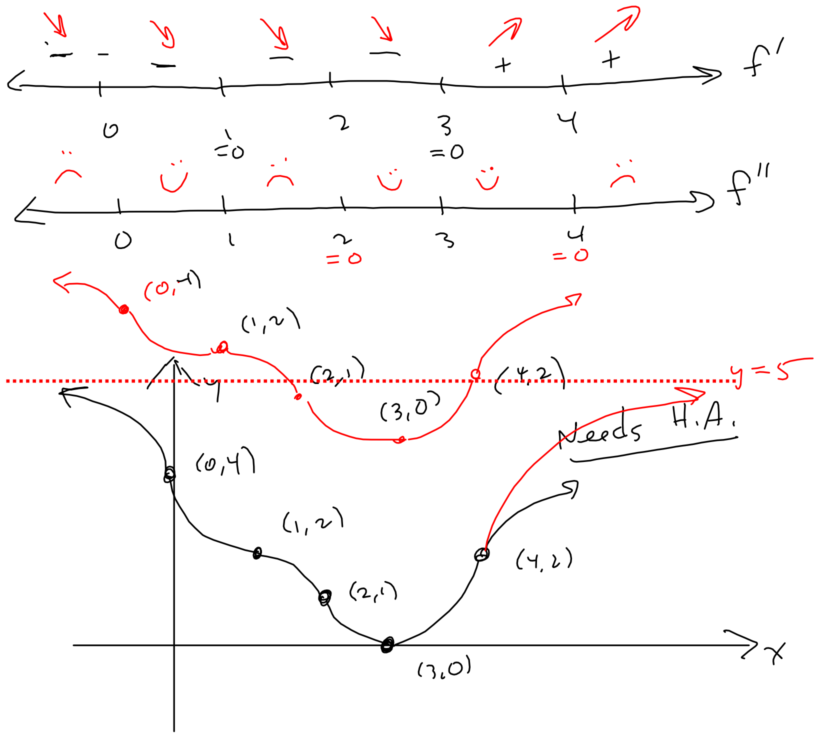
$g'(x)>0 \text{ on } (3,\infty)$

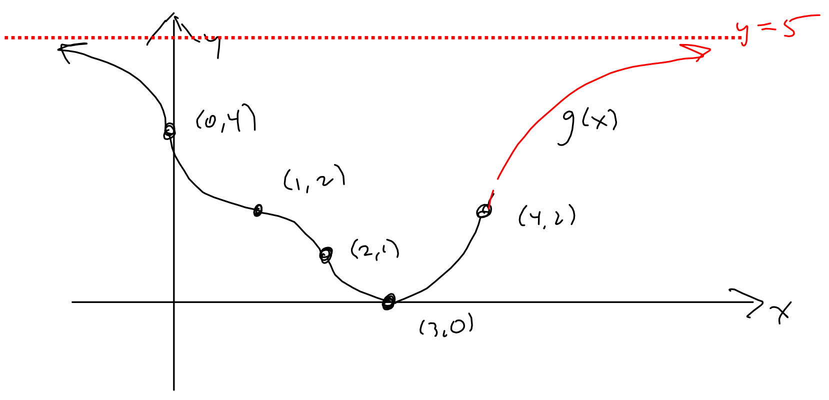
$g''(2)=g''(4)=0$

$g''(x)>0 \text{ on } (0,1)\cup(2,4),$

$g''(x)<0 \text{ on } (-\infty,0)\cup(1,2)\cup(4,\infty)$

$\lim\limits_{|x|\to\infty} g(x)=5$





Oct 30-8:49 AM

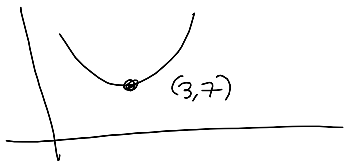
$g(x)=2x^2+5x+2$ and $h(x)=-x^2+17x-17$.

Vertical distance between $g(x)$ & $h(x)$ is $|g(x)-h(x)|$

$K(x)=g(x)-h(x) = 3x^2-12x+19$

Looking @ $|g(x)-h(x)|$

$K'(x) = 6x-12 \overset{SET}{=} 0 \Rightarrow x=2$ is minimum



$K(2)$: $3(4)-12(2)+19$
$= 12-24+19 = -12+19 = 7$

Look $b^2-4ac = (-12)^2-4(3)(19)$
$= 12^2-12(19) = 12(12-19) = 12(-7) < 0$

$\Rightarrow$ No real roots

$\Rightarrow$ No x-int.

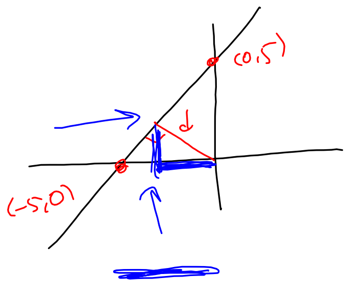
$\Rightarrow$ $|g(x)-h(x)| = g(x)-h(x)$

$\boxed{\text{Min of } 7 \text{ @ } x=3}$

This is the easiest
minimize-the-distance.
Most require some version of Pythagorus

Oct 30-8:54 AM

Minimize distance from $y=4x+5$ to $(0,0)$



Game it w/ ☺ calc:

$y=4x+5 \Rightarrow$

$y=-\frac{1}{4}(x-0)+0 = -\frac{1}{4}x$ is $\perp$ &

passes thru $(0,0)$

Find its intersection w/ $y=4x+5$ & measure the line segment

$-\frac{1}{4}x = 4x+5$

$x = -16x-20$

$17x = -20$

$x = \frac{-20}{17}$

$-\frac{1}{4}\left(-\frac{20}{17}\right) = \frac{5}{17}$

$\left(-\frac{20}{17}, \frac{5}{17}\right)$

$\therefore\ D = \sqrt{\left(-\frac{20}{17}\right)^2 + \left(\frac{5}{17}\right)^2}$

$= \sqrt{\frac{400+25}{289}} = \frac{\sqrt{425}}{17} = \boxed{\frac{5\sqrt{17}}{17}}$

5 | 425
5 | 85
17

w/ calculus:

$d = \sqrt{(x-0)^2 + (y-0)^2}$

$\Rightarrow D = d^2 = x^2 + (4x+5)^2$

$= x^2 + 16x^2 + 40x + 25$

$= 17x^2 + 40x + 25$

$\Rightarrow D' = 34x + 40 \overset{SET}{=} 0 \Rightarrow$

$34x = -40$

$x = \frac{-40}{34} = \frac{-20}{17}$