t (sec)	0	2	4	6
$a(t)$ (ft/sec^2)	5	2	8	3

The data for the acceleration $a(t)$ of a car from 0 to 6 seconds are given in the table above. If the velocity at $t = 0$ is 11 feet per second, the approximate value of the velocity at $t = 6$, computed using a left-hand Riemann sum with three subintervals of equal length, is

(A) 26 ft/sec (B) 30 ft/sec (C) 37 ft/sec (D) 39 ft/sec (E) 41 ft/sec

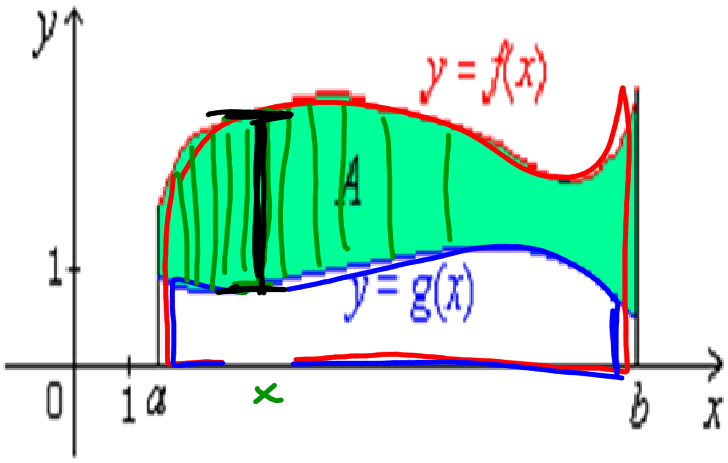
Jan 24-10:52 AM

7-2 Areas in the Plane

Learning Targets

I can find the area between two curve (integrating with respect to both x and y).

Jan 3-12:33 PM



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

$$\int_a^b [f(x) - g(x)]\,dx$$

$$\int_a^b (\text{top} - \text{bottom})\,dx$$

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Area Between Curves

If f and g are continuous with $f(x) \geq g(x)$ throughout [a,b], then the area between the curves y=f(x) and y=g(x) from a to b is

$$A = \int_a^b [f(x) - g(x)]dx$$

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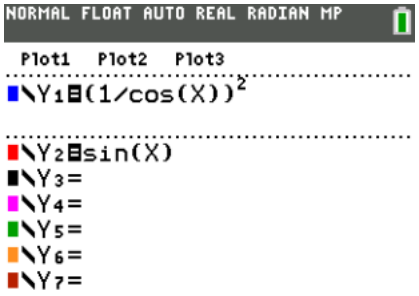
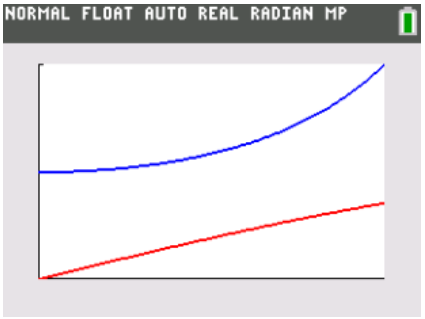
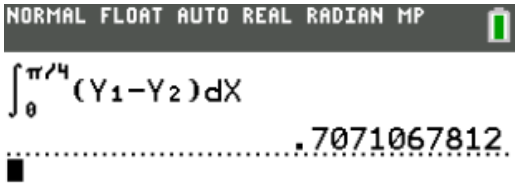
Ex1. Find the area of the region between

$y = \sec^2 x$ and $y = \sin x$ from $x = 0$ to $x = \frac{\pi}{4}$





$$\int_0^{\pi/4} (\sec^2 x - \sin x)\,dx = .707$$



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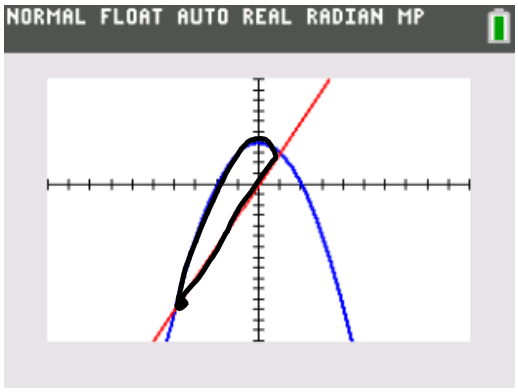
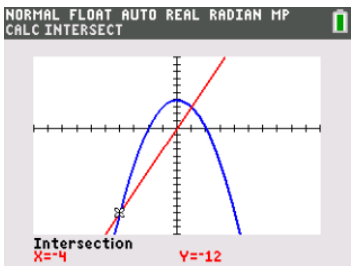
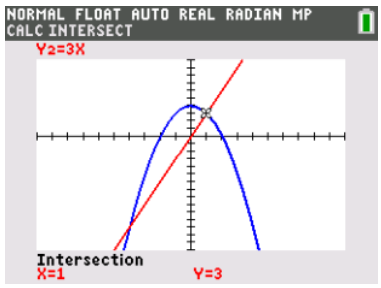
Ex2. Find the area of the region enclosed by $f(x) = 4 - x^2$ and $g(x) = 3x$

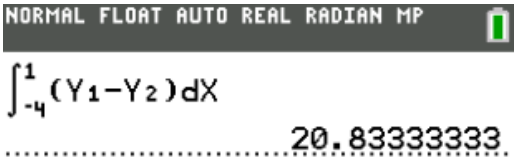


$$\int_{-4}^{1} [(4 - x^2) - 3x]\,dx$$

$$= 20.833 \text{ units}^2$$







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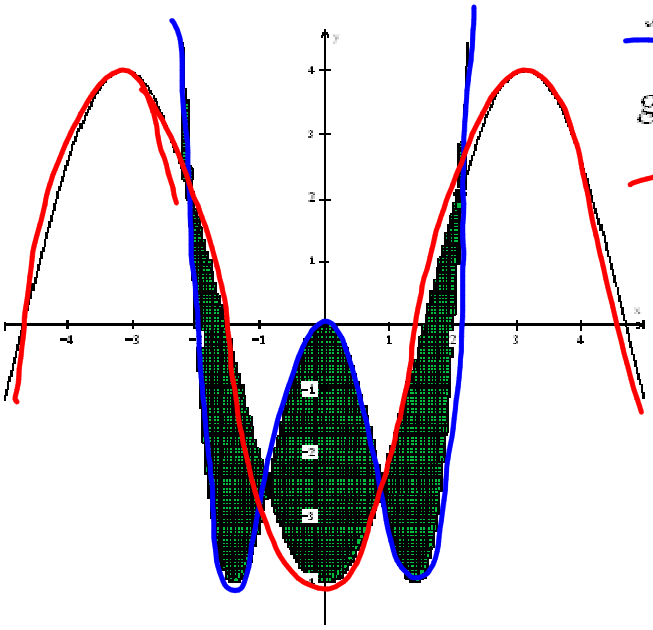
Ex3. Find the area of the shaded region.



$f(x) = x^4 - 4x^2$

$g(x) = 4\sin\left(x - \frac{\pi}{2}\right)$

$A = 10.5767 \text{ units}^2$

$$\int_{-2.1123}^{2.1123} \left[\left| (x^4 - 4x^2) - \left(4\sin\left(x - \frac{\pi}{2}\right)\right) \right| \right] dx$$

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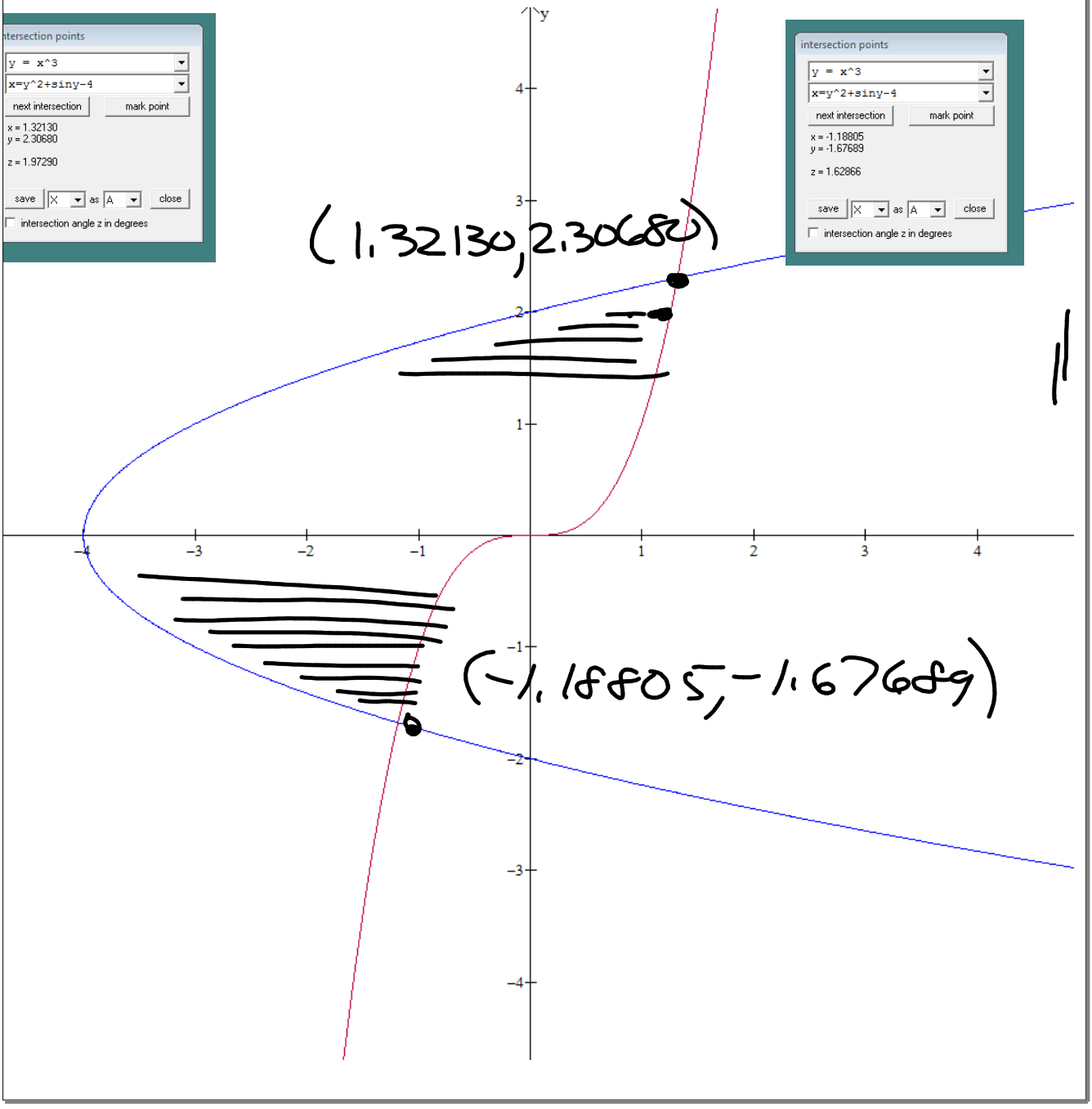
Ex5. Find the area of the region enclosed by the graphs of $y = x^3$ and $x = y^2 + \sin y - 4$

$x = \sqrt[3]{y}$



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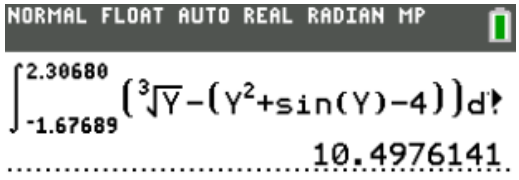
$$\int_{\text{low } y}^{\text{high } y} \text{right} - \text{left}\ dy$$

$$\int_{-1.67689}^{2.30680} \sqrt[3]{y} - (y^2 + \sin y - 4)\ dy$$



Jan 15-9:56 AM

Homework

p. 395 #1-10, 13, 18, 20, 24, 28, 35, 37, 39, 50-55

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