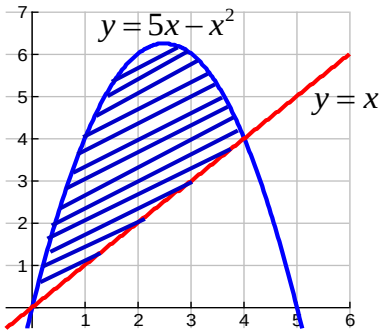
AP Calculus Name_____

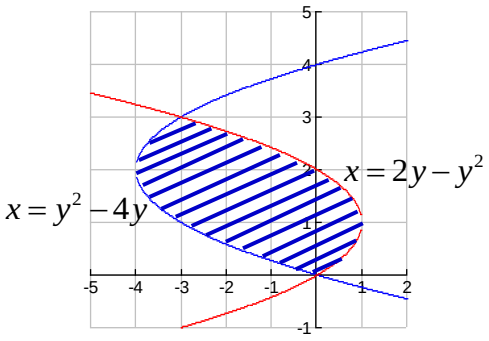
Areas Between Curves Application of Integration Day 2

1-2: Find the area of the shaded region.

1. **Calculator**

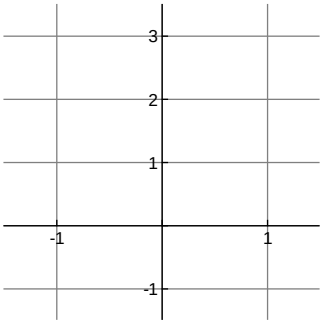


2. **Non-Calculator**

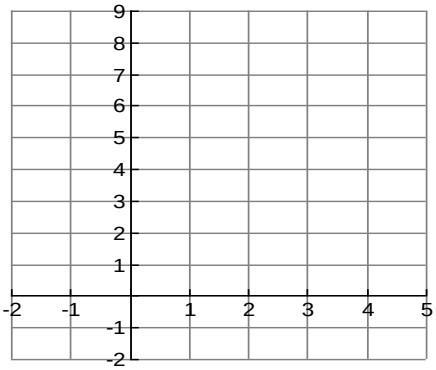


5-7: Sketch the region enclosed by the given curves. Decide whether to integrate with respect to x or y. Draw a typical approximating rectangle and label its height and width. Then find the area of the region.

3. $y = e^x,\ y = x^2 - 1,\ x = -1,\ x = 1$ **Calculator**



4. $y = x^2 - 2x,\ y = x + 4$ **Non-Calculator**



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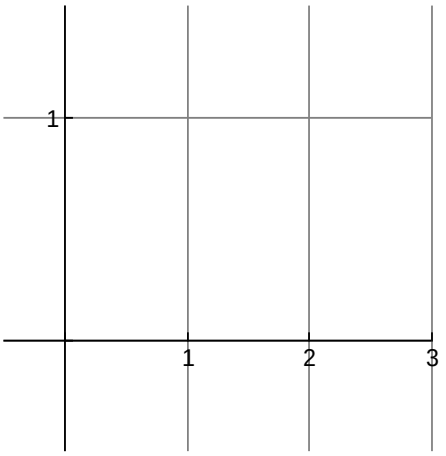
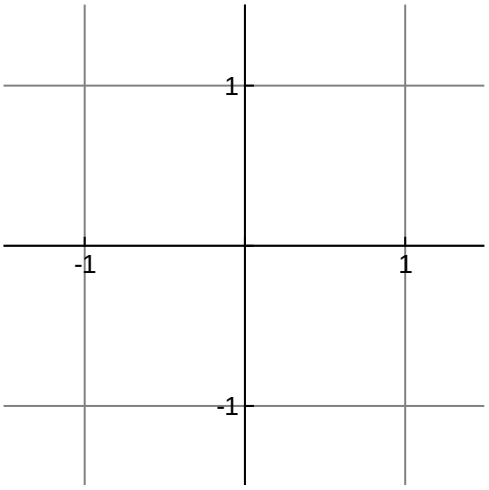
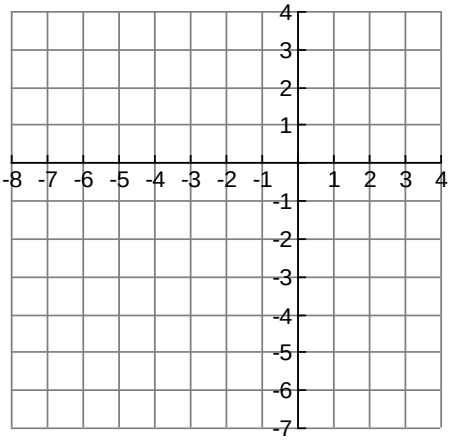
5. $y=\frac{1}{x},\ y=\frac{1}{x^2},\ x=2$ **Calculator**



6. $x=1-y^2,\ x=y^2-1$ **Non-Calculator**



7. $4x+y^2=12,\ x=y$ **Calculator**



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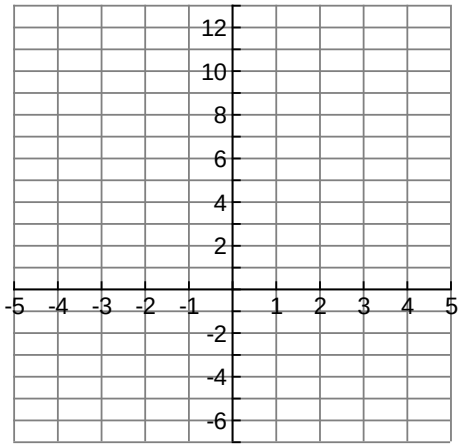
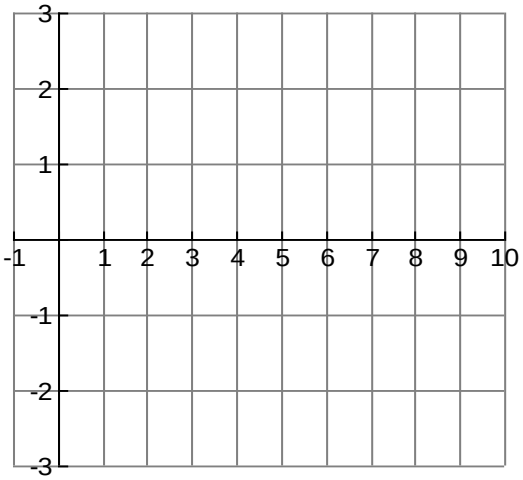
8-12: Sketch the region enclosed by the given curves and find its area.

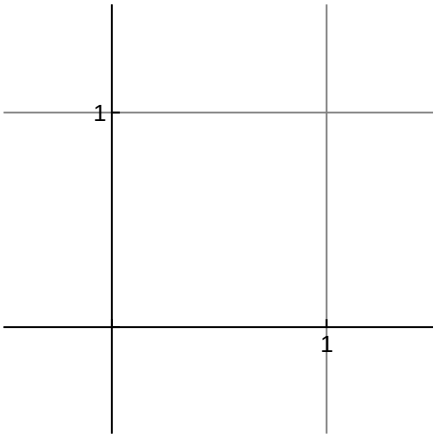
8. $y = 12 - x^2,\ y = x^2 - 6$ **Calculator**



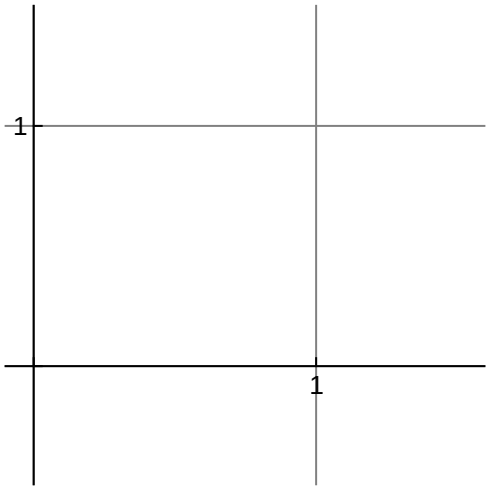
9. $x = 2y^2,\ x = 4 + y^2$ **Calculator**



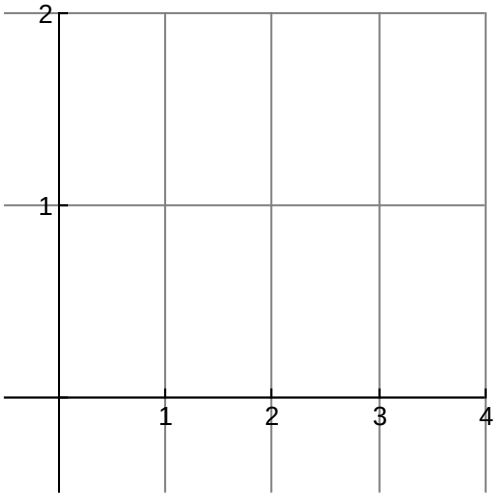
10. $y = x^2,\ y = x$ **Non-Calculator**



11. $y = \cos x,\ y = \sin 2x,\ x = 0,\ x = \frac{\pi}{2}$ **Calculator**



12. $y = \frac{1}{x},\ y = x,\ y = \frac{1}{4}x,\ x > 0$ **Calculator**



Review: ☺ Must show your work to get credit ☺ **NON-CALCULATOR**

13. $\int 9xe^{3x^2+1}$

a.) $\frac{3}{2}x^2e^{x^3+3x}+C$

b) $\frac{9}{2}x^2e^{x^3+3x}+C$

fc) $\frac{9}{2}x^2e^{3x^3+1}+C$

d) $e^{3x^2+1}+C$

e) $\frac{3}{2}e^{3x^2+1}+C$

14. Given the piecewise function $f(x)=\begin{cases}4-bx^2, & -1<x\le 2\\ abx, & 2<x<4\end{cases}$ with a & b as non-zero constants, what are all possible values of b that will make f(x) continuous and differentiable?

a.) *only* 1

b) *only* -1

c) $1 \text{ or } -1$

d) $-1 \text{ or } -4$

e) *none of the above*

15. $\int_1^6 \sqrt{x+3}dx$

a.) $-\frac{5}{36}$

b) 1

c) $\frac{58}{5}$

d) $\frac{38}{3}$

e) 19

16. The derivative of f(x) is given by $f'(x)=\frac{3x^2(x-2)(x+5)^{\frac{1}{3}}}{x-6}$. In which of the following intervals is f(x) decreasing?

a.) $(-\infty,-5)\cup(2,6)$

b) $(-5,0)\cup(2,6)$

c) $(-5,0)\cup(0,2)$

d) $(0,2)$ *only*

e) $(-\infty,0)\cup(0,2)\cup(5,6)$

Answers:

1.) $\frac{32}{3}$ 2.) 9 3.) $e-e^{-1}+\frac{4}{3}\approx 3.683$ 4.) $\frac{125}{6}$

5.) $\ln(2)-\frac{1}{2}$ 6.) $\frac{8}{3}$ 7.) $\frac{64}{3}$ 8.) 72

9.) $\frac{32}{3}$ 10.) $\frac{1}{6}$ 11.) $\frac{1}{2}$ 12.) $\ln(2)$

13.) E 14.) B 15.) D 16.) A