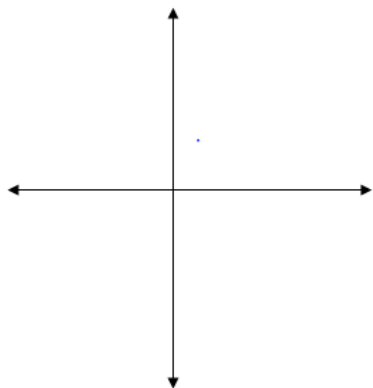


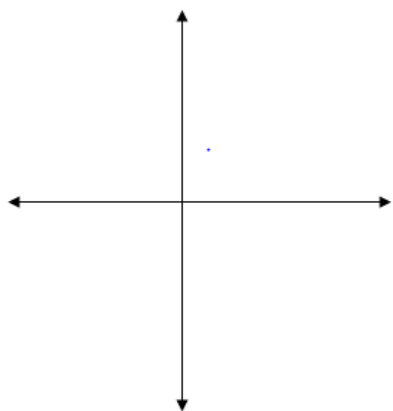
Area Between Two Curves

Definition: The area between two curves $f(x)$ and $g(x)$ in $[a,b]$ is defined to be $\int_a^b (f(x) - g(x))dx$ if $f(x) > g(x)$ for all points on the interval $[a,b]$.

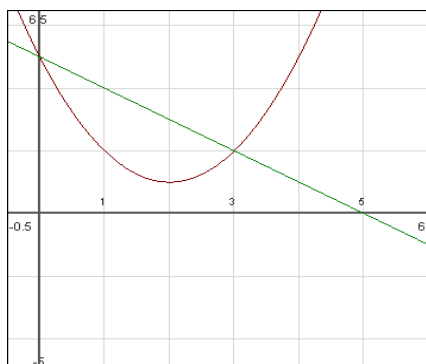


Example 1: Area between $f(x) = x^2 + 4$ and $g(x) = 2x + 1$ in interval $[0,2]$

Example 2: $f(x) = x^2 + 1$ and $g(x) = \frac{2}{3}x - 2$ in interval $[0,2]$.



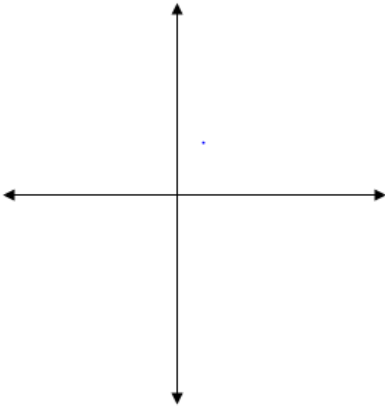
Example 3: Find the area illustrated in the following diagram.



$$f(x) = x^2 - 4x + 5$$

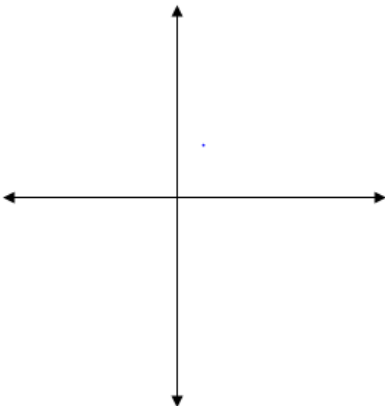
$$g(x) = -x + 5$$

Example 4: Find the area between $f(x) = x^2$ and $g(x) = x + 6$.

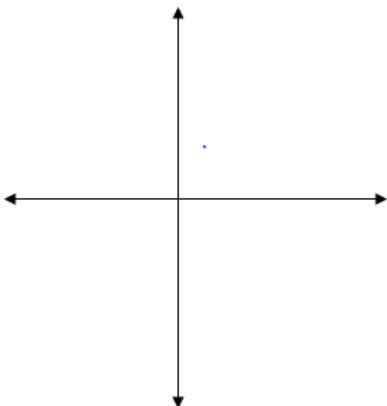


Finding the Interval

Example 5: Find the area bounded by $y = 0$ (x-axis), the line $x = 2$, and the curve $y = -x^2 + 2x + 3$.

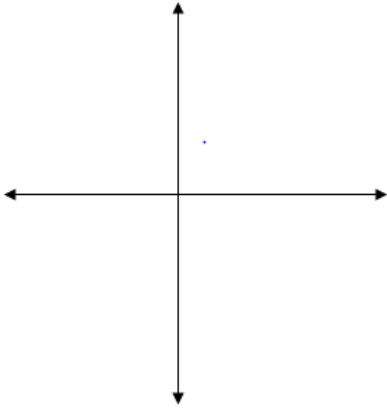


Example 6: Find the area between $y = x^2 - 2$ and $y = x$.

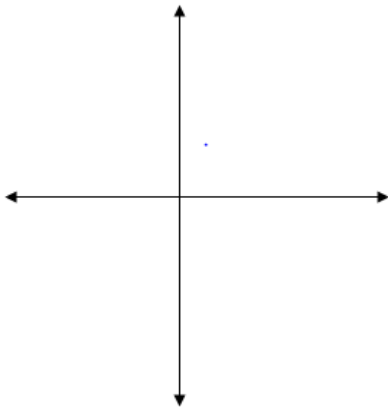


Area with respect to the y-axis

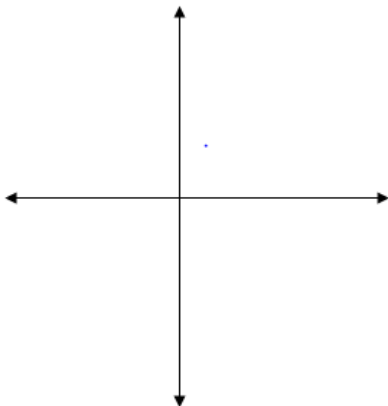
Example 7: Find the area between $f(x) = -2x + 6$ and the x-axis.



Example 8: Find the area between $y = -x^2 + 4$ and $x = 0$.



Example 9: Find the area between $y = x - 2$ and $x = y^2$.



Unit 6 Worksheet 1

Name _____

AP Calculus AB

Date _____

Calculate the area of the region bounded by the following:

1. $y = 4 - \frac{1}{3}x^2$, $y = 0$, $x = 0$, $x = 3$.
2. $y = 4x - x^2$, $y = 0$, $x = 1$, and $x = 3$.
3. $y = x^2 - 2x - 3$, $y = 0$, $x = 0$, and $x = 2$.
4. $y = \frac{1}{2}(x^2 - 10)$, $y = 0$, $x = -2$, and $x = 3$.
5. $y = x^3$, $y = 0$, $x = -1$, and $x = 2$.
6. $y = \sqrt[3]{x}$, $y = 0$, $x = -1$, and $x = 8$.
7. $y = \sqrt{x-4}$, $y = 0$, and $x = 8$.
8. $y = x^2 - 4x + 3$ and $x - y - 1 = 0$.
9. $y = x^2$ and $y = x + 2$.
10. $y = 2\sqrt{x}$, $y = 2x - 4$, and $x = 0$.
11. $y = x^2 - 4x$ and $y = -x^2$.
12. $y = x^2 - 2$ and $y = 2x^2 + x - 4$.
13. $x = 6y - y^2$ and $x = 0$.
14. $x = -y^2 + y + 2$ and $x = 0$.
15. $x = 4 - y^2$ and $x + y - 2 = 0$.
16. $x = y^2 - 3y$ and $x - y + 3 = 0$.
17. $y^2 - 2x = 0$ and $y^2 + 4x - 12 = 0$.
18. $x = y^4$ and $x = 2 - y^4$.