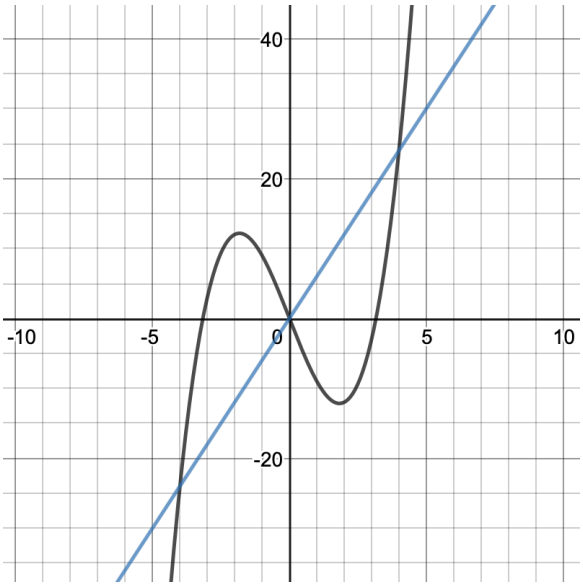
East Los Angeles College
Department of Mathematics
Math 261
Final Exam

Show your work for credit.

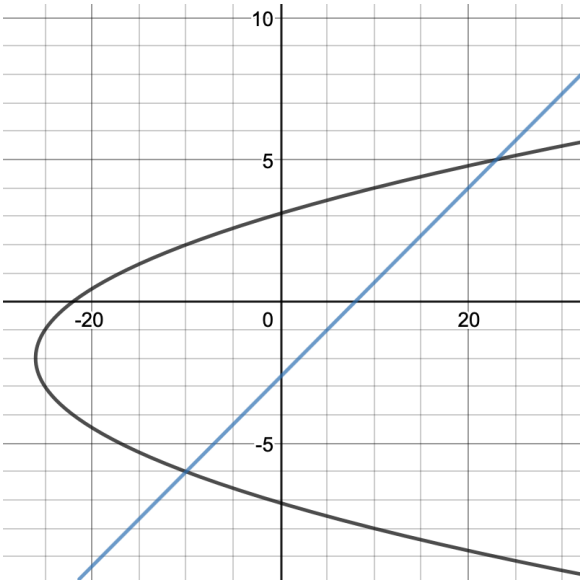
Find the area of the bonded region.

1. $f(x) = x^3 - 10x$ and $g(x) = 6x$



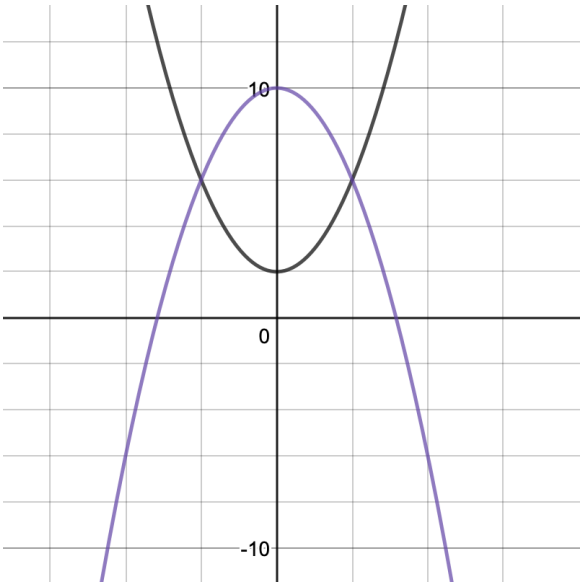
Find the area of the bonded region.

2. $x = y^2 + 4y - 22$ and $x = 3y + 8$



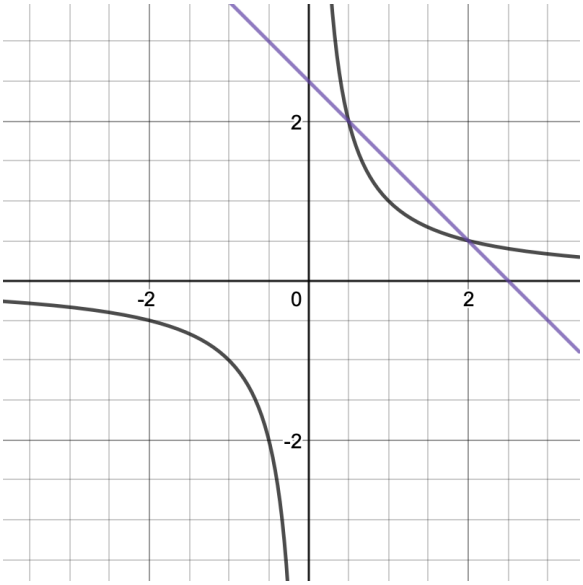
3. Rotate the following region about the **x-axis** and determine the volume of the solid.

$$y = x^2 + 2, \qquad y = 10 - x^2$$



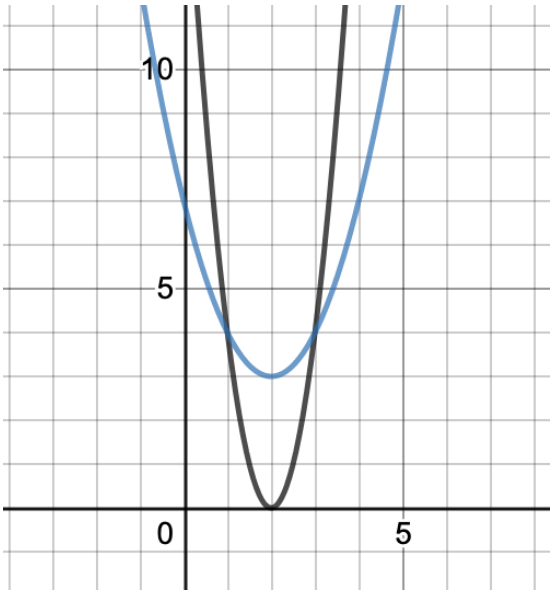
4. Rotate the following region about the **y-axis** and determine the volume of the solid.

$$y = \frac{1}{x}, \quad y = \frac{5}{2} - x$$



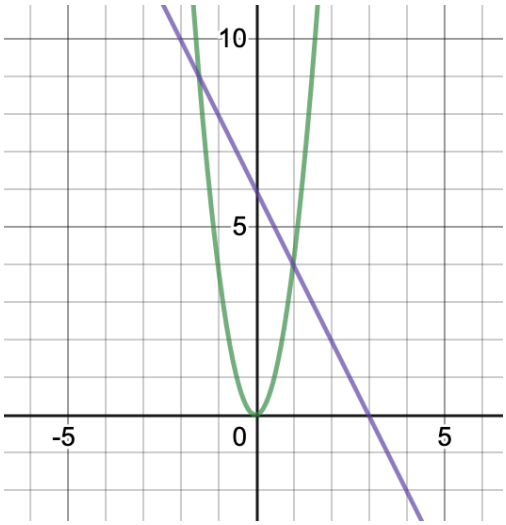
5. Rotate the bounded region about the **y-axis** and use the formula for cylindrical shells to determine the volume of the solid of revolution.

$$y = 4(x-2)^2 \text{ and } y = x^2 - 4x + 7$$



6. Rotate the bounded region about the **x-axis** and use the formula for cylindrical shells to determine the volume of the solid of revolution.

$$y = 4x^2 \text{ and } 2x + y = 6$$



Integrate the following.

7. $\int_0^2 (x - 2|x - 1|)dx$

8. $\int_0^{\frac{\pi}{2}} 3\cos(2x) + \sin(4x) - sec^2(6x)dx$

9. $\int x\sqrt[3]{2x^2+5}dx$

10. $\int \frac{x^2}{(x+5)^4}\,dx$

Solve the following differential equation.

11. $f''(\theta) = 2 - \sin(\theta)$ where $f(0) = 1$ and $f\left(\frac{\pi}{2}\right) = -1$

12. Use the midpoint rule with the given value of n to approximate the following integrals.

$$\int_0^2 sin(x^2)dx \text{ with } n = 5$$