

Today's Plan:

Learning Target (standard): I will review for the semester exam.

Students will: Complete practice problems over previous concepts at the boards and study for my exam.

Teacher will: Provide practice problems over previous concepts, check homework problems for accuracy and provide students feedback, describe and provide examples of exam problems.

Assessment: Board work

Differentiation: Students will work at the board, actively engage in practice review concepts with the aid of other students and the teacher.

$$\begin{aligned}
 14) \int_{-3}^0 3e^x dx &= 3 \int_{-3}^0 e^x dx \\
 &= 3e^x \Big|_{-3}^0 \\
 &= 3(e^0 - e^{-3}) \\
 &= 3\left(1 - \frac{1}{e^3}\right)
 \end{aligned}$$

$$\begin{aligned}
 15) \int_2^3 2e^{2x-6} dx &\Rightarrow \int_{-2}^0 e^u du \\
 u = 2x-6 & \\
 du = 2dx & \\
 &= e^u \Big|_{-2}^0 \\
 &= e^0 - e^{-2} \\
 &= 1 - \frac{1}{e^2}
 \end{aligned}$$

$$\begin{aligned}
 16) \int_0^1 -6x^2(2x^3 - 3) dx &\Rightarrow - \int_{-3}^3 u du \\
 u = 2x^3 - 3 & \\
 du = 6x^2 dx & \\
 &= -\frac{1}{4} u^4 \Big|_{-3}^3 \\
 &= -\frac{1}{4}(1 - 81) \\
 &= 20
 \end{aligned}$$

$$\begin{aligned}
 17) \int_0^1 -18x^2(2x^3 - 2)^2 dx &\Rightarrow -3 \int_{-2}^0 u^2 du \\
 u = 2x^3 - 2 & \\
 du = 6x^2 dx & \\
 -3du = 6x^2 dx &= -3 \left(\frac{1}{3} u^3\right) \Big|_{-2}^0 \\
 &= -u^3 \Big|_{-2}^0 \\
 &= -(0 + 8) \\
 &= -8
 \end{aligned}$$

Evaluate each indefinite integral.

$$\begin{aligned}
 18) \int -\frac{4}{x} dx &= -4 \int \frac{1}{x} dx \\
 &= -4 \ln|x| + C
 \end{aligned}$$

$$\begin{aligned}
 19) \int -2 \cdot 5^x dx &= -2 \int 5^x dx \\
 &= -2 \cdot \frac{1}{\ln 5} \cdot 5^x + C \\
 &= \frac{-2 \cdot 5^x}{\ln 5} + C
 \end{aligned}$$

$$1) \int \frac{5 \sin 5x}{\cos 5x} dx \Rightarrow -\int \frac{1}{u} du$$

$$u = \cos 5x \quad = -\ln|u| + C$$

$$du = -5 \sin 5x dx$$

$$-du = 5 \sin 5x dx$$

$$\Rightarrow -\ln|\cos 5x| + C$$

$$21) \int -25e^{5x} \csc(e^{5x} + 3) \cot(e^{5x} + 3) dx$$

$$u = e^{5x} + 3$$

$$du = 5e^{5x} dx$$

$$-5du = -25e^{5x} dx$$

$$\Rightarrow -5 \int \csc u \cot u du$$

$$= 5 \csc u + C$$

$$\Rightarrow 5 \csc(e^{5x} + 3) + C$$

$$2) \int 20x \sec(5x^2 + 4) \tan(5x^2 + 4) dx$$

$$u = 5x^2 + 4 \Rightarrow 2 \int \sec u \tan u du$$

$$du = 10x dx$$

$$2du = 20x dx$$

$$= 2 \sec u + C$$

$$\Rightarrow 2 \sec(5x^2 + 4) + C$$

$$23) \int -10e^{5x} \cos(e^{5x} + 3) dx$$

$$u = e^{5x} + 3$$

$$du = 5e^{5x} dx$$

$$-2du = -10e^{5x} dx$$

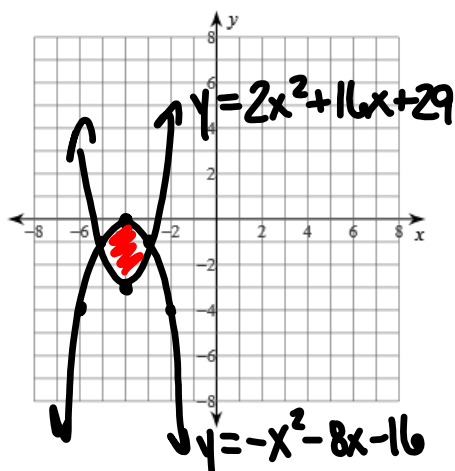
$$\Rightarrow -2 \int \cos v du$$

$$= -2 \sin v + C$$

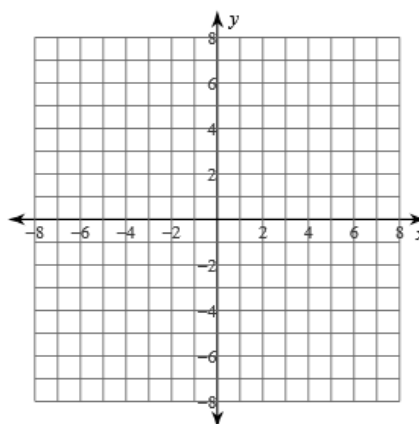
$$\Rightarrow -2 \sin(e^{5x} + 3) + C$$

For each problem, find the area of the region enclosed by the curves. You may use the provided graph to sketch the curves and shade the enclosed region.

24) $y = -x^2 - 8x - 16$, $y = 2x^2 + 16x + 29$



25) $x = \sqrt[3]{y^2}$, $x = \frac{1}{2}y$



$$A = \int_{-5}^{-3} [(-x^2 - 8x - 16) - (2x^2 + 16x + 29)] dx$$

$$= \int_{-5}^{-3} (-x^2 - 8x - 16 - 2x^2 - 16x - 29) dx$$

$$= \int_{-5}^{-3} (-3x^2 - 24x - 45) dx$$

$$= \left(-x^3 - 12x^2 - 45x \right) \Big|_{-5}^{-3}$$

$$= \left[-(-3)^3 - 12(-3)^2 - 45(-3) \right] - \left[-(-5)^3 - 12(-5)^2 - 45(-5) \right]$$

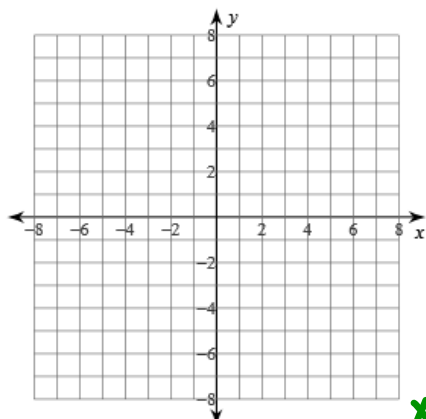
$$= (27 - 108 + 135) - (125 - 300 + 225)$$

$$= 54 - 50$$

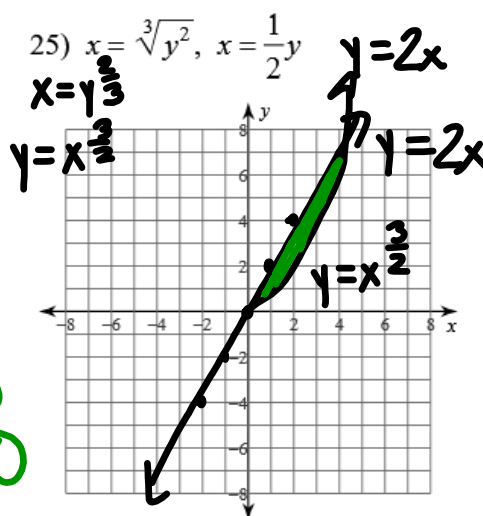
$$A = 4 \text{ u}^2$$

For each problem, find the area of the region enclosed by the curves. You may use the provided graph to sketch the curves and shade the enclosed region.

24) $y = -x^2 - 8x - 16$, $y = 2x^2 + 16x + 29$



$$\begin{aligned} x^{\frac{3}{2}} &= 2x \\ x^{\frac{3}{2}} - 2x &= 0 \\ x(x^{\frac{1}{2}} - 2) &= 0 \\ x &= 0, 4 \end{aligned}$$



$$\begin{aligned} A &= \int_0^4 [2x - x^{\frac{3}{2}}] dx \\ &= \left(x^2 - \frac{2}{5} x^{\frac{5}{2}} \right) \Big|_0^4 \\ &= 16 - \frac{2}{5} (32) \\ &= 16 - \frac{64}{5} \\ &= \frac{80 - 64}{5} \\ A &= \frac{16}{5} \end{aligned}$$