

The following formulas may be helpful with some of the problems.

$$\sum_{i=1}^n i = \frac{n(n+1)}{2} = \frac{n^2}{2} + \frac{n}{2}$$

$$\sum_{i=1}^n i^2 = \frac{n(n+1)(2n+1)}{6} = \frac{n^3}{3} + \frac{n^2}{2} + \frac{n}{6}$$

$$\sum_{i=1}^n i^3 = \frac{n^2(n+1)^2}{4} = \frac{n^4}{4} + \frac{n^3}{2} + \frac{n^2}{4}$$

$$R_n = \lim_{n \rightarrow \infty} \sum_{i=1}^n f(a + \Delta xi) \Delta x$$

1. $\int \frac{x^2 + x - 6}{x - 2} dx$

2. Find the M_4 approximation for $\int_6^{10} x^2 dx$

3. A stone was dropped off a cliff and hit the ground with a speed of 360ft/s. What is the height of the cliff? (Use acceleration due to gravity of $-32.17 \text{ ft} / \text{s}^2$)

4. Use geometry to find $\int_{-5}^8 [|2x| - 5] dx$

5. Use the Riemann sum formula to find $\int_{-2}^5 (3x^2 - x + 2) dx$

6. Determine $\sum_{i=50}^{85} 3i^3 - 9i^2 + i$

7. $\int_{-1}^6 |2x - 7| dx$

8. Determine $\frac{d}{dx} \int_{x^2}^{2x^3} \sqrt{\csc t} dt$

9. If $v(t) = 49 - 9.8t$, find the displacement and total distance traveled during the first 7 seconds by an object. The velocity is measured in m/s.

10. $\int x^4 (x^5 + 6)^9 dx$

11. $\int \cos^3 x \sin x dx$

12. $\int \left(\frac{x}{\sqrt{x+1}} \right) dx$

13. $\int_0^{\frac{\pi}{2}} \sin^4 x \cos x dx$

14. $\int_0^4 \frac{x}{x^2 + 1} dx$

15. $\int_{\sqrt{2}}^{\sqrt{5}} (x-1)(x^2 - 2x)^{11} dx$

16. $\int \frac{y^2}{(y+1)^4} dy$

17. $\int \frac{5x-6}{1+x^2} dx$

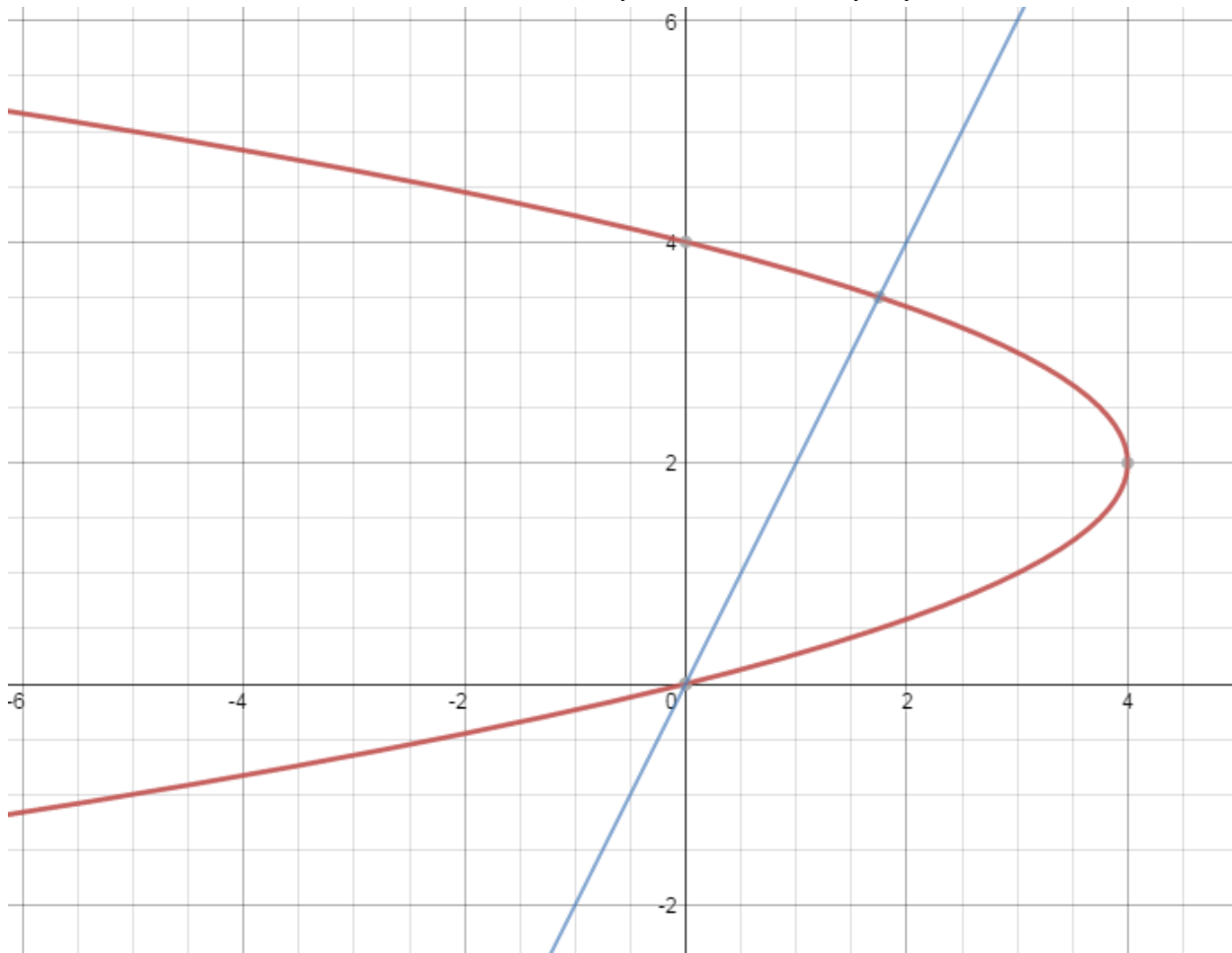
18. $\int \frac{3}{16+25x^2} dx$

19. $\int \frac{2}{\sqrt{5-15x^2}} dx$

20. $\int_4^{4/\sqrt{5}} \frac{\pi}{x\sqrt{x^2-4}} dx$

21. Find the area enclosed between $y = \cos x$, $y = -2$, $x = 0$, and $x = \frac{2\pi}{3}$.

22. Find the area enclosed between the curves $y = 2x$ and $x = 4y - y^2$ displayed below.



23. Find the average value of $y = e^{2x}$ on $x = [0, \ln 2]$. Then find the value(s) of x such that $f(x)$ is the average value.

24. The region bounded by the x-axis and $y = 12x - 2x^2$ is revolved around the x-axis. Find the volume of the solid resulting from the revolution.

25. The region bounded by the x-axis and $y = 12x - 2x^2$ is revolved around the y-axis. Find the volume of the solid resulting from the revolution.

26. The region bounded by the x-axis and $y = 12x - 2x^2$ is revolved around the $y = -3$. Find the volume of the solid resulting from the revolution.