

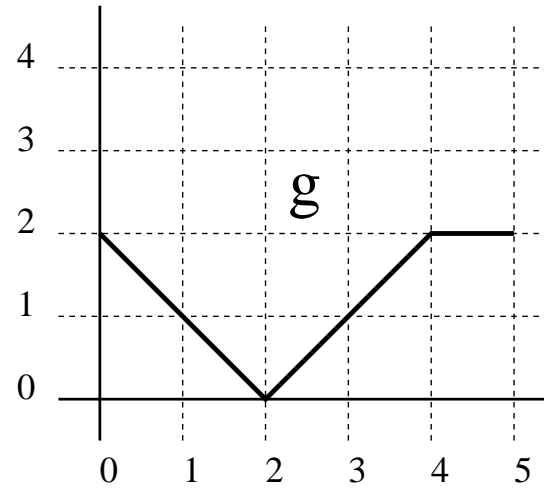
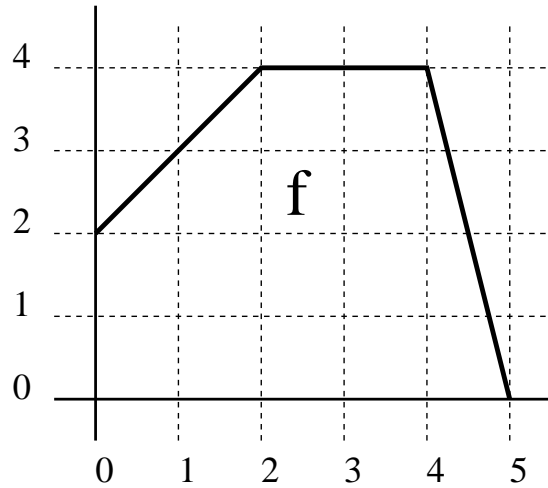
MAT 126.01, Prof. Bishop, Thursday, Sept. 22, 2020
Review for Midterm 1
Sections 1.1 to 1.5 of textbook
Quizzes 2 and 3

Write the correct answer in the box.

1. Evaluate $\sum_{k=1}^3 3^k$

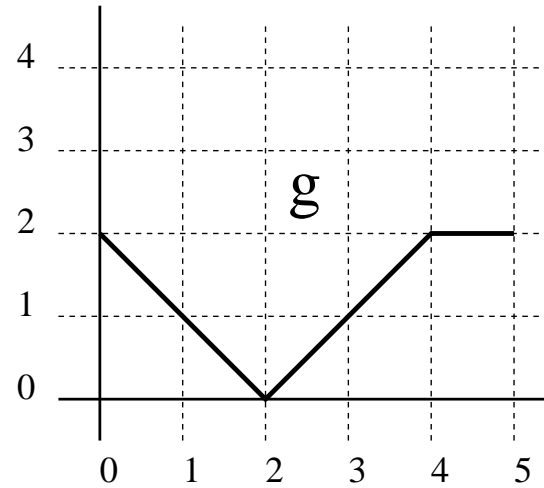
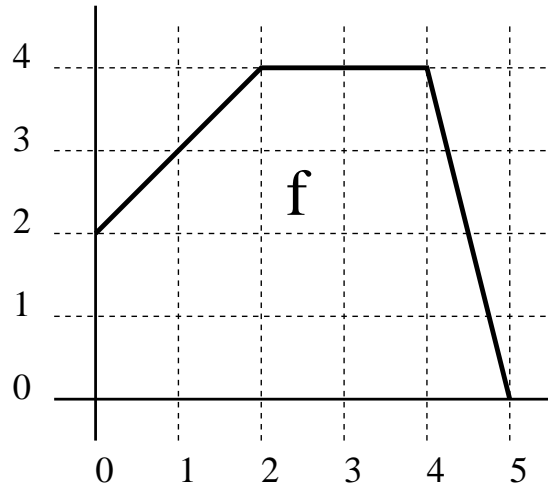
2. Write in Sigma notation: $\frac{1}{2} + \frac{1}{4} + \cdots + \frac{1}{2n}$.

3. Give the Riemann sum approximation to $\int_0^\pi \cos(x)dx$ using 4 subintervals and right hand endpoints.

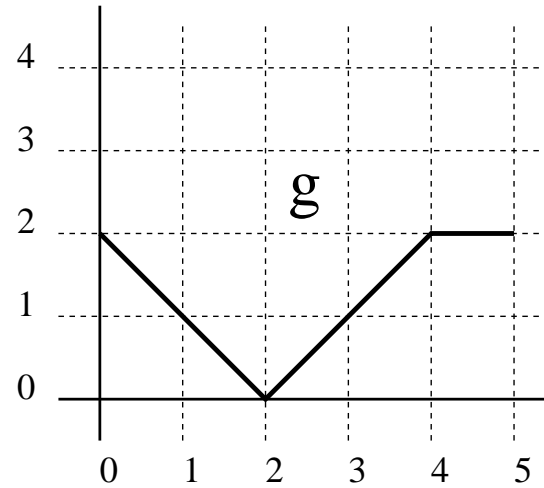
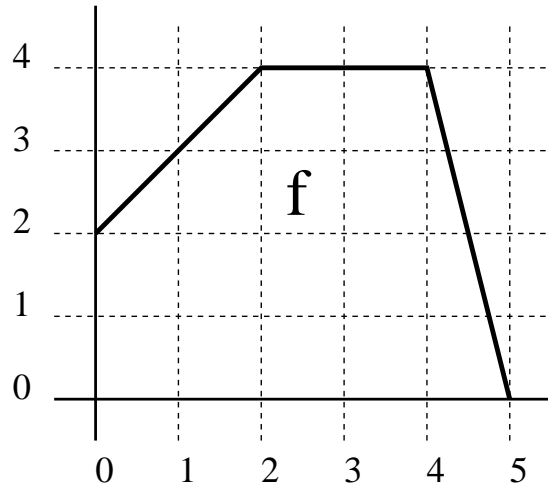


4. Compute the integral $\int_0^5 f(x)dx$ for f plotted above.

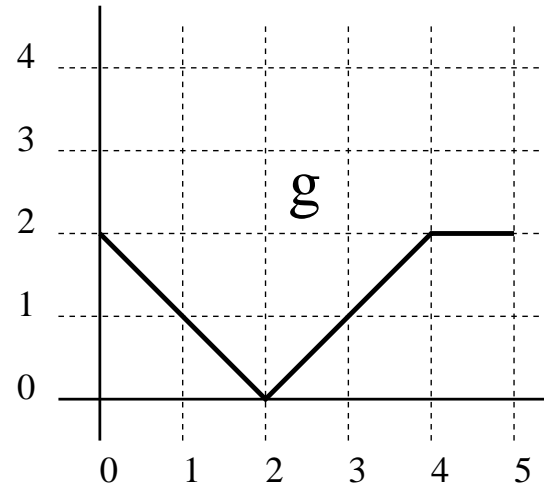
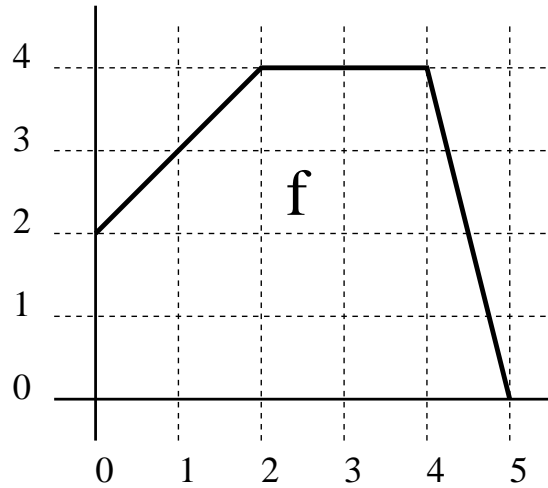
5. Compute the integral $\int_2^4 f(x) - g(x)dx$ using the functions plotted above.



6. Estimate the integral $\int_1^4 g(x)dx$ using the function plotted above and right-hand rule with 3 intervals.



7. Estimate the integral $\int_0^4 g^2(x) dx$ using the function plotted above and left-hand rule with 4 interval (use left endpoint of each subinterval).



8. Estimate the integral $\int_1^5 g(f(x))dx$ using the functions plotted above and left-hand rule with 2 intervals.

9. Write down the integral that is represented by

$$\lim_{n \rightarrow \infty} \frac{2}{n} \sum_{k=1}^n \left(4 - \frac{4k^2}{n^2}\right)^{1/2}.$$

10. Use geometry to evaluate the integral.

TRUE/FALSE: put a T or F in each box.

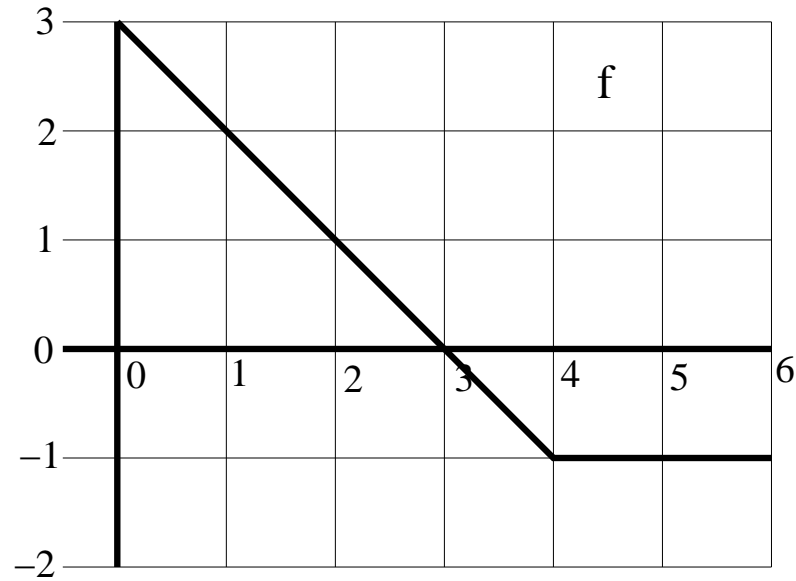
11. The left-hand rule gives a lower bound for $\int_0^4 e^x dx$.

12. If $a < b < c$ then $\int_a^c f(x)dx + \int_c^b f(x)dx = \int_a^b f(x)dx$.

13. $\int_0^1 \sqrt{1+x} dx \geq \int_0^1 \sqrt{1+x^2} dx$.

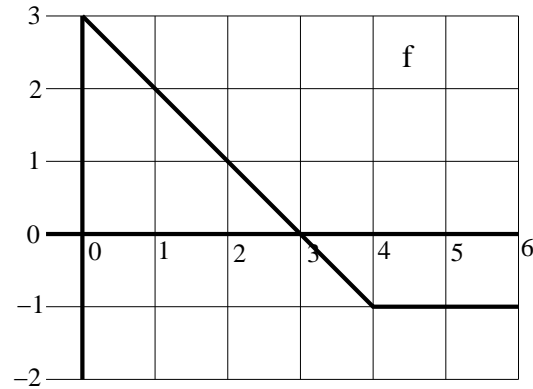
14. $\int_{-1}^1 x e^{1000x} dx > 0$.

$F(x) = \int_0^x f(t)dt$ where f is given by the following figure:



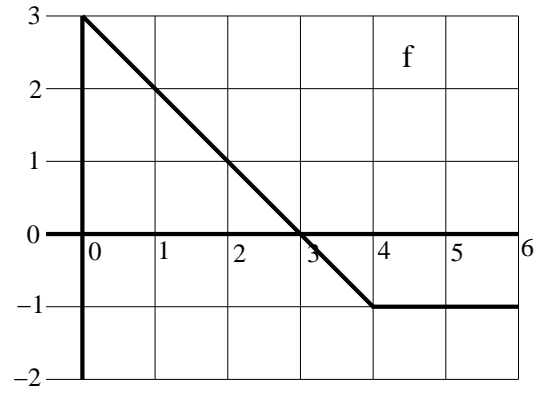
1. What is $F'(3)$?

2. What is $F(6) - F(0)$?



3. At what point x in $[0, 6]$ does F take its maximum value?

4. What is the maximum value of F on $[0, 6]$?



5. If $G(x) = \int_0^{2x} f(t)dt$, what is $G'(1)$?

6. A baseball thrown upwards at 96 ft/sec has a velocity given by $v(t) = 96 - 32t$. If it starts at height zero, what is its height as a function of t ?

7. If f is given by the figure on the right, which of the following is the largest?

$$\int_0^1 f(x)dx$$

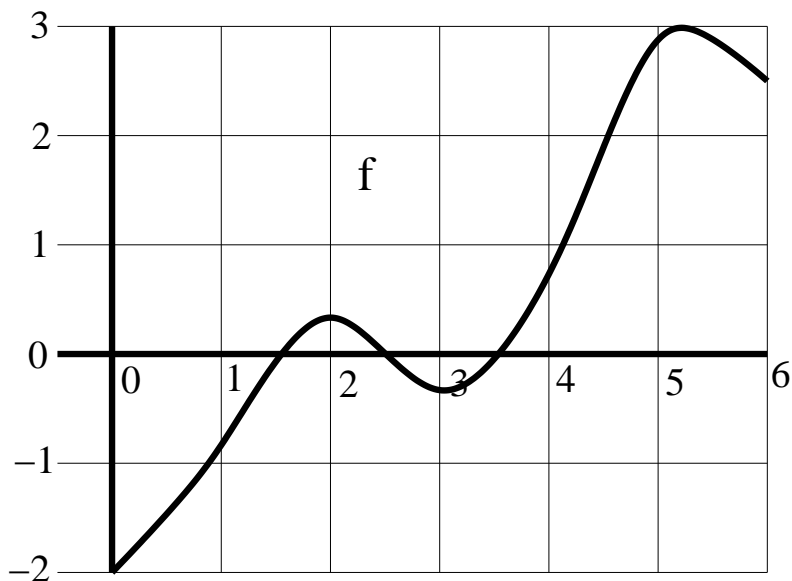
$$\int_1^2 f(x)dx$$

$$\int_2^3 f(x)dx$$

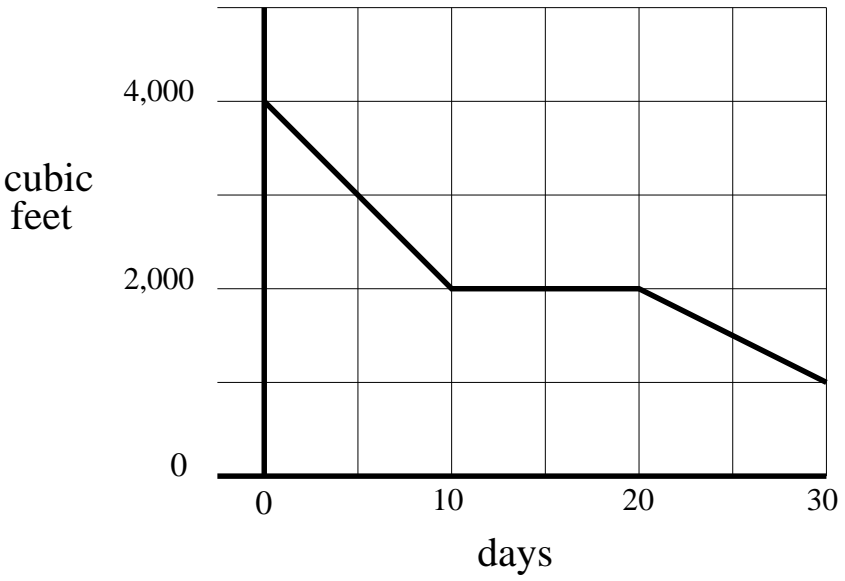
$$\int_3^4 f(x)dx$$

$$\int_4^5 f(x)dx$$

$$\int_5^6 f(x)dx$$



8. A warehouse charges its customers \$2 per day for every cubic foot of space used for storage. The figure on the right shows the storage used by one company over a month. How much will the company have to pay?



9. Which integral gives the area of the region bounded above by $y = 2x$ and below by $y = x^2$?

10. Taking $u = x^2 + 1$ allows you to easily evaluate which of the following integrals?

(a) $\int x^2 \cos(x^2 + 1) dx$

(b) $\int \sin(x^2 + 1) dx$

(c) $\int \frac{x^2 - 1}{x^2 + 1} dx$

(d) $\int x e^{x^2 + 1} dx$

(e) $\int (x - 1) \sqrt{x^2 - 1} dx$

(f) $\int \sqrt{x^2 + 1} dx$

(g) $\int \ln(x^2 - 1) dx$

11. Evaluate $\sum_{k=0}^3 3^k$

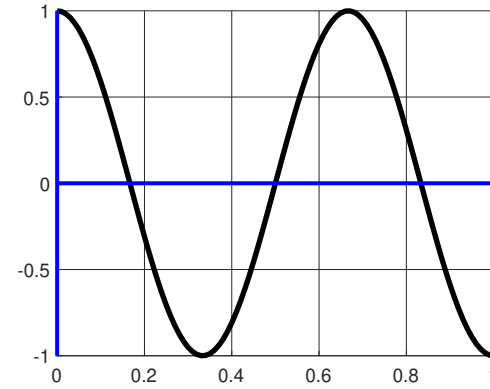
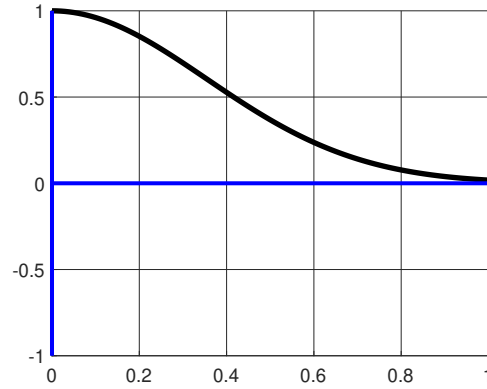
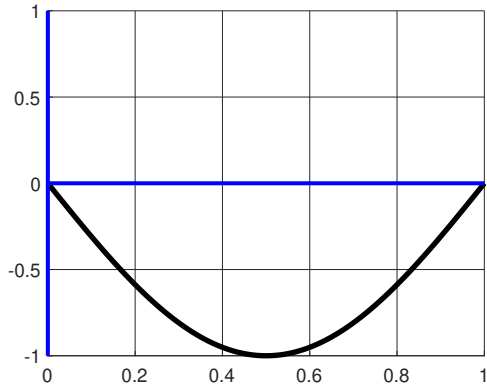
12. Evaluate $\sum_{k=3}^{10} k$

13. Give the Sigma notation for Match the sum to the correct formula:

$$1 + \frac{1}{4} + \frac{1}{9} + \frac{1}{16} + \cdots + \frac{1}{n^2},$$

14. Given the formula for left hand approximation of $\int_2^4 x^3 dx$ with four subintervals.

15. For each function f graphed on $[0, 1]$, sketch a graph of $F(x) = \int_0^x f(t)dt$.



16. Find $\int \sin(x) \sqrt{2 + \cos(x)} dx$

17. Find $\int \frac{e^x}{1+e^x} dx$

18. Find $\int \cos^5(x) dx$

19. Find $\int_0^1 x^3(x^4 + 1)^4 dx$

20. Find $\int_0^1 x^n(1 + x^n)dx$

21. Find $\int_{-1}^1 \sin(x^3) dx$ (this is a trick problem).

