In Problems 49–54, match the given graph with one of the given functions in (a)–(f). The graph of $f(t)$ is given in **FIGURE 4.3.10**.

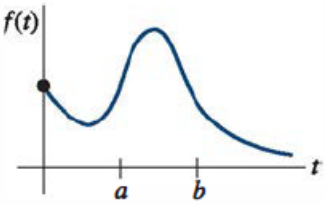


FIGURE 4.3.10 Graph for Problems 49–54

(a) $f(t) - f(t)\,\mathcal{U}(t-a)$
(b) $f(t-b)\,\mathcal{U}(t-b)$
(c) $f(t)\,\mathcal{U}(t-a)$
(d) $f(t) - f(t)\,\mathcal{U}(t-b)$
(e) $f(t)\,\mathcal{U}(t-a) - f(t)\,\mathcal{U}(t-b)$
(f) $f(t-a)\,\mathcal{U}(t-a) - f(t-a)\,\mathcal{U}(t-b)$

49.

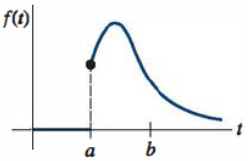


FIGURE 4.3.11 Graph for Problem 49

50.

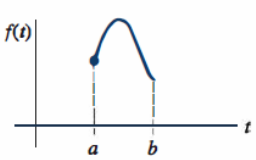


FIGURE 4.3.12 Graph for Problem 50

51.

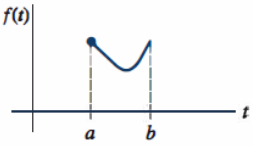


FIGURE 4.3.13 Graph for Problem 51

52.

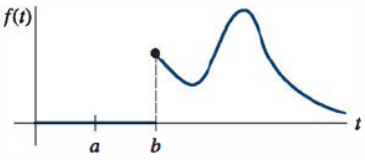


FIGURE 4.3.14 Graph for Problem 52

53.

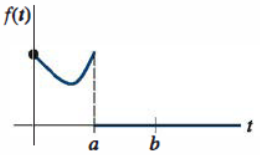


FIGURE 4.3.15 Graph for Problem 53

54.

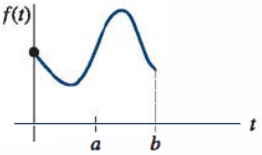


FIGURE 4.3.16 Graph for Problem 54

In Problems 55–62, write each function in terms of unit step functions. Find the Laplace transform of the given function.

55. $f(t) = \begin{cases} 2, & 0 \le t < 3 \\ -2, & t \ge 3 \end{cases}$

56. $f(t) = \begin{cases} 1, & 0 \le t < 4 \\ 0, & 4 \le t < 5 \\ 1, & t \ge 5 \end{cases}$

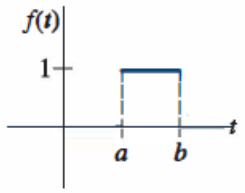
57. $f(t) = \begin{cases} 0, & 0 \le t < 1 \\ t^2, & t \ge 1 \end{cases}$

58. $f(t) = \begin{cases} 0, & 0 \le t < 3\pi/2 \\ \sin t, & t \ge 3\pi/2 \end{cases}$

59. $f(t) = \begin{cases} t, & 0 \le t < 2 \\ 0, & t \ge 2 \end{cases}$

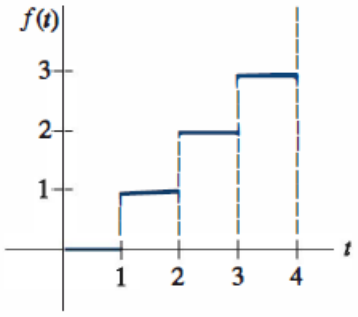
60. $f(t) = \begin{cases} \sin t, & 0 \le t < 2\pi \\ 0, & t \ge 2\pi \end{cases}$

61.



rectangular pulse

62.



staircase function