Exercises

1

(a) The particle is stopped at $t = \dfrac{\pi}{2}$ and $t = \dfrac{3\pi}{2}$; the particle is moving right on the interval $(0, \dfrac{\pi}{2}) \cup (\dfrac{3\pi}{2}, 2\pi)$; the particle is moving left on the interval $(\dfrac{\pi}{2}, \dfrac{3\pi}{2})$.

(b) Total displacement $= 0$.

(c) Total distance traveled $= 20$.

2

(a) The particle moves right when $t \in (0, \pi/3]$, moves left when $t \in (\pi/3, \pi/2]$, and is stationary when $t \in \{0, \pi/3\}$

(b) The total displacement of the particle is 2.

(c) The total distance traveled by the particle is 6.

3

(a) The particle moves right when $t \in [0, 5)$, is stationary when $t = 5$, and moves left when $t \in (5, 10]$.

(b) The total displacement of the particle is 0.

(c) The total distance traveled by the particle is 245.

4

(a) The particle moves right when $t \in [0, 1)$, is stationary when $t = 1$ and $t = 2$, and moves left when $t \in (1, 2)$.

(b) The total displacement of the particle is 4.

(c) The total distance traveled by the particle is 6.

5

(a) stopped: $t = 0, \dfrac{\pi}{2}, \pi, \dfrac{3\pi}{2}, 2\pi$

right: $(0, \dfrac{\pi}{2}) U (\dfrac{3\pi}{2}, 2\pi)$

left: $(\dfrac{\pi}{2}, \dfrac{3\pi}{2})$

(b) The particle's displacement is 0; the particles final position is 3.

(c) The total distance traveled is $\dfrac{20}{3}$.

6

(a) The particle moves right when $t \in [0, 4)$ and is stationary when $t = 4$.

(b) The total displacement of the particle is $\frac{16}{3}$.

(c) The total distance traveled by the particle in this case is the same as the displacement, $\frac{16}{3}$.

7

(a) The particle moves right when $t \in [0, \pi/2) \cup (3\pi/2, 2\pi]$, is stationary when $t \in \{\pi/2, 3\pi/2\}$ and moves left when $t \in (\pi/2, 3\pi/2)$.

(b) The total displacement of the particle is 0.

(c) The total distance traveled by the particle is approximately 4.7.

8

(a) stopped: $t = 0$
right: $(0, 3)$
left: none

(b) The particle's displacement is $\dfrac{1}{2} \ln 10$.

(c) The total distance traveled is $\dfrac{1}{2} \ln 10$.

9

(a) 63 MPH

(b) 344.52 ft

10
(a) Approximately -1.45 meters.

(b) Approximately 1.914 meters.

11
(a) -6 ft/sec *or* 6 ft/sec in the downwards direction.

(b) 5.625 seconds

(c) 0 feet

(d) 253.125 feet

12 -23 cm

13 33

14 $x(a) = 11,\ x(b) = 16,\ x(c) = -8$

15 Point a

16 Point c

17
(a) $x = 6$

(b) 4

18
(a) $x = 2$

(b) 4

19	(a) $x = 5$
	(b) 7

20	(a) $x = -2.5$
	(b) 19.5

21	332.965 billion barrels

22	93.6 kilowatt-hours