1. A student walks 160 m in 150 s . The student stops for 30 s and then walks 210 m farther in 140 s . What is the average speed of the entire walk?

A $\quad 0.53 \mathrm{~m} / \mathrm{s}$
B $\quad 0.80 \mathrm{~m} / \mathrm{s}$
C $\quad 1.2 \mathrm{~m} / \mathrm{s}$
D $\quad 1.3 \mathrm{~m} / \mathrm{s}$
2. This table gives the position of a car as a function of time.

| Time (s) | Position (m) |
| :---: | :---: |
| 0 | 5 |
| 1 | 9 |
| 2 | 13 |
| 3 | 13 |
| 4 | 15 |
| 5 | 20 |

What is the average velocity during the interval 2 s to 3 s ?

A $0 \mathrm{~m} / \mathrm{s}$
B $\quad 2 \mathrm{~m} / \mathrm{s}$
C $3 \mathrm{~m} / \mathrm{s}$
D $4 \mathrm{~m} / \mathrm{s}$
3. Consider this displacement vs. time graph representing the motion of a bicyclist.


What is the average velocity of the bicyclist between 0 and 3 seconds?

A $\quad 3.3 \mathrm{~m} / \mathrm{s}$
B $\quad 5.0 \mathrm{~m} / \mathrm{s}$
C $\quad 7.5 \mathrm{~m} / \mathrm{s}$
D $\quad 10 . \mathrm{m} / \mathrm{s}$
4. If the acceleration of a truck over a given time interval is zero, how does the instantaneous velocity of that truck at any instant during that interval compare to its average velocity over the interval?

A Instantaneous velocity would be greater than average velocity.
B Instantaneous velocity would be less than average velocity.
C Instantaneous velocity would equal average velocity.
D Instantaneous velocity will vary in value compared to average velocity.
5. A car travels from A to B at a constant $100 \mathrm{~km} / \mathrm{hr}$.


Which of the following changes?

A speed
B velocity
C frame of reference
D speed and velocity
6. A person walks 10 km due east, then 30 km at $60^{\circ} \mathrm{N}$ of E . What is the shortest route back to his starting point?

A $\quad 36 \mathrm{~km}$ at $46^{\circ} \mathrm{S}$ of W
B $\quad 36 \mathrm{~km}$ at $46^{\circ} \mathrm{N}$ of E
C $\quad 40 \mathrm{~km}$ at $46^{\circ} \mathrm{S}$ of W
D $\quad 40 \mathrm{~km}$ at $46^{\circ} \mathrm{N}$ of W
7. An airplane went from $120 \mathrm{~m} / \mathrm{s}$ to $180 \mathrm{~m} / \mathrm{s}$ in 4.0 seconds. What was its acceleration?

A $\quad 15 \mathrm{~m} / \mathrm{s} / \mathrm{s}$
B $\quad 30 . \mathrm{m} / \mathrm{s} / \mathrm{s}$
C $\quad 45 \mathrm{~m} / \mathrm{s} / \mathrm{s}$
D $\quad 60 . \mathrm{m} / \mathrm{s} / \mathrm{s}$
8. Which position vs. time graph indicates an object undergoing uniformly accelerated motion?

A


B


C


D


Time
9. A rocket lifts vertically off the launching pad and reaches a final velocity of $450 \mathrm{~m} / \mathrm{s}$ in 15 seconds. What is its acceleration?

A $30 . \mathrm{m} / \mathrm{s} / \mathrm{s}$
B $\quad 45 \mathrm{~m} / \mathrm{s} / \mathrm{s}$
C $\quad 60 . \mathrm{m} / \mathrm{s} / \mathrm{s}$
D $\quad 450 \mathrm{~m} / \mathrm{s} / \mathrm{s}$
10. What does the area bound by this velocity curve and time axis represent?

Time vs. Velocity


Time
A acceleration
B displacement
C position
D velocity
11. This is a velocity vs. time graph for a moving car.


Time (s)
What does the slope of the line on this graph represent?

A displacement
B average velocity
C acceleration
D momentum
12. The graph represents the velocity of a car.

## Velocity vs. Time



What is the displacement of the car during the time interval shown?

A $\quad 0.18 \mathrm{~m}$
B $\quad 5.7 \mathrm{~m}$
C $\quad 140 \mathrm{~m}$
D $\quad 280 \mathrm{~m}$
13. This displacement-time graph below represents the motion of a cart along a straight line.

Displacement vs. Time for a Cart


During which interval was the cart accelerating?

A I-II
B II-III
C III-IV
D IV-V
14. Based on this graph, which is constant?


Time

A displacement
B position
C time
D velocity
15. This graph shows the position of a car along a straight path as a function of time.


What is the car's velocity at 2.0 sec ?

A $\quad 1.25 \mathrm{~m} / \mathrm{s}$
B $\quad 2.50 \mathrm{~m} / \mathrm{s}$
C $\quad 5.00 \mathrm{~m} / \mathrm{s}$
D $\quad 10.0 \mathrm{~m} / \mathrm{s}$
16. This is a velocity vs. time graph of an object.

Velocity vs. Time


What is the velocity of the object at $t=3 \mathrm{~s}$ ?

A $\quad-2 \mathrm{~m} / \mathrm{s}$
B $\quad 0 \mathrm{~m} / \mathrm{s}$
C $1 \mathrm{~m} / \mathrm{s}$
D $\quad 2 \mathrm{~m} / \mathrm{s}$
17. What does the shaded area of the acceleration vs. time graph indicate?


A total displacement
B change in velocity
C instantaneous velocity
D average displacement
18. This is an acceleration vs. time graph of an object.


If the object's initial velocity is $0 \mathrm{~m} / \mathrm{s}$, what is the velocity of an object at $t=8.0 \mathrm{~s}$ ?

A $\quad 0.50 \mathrm{~m} / \mathrm{s}$
B $\quad 2.0 \mathrm{~m} / \mathrm{s}$
C $\quad 12 \mathrm{~m} / \mathrm{s}$
D $\quad 32 \mathrm{~m} / \mathrm{s}$

## End of Goal 2 Sample Items

In compliance with federal law, including the provisions of Title IX of the Education Amendments of 1972, the Department of Public Instruction does not discriminate on the basis of race, sex, religion, color, national or ethnic origin, age, disability, or military service in its policies, programs, activities, admissions or employment.2.02Compare and contrast as scalar and vector quantities:
a. Speed and velocity.
Thinking Skill: Generating
b. Distance and displacement.
Correct Answer: ..... B ..... 2.01
Analyze velocity as a rate of change of position:
a. Average velocity.
b. Instantaneous velocity.
Thinking Skill: Integrating Correct Answer: ..... C
Analyze velocity as a rate of change of position:
a. Average velocity.
a. Average velocity.
b. Instantaneous velocity.
b. Instantaneous velocity.
3 Objective:
3 Objective:
Thinking Skill: Analyzing Correct Answer: A
Analyze velocity as a rate of change of position:a. Average velocity.
Thinking Skill: Applying Correct Answer: ..... C
Objective: ..... 2.01
Analyze velocity as a rate of change of position:
a. Average velocity.
b. Instantaneous velocity.
Thinking Skill: Analyzing Correct Answer: A
Objective:
Objective:
Objective: ..... 2.02
Compare and contrast as scalar and vector quantities:
a. Speed and velocity. b. Distance and displacement.
Thinking Skill: Knowledge Correct Answer: A
7 Objective: ..... 2.03
Analyze acceleration as rate of change in velocity. (Include negative acceleration)Thinking Skill: ApplyingCorrect Answer: A
8 ..... 2.03
Analyze acceleration as rate of change in velocity. (Include negative acceleration)Thinking Skill: AnalyzingCorrect Answer: C

## Objective: <br> 2.03

Analyze acceleration as rate of change in velocity. (Include negative acceleration)
Thinking Skill: Applying Correct Answer: A

Objective: 2.04

Using graphical and mathematical tools, design and conduct investigations of linear motion and the relationships among:
a. acceleration.
b. velocity.
c. Instantaneous velocity.
d. Instantaneous velocity
Thinking Skill: Analyzing Correct Answer: B

11 Objective: 2.03
Analyze acceleration as rate of change in velocity. (Include negative acceleration)
Thinking Skill: Knowledge Correct Answer: C
12 Objective: 2.04a
Using graphical and mathematical tools, design and conduct investigations of linear motion and the relationships among:
a. acceleration.

Thinking Skill: Analyzing Correct Answer: C
$13 \quad$ Objective: 2.04
Using graphical and mathematical tools, design and conduct investigations of linear motion and the relationships among:
a.acceleration.
b. velocity.
c. Instantaneous velocity.
d. Instantaneous velocity

Thinking Skill: Analyzing Correct Answer: A

## $14 \quad$ Objective: $\quad 2.04$

Using graphical and mathematical tools, design and conduct investigations of linear motion and the relationships among:
a.acceleration.
b. velocity.
c. Instantaneous velocity.
d. Instantaneous velocity

Thinking Skill: Analyzing Correct Answer: D

15 Objective: 2.04
Using graphical and mathematical tools, design and conduct investigations of linear motion and the relationships among:
a.acceleration.
b. velocity.
c. Instantaneous velocity.
d. Instantaneous velocity

Thinking Skill: Analyzing Correct Answer: A

## $16 \quad$ Objective: 2.04

Using graphical and mathematical tools, design and conduct investigations of linear motion and the relationships among:
a. acceleration.
b. velocity.
c. Instantaneous velocity.
d. Instantaneous velocity

Thinking Skill: Analyzing Correct Answer: D
17 Objective: 2.04
Using graphical and mathematical tools, design and conduct investigations of linear motion and the relationships among:
a.acceleration.
b. velocity.
c. Instantaneous velocity.
d. Instantaneous velocity

Thinking Skill: Analyzing Correct Answer: B

## 18 Objective: 2.04

Using graphical and mathematical tools, design and conduct investigations of linear motion and the relationships among:
a. acceleration.
b. velocity.
c. Instantaneous velocity.
d. Instantaneous velocity

Thinking Skill: Analyzing Correct Answer: D

