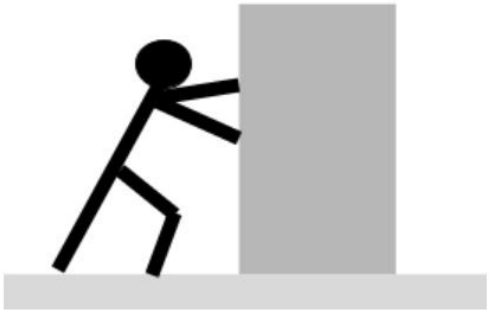
AP Physics 1 – Algebra-Based: Unit 1 Kinematics Practice Test

Question 1:

An ambulance driver accelerates from rest to $14\frac{m}{s}$ in $2.5\,s$. The magnitude of the force of friction on its tires is $9{,}500\,N$. What is the best estimate of the mass of the ambulance?

A. $3{,}400\,N$
B. $1{,}700\,N$
C. $9{,}500\,N$
D. $2{,}500\,N$

Question 2:



A $120\,kg$ box is initially at rest when a student pushes it with $450\,N$ of force for $1.5\,s$. There is negligible friction between the box and floor. What is the best estimate of the speed of the box after $1.5\,s$ time interval?

A. $4.9\frac{m}{s}$
B. $7.2\frac{m}{s}$
C. $5.7\frac{m}{s}$

D. $6.3\frac{m}{s}$

Question 3:

A robot on an asteroid with no atmosphere is conducting gravity experiments. It throws a $2.0\,kg$ rock downward with an initial speed of $1.0\frac{m}{s}$. The rock falls $10.0\,m$ in $3.0\,s$. What is the best estimate of the magnitude of the gravitational force acting on the rock during the experiment?

A. $2.6\,N$
B. $0.65\,N$
C. $3.2\,N$
D. $13\,N$

Question 4:

A police car accelerates from rest to $16\frac{m}{s}$ over a distance of $21\,m$. The magnitude of the force of friction on its tires is $8{,}700\,N$. What is the best estimate of the mass of the police car?

A. $1{,}200\,kg$
B. $1{,}800\,kg$
C. $2{,}800\,kg$
D. $1{,}400\,kg$

Question 5:

Kinematic equation can only be used when you have a constant…

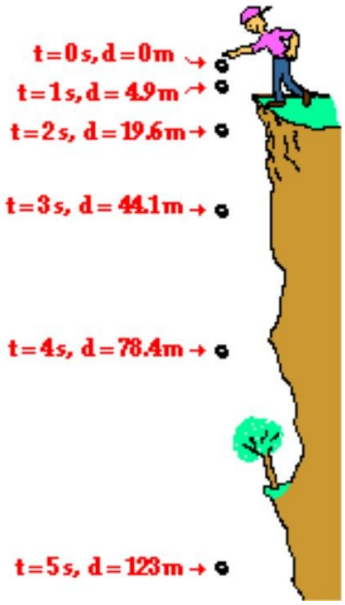
A. Position
B. Velocity
C. Acceleration
D. Time

Question 6:

A boat travels $12.0\,m$ while it reduces its velocity from $9.5\frac{m}{s}$ to $5.5\frac{m}{s}$. What is the magnitude of the boat's acceleration while it travels the $12.0\,m$?

- **A.** $1.3\frac{m}{s^2}$
- **B.** $2.5\frac{m}{s^2}$
- **C.** $3.0\frac{m}{s^2}$
- **D.** $7.5\frac{m}{s^2}$

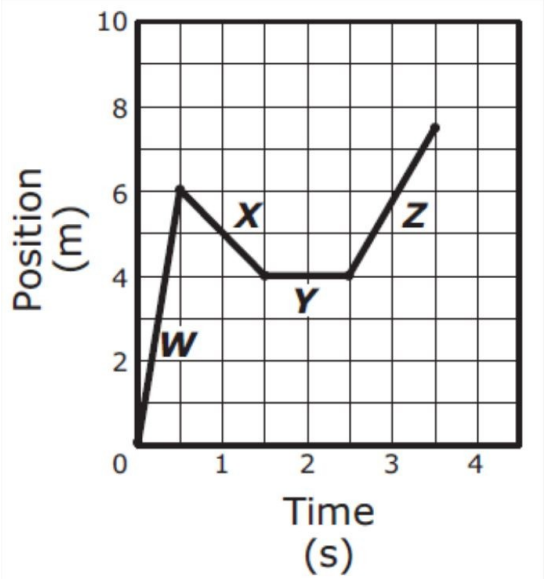
Question 7:



What happens to the velocity of a ball as it is dropped off a cliff?

- **A.** It decreases at a uniform rate.
- **B.** It increases at a uniform rate.
- **C.** It is constant.
- **D.** It increases at a non-uniform rate.

Question 8:



Motion sensors recorded the following data about a runner during a cross-country race. During which segment of the race did the runner have the greatest speed?

- **A.** W
- **B.** X
- **C.** Y
- **D.** Z

Question 9:

What would the d-t graph look like for an object travelling at a constant velocity?

- **A.** Horizontal Line
- **B.** Curved Line
- **C.** Straight Line

Question 10:

What would the v-t graph look like for an object travelling at a constant velocity?

- **A.** Curved Line
- **B.** Horizonal Line
- **C.** Straight Line

Question 11:

A train travels $6\,m$ in the first seconds of travel, $6\,m$ again during the second seconds of travel, $6\,m$ again during the third seconds. What is the train's acceleration?

- **A.** $0\,\frac{m}{s^2}$

B. $6\frac{m}{s^2}$

C. $12\frac{m}{s^2}$

D. $18\frac{m}{s^2}$

Question 12:

A dog runs with an initial speed of $7.5\frac{m}{s}$ to a stop in $15\,seconds$. What is the dog's acceleration?

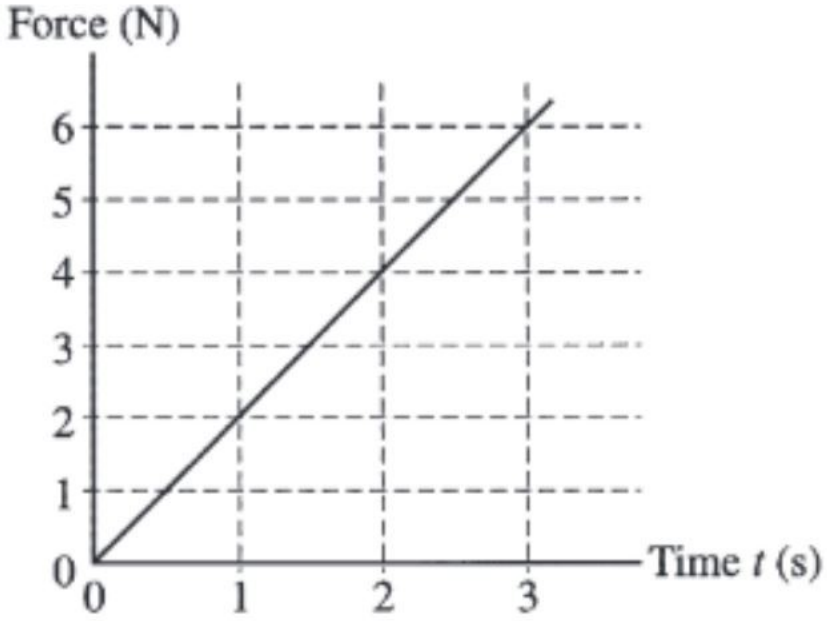
A. $-7.5\frac{m}{s}$

B. $-7.5\frac{m}{s^2}$

C. $-0.5\frac{m}{s^2}$

D. $7.5\frac{mi}{hr}$

Question 13:



A block of mass $3kg$, initially at rest, is pulled along a frictionless, horizontal surface with a force shown as a function of t by the graph above. The speed of the block at $t=2s$ is

- **A.** $\frac{4}{3}\frac{m}{s}$
- **B.** $4\frac{m}{s}$
- **C.** $24\frac{m}{s}$
- **D.** $\frac{8}{3}\frac{m}{s}$
- **E.** $8\frac{m}{s}$

Question 14:

A car from rest and after $7seconds$ it is moving at $42\frac{m}{s}$. What is the car's average acceleration?

- **A.** $0.17\frac{m}{s^2}$
- **B.** $6\frac{m}{s^2}$
- **C.** $1.67\frac{m}{s^2}$
- **D.** $7\frac{m}{s^2}$

Question 15:

A golf ball starts with a speed of $2\frac{m}{s}$ and slows at a constant rate of $0.5\frac{m}{s^2}$, what is its velocity after $2s$?

- **A.** $0\frac{m}{s}$
- **B.** $1\frac{m}{s}$
- **C.** $0.5\frac{m}{s}$
- **D.** $1.5\frac{m}{s}$

Question 16:

An object with an initial velocity of $3.50\frac{m}{s}$ moves east along a straight and level path. The object then undergoes a constant acceleration of $1.80\frac{m}{s^2}$ east for a period of $5.00\,s$. How far does the object move while it is accelerating?

- **A.** $6.30\,m$
- **B.** $27.2\,m$
- **C.** $17.5\,m$
- **D.** $40.0\,m$

Question 17:

A ball is thrown downward from the top of a roof with a speed of $25\frac{m}{s}$. After $2\,s$, its velocity will be:

- **A.** $19.6\frac{m}{s}$
- **B.** $-44.6\frac{m}{s}$
- **C.** $-5.4\frac{m}{s}$
- **D.** $44.6\frac{m}{s}$

Question 18:

A car is travelling to the right with a speed of $29\frac{m}{s}$ when the rider slams on the accelerator to pass another car. The car passes in $110\,m$ with constant acceleration and reaches a speed of $34\frac{m}{s}$. We want to find the acceleration of the car as it sped up. What equation should you choose?

- **A.** $v_f = v_i + at$
- **B.** $v_f{}^2 = v_i^2 + 2aX$
- **C.** $x = v_i t + \frac{1}{2} a t^2$

D. $x=\frac{v_f-v_i}{2}t$

Question 19:

Rocket-powered sleds are used to test the human response to acceleration. If a rocket-powered sled is accelerated to a speed of $444\frac{m}{s}$ **in** $1.83\,seconds$ **, then what is the distance that the sled travels? Choose the appropriate equation.**

A. $v_f=v_i+at$

B. $v_f{}^2=v_i^2+2aX$

C. $x=v_it+\frac{1}{2}at^2$

D. $x=\frac{v_f-v_i}{2}t$

Answer Key:

1. B
2. C
3. C
4. D
5. C
6. B
7. B
8. A
9. C
10. B
11. A
12. C
13. A
14. B
15. B
16. D
17. D
18. B
19. D