Name: KEY

Sample Multiple Choice Questions

1. Which unit would be the best choice to report the velocity of a snowmobile as it travels along a groomed trail over a frozen lake?

   a. cm/min
   b. km/h
   c. mm/year
   d. m/s

2. Which unit would be the best choice to report the velocity of a snail as it moves along a sidewalk at the playground?

   a. cm/hour
   b. km/h
   c. m/s
   d. mm/min

3. A car has its velocity reported in km/h and you are told how long it will be travelling in minutes. When you report your final answer of how far the car travelled, what will be the units in your final answer?

   a. km
   b. mm
   c. m
   d. cm

4. When velocity is in cm/min and time is given in minutes for an object travelling with uniform velocity, in which unit will the distance the object travels be reported?

   a. km
   b. mm
   c. m
   d. cm

5. Which is the correct formula for calculating the velocity of a moving object?

   a. $v = \frac{d}{t}$
   b. $v = d \times t$
   c. $v = \frac{t}{d}$
   d. $v = t \times d$

6. Which is the correct formula for calculating the distance covered by a moving object?

   a. $d = \frac{v}{t}$
   b. $d = v \times t$
   c. $d = \frac{t}{v}$
   d. $d^2 = v \times t$

7. Which is the correct formula for calculating the time needed to cover a given distance at a constant velocity?

   a. $t = \frac{v}{d}$
   b. $t = v \times d$
   c. $t = \frac{d}{v}$
   d. $t^2 = v \times d$

8. If distance an object travels is in kilometres (km) and the time needed to cover this distance is in minutes (min), the velocity of the object will be in which unit?

   a. min/km
   b. km^2/min
   c. km • min
   d. km/min

9. Which vehicle would travel the greater distance: a truck travelling at 45 km/h for 2 hours or a car travelling at 30 km/h for 3 hours?

   a. it would depend on which direction each was travelling
   b. the truck
   c. the car
   d. they would both cover the same distance

10. Which vehicle would travel the greater distance: a pick-up travelling at 80 km/h for 90 minutes or a car travelling at 50 km/h for 120 minutes?

    a. it would depend on which direction each was travelling
    b. the pick-up
    c. the car
    d. they would both cover the same distance

11. A moving object covers a distance, *d,* in an interval of time, *t*. A second object moves a distance $2d$ in an interval of time $2t$. Which statement is correct with respect to their velocity values?

    a. The first object is moving at a higher velocity.
    b. The second object is moving at a higher velocity.
    c. More information is needed to determine the relationship between their velocities.
    d. The two objects have the same velocity.

12. Anju travels at a velocity, *v*. Her friend Sonya travels half of the distance Anju covers, in the same amount of time it took Anju to cover the distance used in the calculation of her velocity. Which statement is correct with respect to Sonya's velocity?

    a. Sonya is moving at a higher velocity than Anju.
    b. Sonya is moving at a lower velocity than Anju.
    c. More information is needed to determine the relationship between their velocities.
    d. The two girls have the same velocity.

13. Jason runs a total distance of 9.0 km in 1 hour and 30 minutes. How fast did he travel, in km/h?

a. 1.0
b. 3.0
c. 4.5
d. 6.0

14. A bear covers 1.0 km in 5 minutes. What is its velocity, in m/s?

a. 3.3
b. 0.3
c. 0.2
d. 20

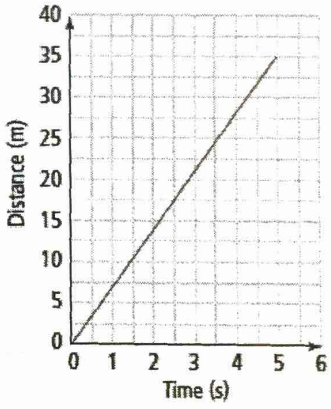
15. How fast is a car travelling, in m/s, if it covers 15 km in 10 minutes?

a. 1.5
b. 0.05
c. 25
d. 250

16. Which student is travelling faster: Simon who covers 325 m in 25 seconds or Andre who covers 713 m in 54 seconds?

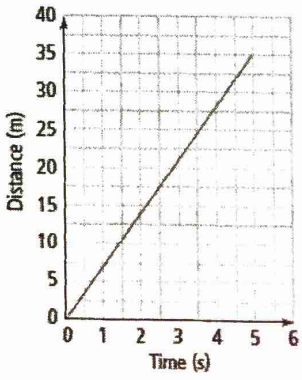
a. Simon, because his velocity is a larger value
b. Andre, because his velocity is a larger value
c. The both move at the same velocity.
d. Simon, because his interval of time is smaller

17. On the given graph, which variable represents the independent variable?



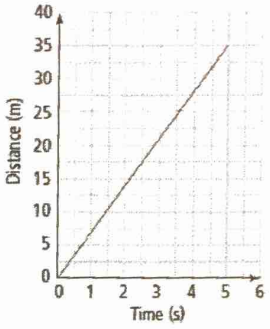
a. distance
b. velocity
c. time
d. speed

18. On the given graph, which variable represents the dependent variable?



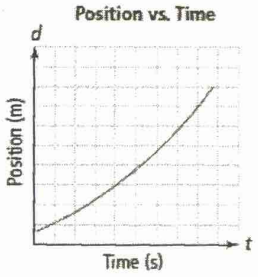
a. distance
b. velocity
c. time
d. speed

19. Which statement is correct when describing the motion of the object represented by the given distance/time graph?



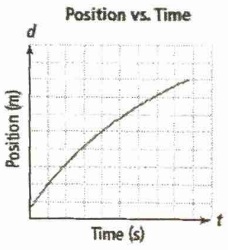
a. The object is moving at a uniform velocity.
b. The object is not moving.
c. The object is moving backwards.
d. The velocity of the object is decreasing as it moves.

20. Which statement is correct when describing the motion of the object represented by the given distance/time graph?



a. The object is moving at a uniform velocity.
b. The object is moving backwards.
c. The velocity of the object is decreasing as it moves.
d. The velocity of the object is increasing as it moves.

21. Which statement is correct when describing the motion of the object represented by the given distance/time graph?



a. The object is moving at a uniform velocity.
b. The object is not moving.
c. The object is moving backwards.
d. The velocity of the object is decreasing as it moves.

22. The distance/time graph of an object is a horizontal line. Which statement is correct with respect to the velocity of this object?

a. The object is moving at a uniform velocity.
b. The object is not moving.
c. The object is moving backwards.
d. The velocity of the object is decreasing as it moves.

23. Boris has a turtle that moves at 2.1 cm/min along a path towards a small pond in the terrarium he keeps it in. How far will the turtle travel in 20.0 seconds?

a. 0.7 cm
b. 70 cm
c. 0.7 m
d. 42 cm

24. Tessa drives at a constant velocity of 75 km/h for 3 hours. What distance will she have travelled in this amount of time?
    a. 25 km
    b. 75 km
    c. 150 km
    d. 225 km

25. Enrico jogs at a constant velocity of 1.5 m/s for 35 minutes. What distance will he have travelled in this amount of time?
    a. 0.04 m
    b. 0.04 km
    c. 52.5 m
    d. 3 150 m

26. Joseph drives his truck at 72 km/h. How many metres of distance will his truck have moved in 5.0 s?
    a. 100 m
    b. 10 m
    c. 360 m
    d. 3.6 m

27. How long will it take Chinonso to get home, a total distance of 224 km, if she drives at 62 km/h?
    a. 6.3 h
    b. 3.6 h
    c. 13.9 h
    d. 2.24 h

28. If Josh can run at a constant velocity of 8.6 m/s, how long would it take him to complete a 200 m long race?
    a. 8.6 s
    b. 200 s
    c. 1720 s
    d. 23 s
    e. 0.043 s

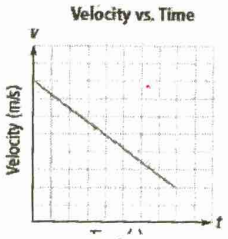
29. A bowling ball is travelling at 7.5 m/s as it moves towards the pins that are located 18 m away. How long will it take for the bowling ball to hit the pins?
    a. 2.4 s
    b. 4.2 s
    c. 7.5 s
    d. 18 s

30. Which object is experiencing zero acceleration?
    a. a truck travelling at 10 m/s that changes to 15 m/s over 5.0 s
    b. a runner who comes to rest after crossing the finish line
    c. a car travelling at a constant 45 km/h around a curve in the road
    d. a car travelling at a constant 45 km/h on a level stretch of road

31. Which is a correct unit for acceleration?
    a. km/h/s
    b. m/s
    c. cm/min/m
    d. m^2/s

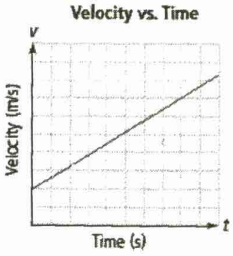
32. Which object is experiencing the greatest acceleration?
a. a tennis ball that changes velocity by 10 m/s in 2 seconds
b. a truck that changes velocity by 10 m/s in 2.5 seconds
c. a runner that changes velocity by 2.0 m/s in 2 seconds
d. a cyclist that changes velocity by 10 m/s in 5.0 seconds

33. Which statement is correct with respect to the graph given?



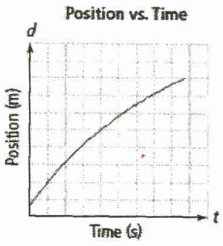
a. The acceleration of the object is zero.
b. The object has a constant velocity.
c. The distance travelled by the object is decreasing.
d. The object is experiencing negative acceleration.

34. Which statement is correct with respect to the graph given?



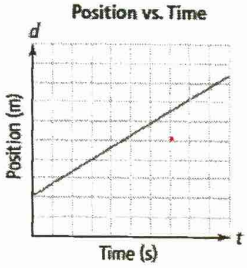
a. The object has a constant velocity.
b. The distance travelled by the object is decreasing.
c. The object is experiencing negative acceleration.
d. The object is experiencing positive acceleration.

35. Which statement is correct with respect to the graph given?



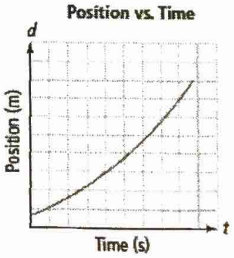
a. The acceleration of the object is zero.
b. The object has a constant velocity.
c. The distance travelled by the object is decreasing.
d. The object is experiencing negative acceleration.

36. Which statement is correct with respect to the graph given?



a. The acceleration of the object is zero.
b. The velocity of the object is increasing.
c. The distance travelled by the object is decreasing.
d. The object is experiencing negative acceleration.

38. Which statement is correct with respect to the graph given?



a. The object has a constant velocity.
b. The distance traveled by the object is decreasing.
c. The object is experiencing negative acceleration.
d. The object is experiencing positive acceleration.

39. Which object is experiencing positive acceleration?

a. a runner slowing to a stop at the end of a race
b. a car maintaining a 25 km/h velocity
c. a truck at rest in a parking lot
d. a fish just after being released after being caught

40. Which is the correct scientific term for an object experiencing deceleration?

a. positive acceleration
b. negative acceleration
c. zero acceleration
d. constant velocity

41. An object is moving forward at 15 m/s, and 15 seconds later it is moving backwards at 15 m/s. Which is the correct term for what occurred to the object in this 15 second interval of time?

a. positive acceleration
b. negative acceleration
c. zero acceleration
d. constant velocity

44. When an object is experiencing negative acceleration, which statement is correct with respect to its distance/time graph?

a. The distance/time graph is a straight sloping line with a positive slope.
b. The distance/time graph is a straight sloping line with a negative slope.
c. The distance/time graph is a horizontal line.
d. The distance/time graph is a downward curve.

45. When an object is experiencing positive acceleration, which statement is correct with respect to its distance/time graph?

a. The distance/time graph is a straight sloping line with a negative slope.
b. The distance/time graph is a horizontal line.
c. The distance/time graph is a downward curve.
d. The distance/time graph is an upward curve.

46. Which is the correct set of data needed to calculate the acceleration of an object?

a. the final velocity and the time interval over which the change in velocity occurred
b. the initial velocity and the final velocity
c. initial distance, final distance, and the time interval over which the change in distance occurred
d. initial velocity, final velocity, and the time interval over which the change in velocity occurred

47. At the 3.5 s mark, a lab cart is moving at 1.5 m/s, and at the 5.0 s mark it is moving at 2.5 m/s. Which is the correct value for its acceleration?
    a. 0.43 m/s^2
    b. 0.50 m/s^2
    c. 4.0 m/s^2
    d. 0.67 m/s^2

48. A sparrow was moving forward at 8.5 m/s and 4.0 seconds later, it was moving forward at 4.5 m/s. Which is the correct value for the acceleration of the sparrow?
    a. -1.0 m/s^2
    b. -0.50 m/s^2
    c. 2.1 m/s^2
    d. 0.47 m/s^2

49. A car was travelling north at 15 m/s and 20 seconds later, it was travelling north at 10 m/s. Assuming that north is the positive direction, which is the correct value for the acceleration of the car?
    a. 4.0 m/s^2
    b. 0.25 m/s^2
    c. -4.0 m/s^2
    d. -0.25 m/s^2

50. A tennis ball is travelling at 11 m/s towards Jennifer. The ball is returned to her friend Nancy at 11 m/s. Let the direction towards Nancy be the positive direction. If the change in velocity takes place over an interval of time of 0.2 s, what is the acceleration of the tennis ball?
    a. 11 m/s^2
    b. 110 m/s^2
    c. 0.0 m/s^2
    d. -11 m/s^2

64. Which is the correct statement for Newton's first law of motion?

    a. An object will remain at rest or in constant straight line motion until a force acts on it.
    b. A moving object will only move if friction does not exist.
    c. All forces cause motion.
    d. The more force you add to an object, the more it will accelerate.

65. Which is the correct statement for Newton's second law of motion?

    a. An object will remain at rest or in constant straight line motion until a force acts on it.
    b. A moving object will only move if friction does not exist.
    c. All forces cause motion.
    d. The more force you add to an object, the more it will accelerate.

66. If a force acting on an object doubles, which is the change to the acceleration on the object?

    a. The acceleration will be reduced to half of its initial value.
    b. The acceleration will double.
    c. The acceleration will quadruple.
    d. The acceleration will be one quarter of its initial value.

67. Which is the correct statement for Newton's third law of motion?

a. A moving object will only move if friction does not exist.
b. All forces cause motion.
c. The more force you add to an object, the more it will accelerate.
d. For every action force there exists a reaction force, equal in magnitude and opposite in direction to the action force.

68. Which law is often referred to as the law of inertia?
a. Aristotle's law
b. Galileo's law
c. Newton's first law
d. Newton's second law

69. Which law is often referred to as the law of acceleration?
a. Aristotle's law
b. Galileo's law
c. Newton's first law
d. Newton's second law

70. Which law is often referred to as the law of action-reaction?
a. Galileo's law
b. Newton's first law
c. Newton's second law
d. Newton's third law

71. A force is applied to an object to get it to travel at a constant velocity on a frictionless horizontal surface. Which is the correct amount of force that would be needed on a second object that is half the mass of the original object to get it to move with the same velocity on the same surface?
a. twice the original force
b. four times the original force
c. one half the original force
d. one quarter the original force

72. Which force will result if a 225 gram mass is given an acceleration of 2.45 m/s^2?
a. 551 N
b. 0.551 N
c. 0.625 N
d. 0.918 N

73. Which force will result if a 3.25 kg mass is given an acceleration of 0.25 m/s^2?
a. 0.81 N
b. 0.20 N
c. 1.2 N
d. 13 N

74. The gate for a railway crossing will come down to block the road well in advance of the train reaching the crossing. Which is the correct reason this occurs?
a. The engineer cannot see trouble ahead to know that the train would have to stop.
b. The train cannot turn away from danger.
c. Due the large amount of inertia, the train would not be able to stop in time if there was an issue.
d. It is not possible to exactly determine how long it will take for the train to reach the crossing.

80. Objects that have a large quantity of momentum will take more force and longer to stop because
   a. the impulse needed to bring the object to rest is extremely large.
   b. all objects take a large force to stop.
   c. all objects take longer to stop when they are moving.
   d. once an object has momentum there is no way to decrease it without friction.

81. A 2.58 kg object is moving at 4.52 m/s. It has a momentum that is equal to
   a. 52.7 kg • m/s
   b. 11.7 kg • m/s
   c. 0.562 kg • m/s
   d. 1.78 kg • m/s

82. A 250 g ball is moving at 1.50 m/s. It has a momentum that is equal to
   a. 375 kg • m/s
   b. 167 kg • m/s
   c. 0.167 kg • m/s
   d. 0.375 kg • m/s

83. A 1490 kg vehicle is moving at 14.0 m/s. It has a momentum that is equal to
   a. 20 860 kg • m/s
   b. 10 430 kg • m/s
   c. 146 020 kg • m/s
   d. 29240 kg • m/s

84. Lauren is a 37.5 kg runner who jogs at a rate of 3.85 m/s. Her friend Lexi is a 43.2 kg runner who jogs at a rate of 3.65 m/s. Which statement regarding these two runners is correct?
   a. Lauren has the greater momentum.
   b. Lexi has the greater momentum.
   c. They both have the same amount of momentum.
   d. There is too much missing information to determine which has the greater momentum.

85. Which is the correct force needed to stop a 255 kg object travelling at 5.0 m/s in 5.0 s?
   a. 255 kg • m/s^2
   b. -255 kg • m/s^2
   c. 1275 kg • m/s^2
   d. -1275 kg • m/s^2

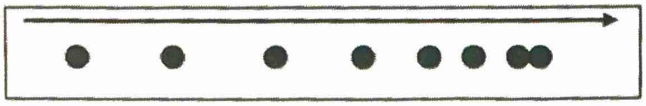
86. How much force is needed to stop a 400 kg object travelling at 5.0 m/s in 10.0 s?
   a. -200 kg • m/s^2
   b. 200 kg • m/s^2
   c. 1000 kg • m/s^2
   d. -1000 kg • m/s^2

87. Which statement is true with respect to momentum associated with two vehicles involved in a collision?
   a. The total momentum will be less after the collision.
   b. The total momentum will be greater after the collision.
   c. Momentum calculations would need to be taken to determine if momentum increased or decreased.
   d. The total momentum will be the same before and after the collision.

88. Which statement is correct with respect to the total energy before and after a collision?

a. The total energy will be the same before and after a collision.
b. The total energy will decrease after the collision.
c. The total energy will increase after the collision.
d. There is no way to anticipate a change in energy.

90. The ticker-tape sample below shows motion with ink dots on paper (each dot represents 1 second of time) —use the ink dots to infer the motion of a body; the body's motion is best described as



A. constant velocity
B. increasing acceleration
C. speeding up
D. slowing down

spaces getting smaller

Short Answer

1. A bear cub moves 20.0 m towards a small berry bush. If it takes the cub 5.5 seconds to cover this distance, how fast is the cub moving, in m/s?

$v = \frac{d}{t} = \frac{20}{5.5} =$ 3.6 m/s

2. A truck is travelling along a stretch of highway to a town. The truck starts from a point that has a sign indicating it is 205 km to the town. It takes the driver 1 hour and 15 minutes to get to the next distance sign, which reads 120 km to town. Assuming that velocity was constant over the entire interval, what was the velocity of the truck?

$v = \frac{\Delta d}{t} = \frac{205 - 120}{1.25} = \frac{85}{1.25} =$ 68 km/h

3. Paula drives 225 km in three hours. How fast is she travelling? Show all work.

$v = \frac{d}{t} = \frac{225}{3} =$ 75 km/h

4. At what velocity would a hawk have to fly to cover 14 km in 30 minutes? Show all work.

$v = \frac{d}{t} = \frac{14\ km}{0.5\ hr} =$ 28 km/h (0.5 hr)

5. In a recent lab activity, Simone collected data as a dynamics cart travelled along a horizontal surface. While she was working on the lab report, her little brother spilled juice on her data. She could only see two points, (5.4 s, 1.5 m) and (8.8 s, 6.7 m). Using these two data points, what value can she report as the velocity of the cart? Show all work.

$v = \frac{\Delta d}{\Delta t} = \frac{6.7 - 1.5}{8.8 - 5.4} = \frac{5.2}{3.4} =$ **1.5 m/s**

6. In a lab activity, two students stand at predetermined locations along a line that an object will be following as it travels with constant velocity. The first person is located 5.0 m from where the object will start and the second person is located 11.5 m from where the object will start. Person 1 measures that it takes the object 14.4 s to reach her location while Person 2 measures that it takes the object 17.9 s to reach his location. Based on the data collected, what is the velocity of the object? Show all work.

$v = \frac{\Delta d}{\Delta t} = \frac{11.5 - 5}{17.9 - 14.4} = \frac{6.5}{3.5} =$ **1.9 m/s**

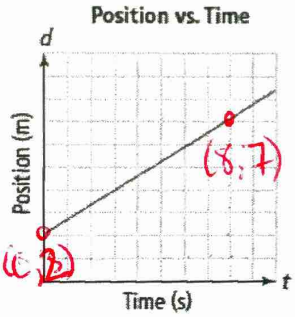
7. Which student is travelling faster: Jenny who covers 524 m in 58 seconds or Sanjay who covers 638 m in 67 seconds?

Jenny: $v = \frac{d}{t} = \frac{524}{58} =$ **9 m/s**

Sanjay: $v = \frac{d}{t} = \frac{638}{67} =$ **9.5 m/s**

SANJAY IS FASTER

8. Calculate the velocity of the object represented in the following graph, to three decimal places. The scale on each axis is 1.



$\text{SLOPE} = \frac{\text{RISE}}{\text{RUN}} = \frac{y_2 - y_1}{x_2 - x_1} = \frac{7 - 2}{8 - 0} = \frac{5}{8} =$ **0.625 m/s**

9. Two points on a distance/time graph are (3 s, 11 m) and (5 s, 19 m). Determine how long it would take this object to cover 1 km, if it travels at the same velocity shown on the graph of its motion.

Find velocity → $v = \frac{\Delta d}{\Delta t} = \frac{9 - 11}{5 - 3} = \frac{8}{2} =$ **4 m/s**

Find time → $t = \frac{d}{v} = \frac{1000}{4} =$ **250 s**

10. Describe an example of an object travelling at a constant velocity and an object travelling with a changing velocity. Include a representative graph for each object.

various answers... check with Ms. Kalyta!

11. How long will it take a cyclist travelling at 14 km/h to cover a distance of 45 km?

$t = \frac{d}{v} = \frac{45}{14} = 3.2\text{hr}$

12. If you were to travel at 8.4 m/s, how long would it take you to cover 225 m?

$t = \frac{d}{v} = \frac{225}{8.4} = 27\text{s}$

13. A snail can travel at 13.0 mm/s at top speed. If it was possible for the snail to maintain this speed, how many hours would it take to cover 1.00 km?

$t = \frac{d}{v} = \frac{1000}{13} = 76923\text{s}$

convert to hrs $\frac{76923}{3600} = 21.4\text{hr}$

14. Monique jogs at 2.8 m/s for 35 minutes while her brother Jason rider his motorcycle at 25 km/h for 10 minutes. Who will cover more distance? Show all work.

Monique:
$d = vt$
$= 2.8 \times 2100$
$= 5880\text{m}$ or 5.9km

Jason:
$d = vt$
$= 25 \times 0.16$
$= 4.16\text{ km}$

Monique covers more distance.

15. What distance would be covered by a baby crawling along the floor at 0.75 m/s for 4.0 seconds?

$d = vt$
$= 0.75 \times 4$
$= 3\text{m}$

16. How much distance would a snowmobile moving at 35 km/h cover in 90 minutes?

$d = vt$

$= 35 \times 1.5$

$= 52.5 \text{ km}$

17. What covers more distance: a bear travelling at 2.1 m/s for 25 minutes, or a motorcycle travelling at 24 km/h for 10 minutes?

Bear

$d = vt$

$= 2.1 \times 1500$

$= 3150 \text{ m}$ or 3.15 km

Motorcycle

$d = vt$

$= 24 \times 0.16$

$= 4 \text{ km}$

MOTORCYCLE COVERS MORE DISTANCE.

18. What is the acceleration, in m/s^2, of a truck that accelerates from rest to 25 km/h in 75 seconds?

$$a = \frac{\Delta v}{\Delta t} = \frac{6.94}{75} = 0.093 \text{ m/s}^2$$

19. What is the acceleration of a snowmobile that accelerates from 11.7 m/s to 18.8 m/s in 5.2 seconds?

$$a = \frac{\Delta v}{\Delta t} = \frac{18.8 - 11.7}{5.2} = \frac{7.1}{5.2} = 1.4 \text{ m/s}^2$$

20. A hockey puck slides along a smooth ice surface and comes to rest 7.5 seconds later. If it was initially moving at a velocity of 12.9 m/s, what was the acceleration that eventually brought it to rest?

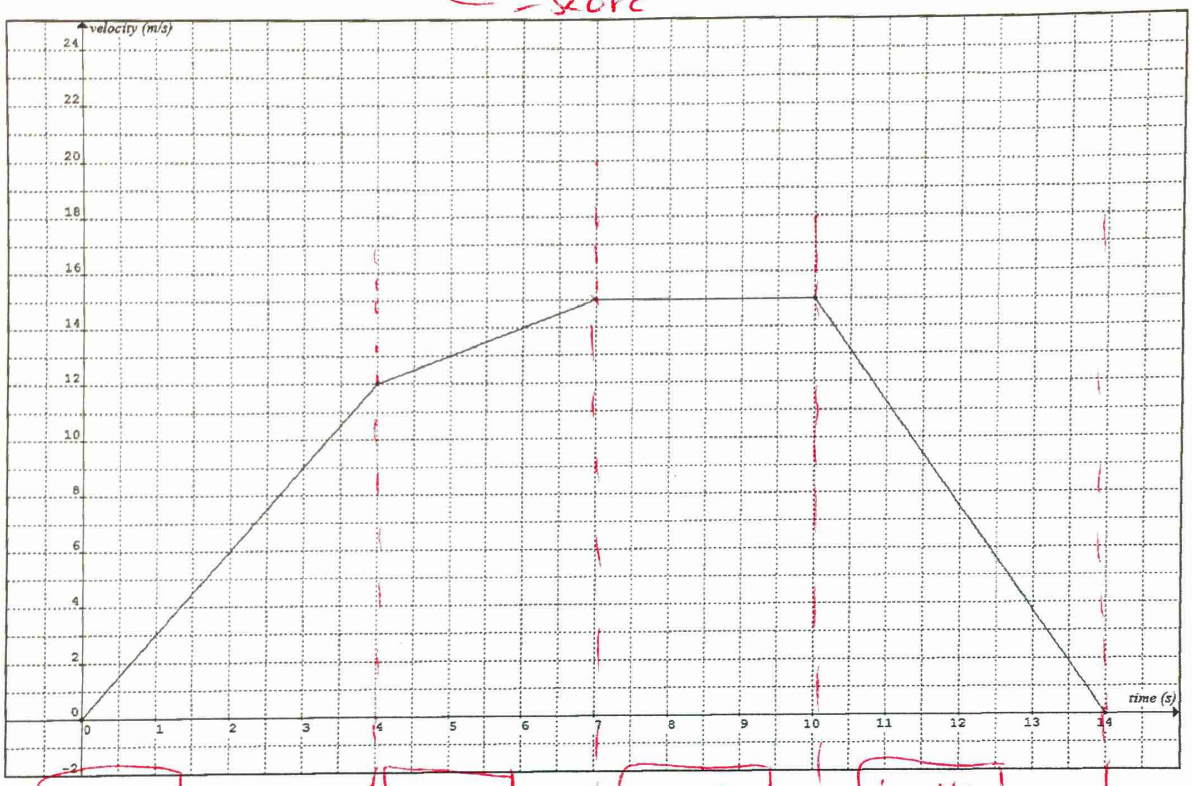
$$a = \frac{\Delta v}{\Delta t} = \frac{0 - 12.9}{7.5} = -1.72 \text{ m/s}^2$$

21. Determine the acceleration of an object that is travelling at 42.1 m/s at the 4.5 s mark and later is travelling at 14.7 m/s at the 11.8 s mark.

$a = \frac{\Delta v}{\Delta t} = \frac{14.7 - 42.1}{11.8 - 4.5} = \frac{-27.4}{7.3} = -3.75 \text{ m/s}^2$

22. For the graph given, determine the acceleration values in each interval of motion (or each line segment).

= slope



0-4s | 4-7s | 7-10s | 10-14s

$\frac{12-0}{4-0} = \frac{12}{4} = 3 \text{ m/s}^2$ | $\frac{15-12}{7-4} = \frac{3}{3} = 1 \text{ m/s}^2$ | 0 m/s^2 (horizontal = 0) | $\frac{0-15}{14-10} = \frac{-15}{4} = -3.8 \text{ m/s}^2$

23. State the effect of each change of variables from Newton's second law equation $F = ma$.

a) With a constant force, the mass doubles. acceleration in half

b) With a constant mass, the acceleration decreases to half of its original value. Force is reduced by half

c) With a constant force, the acceleration triples. mass reduced to a $\frac{1}{3}$ of original

24. In each pair, select the object with the larger inertia. Explain each answer.
    a) a truck or a motorbike both moving at the speed limit on a highway
    b) an adult sitting on a park bench or a small child running through the park
    c) a two dollar coin or a dime

a) Truck → more mass = more inertia

b) Adult → more mass = more inertia

c) two dollar coin → more mass = more inertia

30. Determine the amount of force you would need to push a 12.5 kg sled across a horizontal smooth ice surface to give it an acceleration of 1.25 m/s^2.

$F = ma$

$= 12.5 \times 1.25$

$= \boxed{15.6\,N}$

31. Determine the amount of force Bonnie used to push a 7.57 kg box across a horizontal smooth surface to give it an acceleration of 0.85 m/s^2.

$F = ma$

$= 7.57 \times 0.85$

$= \boxed{6.43\,N}$

32. An object was given a force of 26.0 N, which caused an acceleration of 4.52 m/s^2. What is the mass of this object?

$m = \frac{F}{a} = \frac{26}{4.52} = \boxed{5.75\,kg}$

33. A 407.3 kg object is acted upon by a 175.6 N force. What will be the acceleration of the object due to this force?

$a = \frac{F}{m} = \frac{175.6}{407.3} = \boxed{0.431\,m/s^2}$

34. A 23.0 kg small child is running at 1.75 m/s. What is the momentum of the child?

$p = mv$

$= 23 \times 1.75$

$= 40.3 \text{ kg} \cdot \text{m/s}$

35. A 1750 kg car is moving at 45 km/h. What is the momentum of the car?

$p = mv$

$= 1750 \times 45$

$= 78750 \text{ kg} \cdot \text{km/h}$

36. A 2624 kg car is rolling backwards at 0.180 m/s. What is the momentum of the vehicle?

$p = mv$

$= 2624 \times 0.18$

$= 472 \text{ kg} \cdot \text{m/s}$

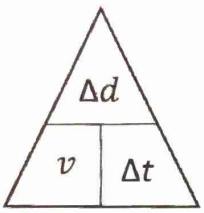
37. A 175 g dynamics cart is moving at 6.52 m/s during a science lab. What is the momentum of the cart?

$p = mv$

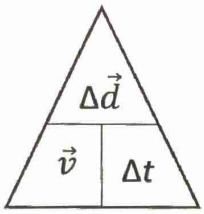
$= 0.175 \times 6.52$

$= 1.141 \text{ kg} \cdot \text{m/s}$

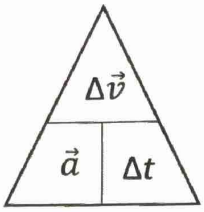
Formulas of Physics:



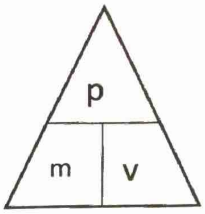
Speed: $v = \frac{\Delta d}{\Delta t}$



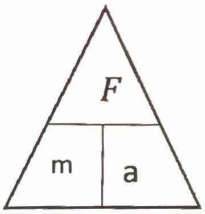
Velocity: $\vec{v} = \frac{\Delta \vec{d}}{\Delta t}$



Acceleration: $\vec{a} = \frac{\Delta \vec{v}}{\Delta t}$



Momentum: $\rho = mv$



Force: $F = ma$

$Intervals: \Delta = Final - Initial$ $\quad$ $Slope = \frac{rise}{run} = \frac{\Delta y}{\Delta x}$

$F = ma$ $\quad$ $F = m\left[\frac{\Delta v}{\Delta t}\right]$

Conversion Factors

1000 m = 1 km

100 cm = 1 m

10 mm = 1 cm

60 s = 1 min $\quad$ 60 min = 1 h $\quad$ 1000 g = 1 kg

$$m/s = \frac{km/h}{3.6} \qquad km/h = m/s \times 3.6$$