

Chapter 1 Linear Motion

Example Problems

1.4 Kinematics

E1. Super-monkey is flying at 14.5 m/s when he sees trouble and accelerates at a rate of 23.6 m/s² for 7.0 sec. What is Super-monkey's final velocity?

Record all givens, draw a picture, arrow all vectors, write the formula, substitute and solve

$a =$

$v_o =$

$v_f =$

$\Delta d =$

$t =$

a) _____ ← units

E2. Super-monkey is flying at 14.5 m/s when he slows to a new speed of 7.5 m/s in 3.5 seconds, how far does Super-monkey travel during this time period

Record all givens, draw a picture, arrow all vectors, write the formula, substitute and solve

$a =$

$v_o =$

$v_f =$

$\Delta d =$

$t =$

a) _____ ← units

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E3. An airplane starts from rest and accelerates at a constant 3.00 m/s^2 for 30.0 seconds before leaving the ground. What is the plane's displacement before it left the ground?

Record all givens, draw a picture, arrow all vectors, write the formula, substitute and solve

$a =$

$v_o =$

$v_f =$

$\Delta d =$

$t =$

a) _____ ← units

E4. A monkey is jogging along at 2.3 m/s when he speeds up uniformly at a rate of 4.2 m/s^2 in order to pass a gorilla up a head. If it takes 7 seconds from the time the monkey sees the gorilla until he passes the gorilla, how far did the monkey travel?

Record all givens, draw a picture, arrow all vectors, write the formula, substitute and solve

$a =$

$v_o =$

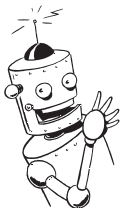
$v_f =$

$\Delta d =$

$t =$

a) _____ ← units

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E5. A monkey-mobile is traveling at 16 m/s when the driver steps on the gas causing the vehicle to accelerate uniformly at a rate of 1.3 m/s². Calculate the velocity of the vehicle after it has traveled 170 meters.

Record all givens, draw a picture, arrow all vectors, write the formula, substitute and solve

$a =$

$v_o =$

$v_f =$

$\Delta d =$

$t =$

a) _____ ← units

E6. A monkey is driving at a speed of 35 mph (15.65 m/s) when he sees a gorilla 100 m away in the middle of the road. What is the minimum acceleration that the car must undergo in order to stop the car in order to avoid hitting the gorilla?

Record all givens, draw a picture, arrow all vectors, write the formula, substitute and solve

$a =$

$v_o =$

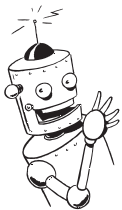
$v_f =$

$\Delta d =$

$t =$

a) _____ ← units

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E7. A car is traveling east when the driver applies the brakes slowing the car uniformly at a steady rate of 2.5 m/s^2 over a distance of 141 meters. Calculate the initial velocity of the car if the car's final velocity at the end of the 141 meters is 14 m/s .

Record all givens, draw a picture, arrow all vectors, write the formula, substitute and solve

$a =$

$v_o =$

$v_f =$

$\Delta d =$

$t =$

a) _____ ← units

E8. A monkey-mobile is traveling at 25 m/s when the driver sees an armadillo standing 37 meters up ahead in the middle of the road. The driver, a monkey, slams on the brakes slowing the vehicle to 11 m/s just before hitting the armadillo who jumps out of the way in the nick of time. Assuming the deceleration was uniform, calculate how long the monkey had his foot on the brake.

Record all givens, draw a picture, arrow all vectors, write the formula, substitute and solve

$a =$

$v_o =$

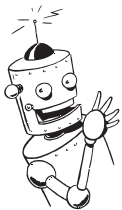
$v_f =$

$\Delta d =$

$t =$

a) _____ ← units

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Student Problems

1.4 Kinematics

1. A monkey starts at the top of a big hill traveling at 1.5 m/s on his skateboard. As he goes down the hill he accelerates at a rate of 0.75 m/s² until he reaches the bottom. How fast is the monkey going if it takes 15 seconds to reach the bottom of the hill?

Record all givens, draw a picture, arrow all vectors, write the formula, substitute and solve

$a =$

$v_o =$

$v_f =$

$\Delta d =$

$t =$

a) _____ ← units

2. A monkey is traveling at 55 mph (24.58 m/s) when he accelerates uniformly to a final velocity of 70 mph (31.29 m/s) in 14.7 seconds, calculate how far he travels.

Record all givens, draw a picture, arrow all vectors, write the formula, substitute and solve

$a =$

$v_o =$

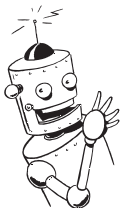
$v_f =$

$\Delta d =$

$t =$

a) _____ ← units

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3. A monkey is starting from rest on his scooter. He begins accelerating at a uniform rate at 1.90 m/s^2 . What is the monkey's velocity after he has traveled 45.72 m ?

Record all givens, draw a picture, arrow all vectors, write the formula, substitute and solve

$a =$

$v_o =$

$v_f =$

$\Delta d =$

$t =$

a) _____ ← units

4. A monkey-mobile (car) is traveling along with an initial velocity of 35 mph (15.65 m/s) when the monkey accelerates the vehicle for 8.0 seconds at a uniform rate of 1.6 m/s^2 . Calculate how far the vehicle travels during the 8.0 seconds .

Record all givens, draw a picture, arrow all vectors, write the formula, substitute and solve

$a =$

$v_o =$

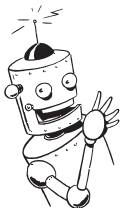
$v_f =$

$\Delta d =$

$t =$

a) _____ ← units

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5. A monkey-mobile (car) is traveling down the road at 15.3 m/s when the driver accelerates for 12 seconds reaching a final velocity 27.0 m/s. Calculate how far the car travels during the 12 seconds.

Record all givens, draw a picture, arrow all vectors, write the formula, substitute and solve

$a =$

$v_o =$

$v_f =$

$\Delta d =$

$t =$

a) _____ ← units

6. A monkey is coasting along on his skateboard with a speed of 4.3 m/s. The monkey reaches a slight uphill grade and begins to slow at a rate of 0.75 m/s², calculate how fast the monkey is traveling after 2.7 s.

Record all givens, draw a picture, arrow all vectors, write the formula, substitute and solve

$a =$

$v_o =$

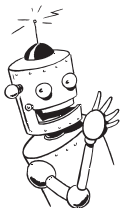
$v_f =$

$\Delta d =$

$t =$

a) _____ ← units

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7. A gorilla is out for a jog. The gorilla is initially jogging at a velocity of 5.0 m/s when he speeds up for 8 seconds uniformly at a rate of 0.25 m/s². Calculate how far the gorilla has travel during the 8 seconds.

Record all givens, draw a picture, arrow all vectors, write the formula, substitute and solve

$a =$

$v_o =$

$v_f =$

$\Delta d =$

$t =$

a) _____ ← units

8. Rickey Henderson, baseball's record holder for stolen bases, approaches third base. He dives into third base head first, hitting the ground at 6.75 m/s and reaching third base at a speed of 5.91 m/s. If the acceleration of the slide is -5.11 m/s², calculate the distance Rickey slides across the ground before touching third base.

Record all givens, draw a picture, arrow all vectors, write the formula, substitute and solve

$a =$

$v_o =$

$v_f =$

$\Delta d =$

$t =$

a) _____ ← units

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