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KE, GPE, Velocity, and Acceleration Quiz Review

Directions: Write the correct equation, plug in the values, and write the final answer with correct units. For velocity, include direction. Use **g = 9.8 m/s² for gravity**. Practice using a calculator please.

GPE = mass × gravity × height	**KE = ½ × mass × velocity²**
Acceleration = (final − initial velocity) ÷ time	**Velocity = displacement ÷ time**

GRAVITATIONAL POTENTIAL ENERGY (GPE) (Gravity equals 9.8 m/s²)

100 POINTS A 3 kg backpack is sitting on a shelf 4 meters above the ground. Calculate its gravitational potential energy.

a. Write your equation:

b. Plug in #s and solve with correct units:

200 POINTS An 8 kg bowling ball is lifted 6 meters above the ground. Calculate its gravitational potential energy.

a. Write your equation:

b. Plug in #s and solve with correct units:

300 POINTS A construction worker lifts a 12 kg box onto a platform 2.5 meters high. Calculate the box's gravitational potential energy.

a. Write your equation:

b. Plug in #s and solve with correct units:

400 POINTS A flowerpot on a balcony 5 meters above the ground has 350 joules of gravitational potential energy. What is its mass?

a. Write your equation:

b. Plug in #s and solve with correct units:

500 POINTS A crane lifts a 25 kg steel beam. When the beam has 2,000 joules of gravitational potential energy, how high above the ground is it?

a. Write your equation:

b. Plug in #s and solve with correct units:

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KINETIC ENERGY (KE)

100 POINTS Write the equation for kinetic energy.

a. Write your equation:

b. What does the small “2” in the equation tell you to do?

200 POINTS A 2 kg ball rolls at 4 m/s. Calculate its kinetic energy.

a. Write your equation:

b. Plug in #s and solve with correct units:

300 POINTS A 3 kg model vehicle travels at 8 m/s. How much kinetic energy does it have?

a. Write your equation:

b. Plug in #s and solve with correct units:

400 POINTS An object has 72 joules of kinetic energy while moving at 6 m/s. What is the object’s mass?

a. Write your equation:

b. Plug in #s and solve with correct units:

500 POINTS A 4 kg cart speeds up from 3 m/s to 6 m/s. By how many joules does its kinetic energy increase?

a. Write your equation:

b. Plug in #s and solve with correct units:

TIME CONVERSIONS

Reminder: *1 minute = 60 seconds* | 1 hour = 3,600 seconds

100 POINTS How many seconds are in 2 minutes?

200 POINTS How many seconds are in 3 hours?

300 POINTS A science experiment lasts 4.5 minutes. How many seconds does it last?

400 POINTS A road trip takes 0.25 hours. How many seconds is that?

500 POINTS A movie lasts 1 hour and 20 minutes. How many seconds is that altogether?

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ACCELERATION

100 POINTS Write the equation for acceleration using initial velocity, final velocity, and time.

a. Write your equation:

200 POINTS A cyclist starts at 0 m/s and reaches 12 m/s in 4 seconds. What is the cyclist's acceleration?

a. Write your equation:

b. Plug in #s and solve with correct units:

300 POINTS A skateboarder slows (decelerates) from 20 m/s to 8 m/s in 4 seconds. Calculate the skateboarder's acceleration (deceleration).

a. Write your equation:

b. Plug in #s and solve with correct units:

400 POINTS A skateboarder is traveling 3 m/s, then accelerates at 2.5 m/s^2 for 4 seconds. What is the skateboarder's final velocity?

a. Write your equation:

b. Plug in #s and solve with correct units:

500 POINTS A cyclist is moving 6 m/s and accelerates at 0.5 m/s^2 until reaching 36 m/s. **How long** does this take? Give your answer in seconds

a. Write your equation:

b. Plug in #s and solve with correct units:

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VELOCITY

Remember: **Displacement = Final position - Starting position**

100 POINTS Write the equation for velocity.

a. Write the equation for velocity:

b. What extra information must a velocity answer include compared with speed?

200 POINTS A student walks 40 meters east in 8 seconds. Calculate the student's velocity.

a. Write your equation:

b. Plug in #s and solve with correct units:

300 POINTS A runner moves 150 meters east in 2 minutes. What is the runner's velocity in m/s?

a. Write your equation:

b. Plug in #s and solve with correct units:

400 POINTS A robot moves east at a velocity of 6 m/s for 15 seconds. What is its displacement?

a. Write your equation:

b. Plug in #s and solve with correct units:

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500 POINTS A student walks 90 meters east and then 30 meters west. Their velocity for the whole trip is 0.5 m/s east. How long did the trip take? Give the time in seconds.

a. Write your equation:

b. Plug in #s and solve with correct units: