1. (1 pt) A steel ball weighing 128 pounds is suspended from a spring. This stretches the spring $\frac{128}{325}$ feet.

The ball is started in motion from the equilibrium position with a downward velocity of 5 feet per second.

The air resistance (in pounds) of the moving ball numerically equals 4 times its velocity (in feet per second) .

Suppose that after t seconds the ball is y feet below its rest position. Find y in terms of t. (Note that this means that the postiive direction for y is down.)

$y =$

Take as the gravitational acceleration 32 feet per second per second.

Correct Answers:

- `(0) *(exp((-1/2)*t))*(cos((9)*t)) + (5/9) *(exp((-1/2)*t))*(sin((9)*t))`

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2. (1 pt) A hollow steel ball weighing 4 pounds is suspended from a spring. This stretches the spring $\frac{1}{5}$ feet.

The ball is started in motion from the equilibrium position with a downward velocity of 5 feet per second. The air resistance (in pounds) of the moving ball numerically equals 4 times its velocity (in feet per second) .

Suppose that after t seconds the ball is y feet below its rest position. Find y in terms of t. (Note that the positive direction is down.)

Take as the gravitational acceleration 32 feet per second per second.

$y =$

Correct Answers:

- `(0 - 5 *sqrt(6) /48) *exp((-16 - 4 * sqrt(6))*t) + (0 + 5 *sqrt(6) /48) *exp((-16 + 4 * sqrt(6))*t)`

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3. (1 pt) This problem is an example of critically damped harmonic motion.

A hollow steel ball weighing 4 pounds is suspended from a spring. This stretches the spring $\frac{1}{8}$ feet.

The ball is started in motion from the equilibrium position with a downward velocity of 6 feet per second. The air resistance (in pounds) of the moving ball numerically equals 4 times its velocity (in feet per second) . Suppose that after t seconds the ball is y feet below its rest position. Find y in terms of t.

Take as the gravitational acceleration 32 feet per second per second. (Note that the positive y direction is down in this problem.)

$y =$

Correct Answers:

- `(0) *exp((-16)*t) + (6)*t *exp((-16)*t)`