

EXTRA PRACTICE — Exercises

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Unit VII – Relations of Rational Number Degree Part D – Problem-Solving with Relations Containing Radicals **Lesson 2 – “Formula” Problems**

Solve the following story problems using the given formula for each.

1. The resonant frequency “ f ” of a circuit with inductance L (in Henrys, H) and capacitance C (in Farads, F) is given by the formula: $f = \frac{1}{2\pi\sqrt{L \cdot C}}$

Find the resonant frequency of a circuit containing an inductance of 1.25×10^{-2} Henrys and a capacitance of 4×10^{-6} Farads.

2. The power P (in watts) of a circuit with total resistance R (in ohms) is related to the current I (in amperes) by the equation $P = I^2R$. What current will be produced in a circuit with a total resistance of 10 ohms if the power output is 1200 watts?

3. An object propelled horizontally at a velocity (V_o) from a height (h) will hit the ground $V_o \cdot \sqrt{\frac{h}{4 \cdot 9}}$ meters from its starting point if air resistance is neglected. How far will a baseball that is thrown horizontally at a speed of 40 meters/second from a height of 2.1 meters travel before hitting the ground?

4. The resonant frequency “ f ” of a string on a musical instrument is given by $f = \frac{1}{2L} \cdot \sqrt{\frac{10^5 \cdot F \cdot L}{m}}$, where L is the length of the string, F is the tension on the string, and m is the mass of the string. What is the frequency of the D-string on a violin if it has a length of 45 cm, a mass of 0.9 grams and is under a tension of 140 Newtons? (“ f ” is expressed in Hertz (Hz))

5. When an object is launched upward from the earth, the force of gravity acts to pull it back down. Whether or not it actually falls back down, however, depends on the velocity with which it is launched. Escape velocity can be calculated using the formula: $V_e = \sqrt{2gr}$ where g is the surface gravity of the planet and r is its radius. The radius of the earth is 6,380,000 meters. Its surface gravity is 9.8 meters/second². Find its escape velocity.

EXTRA PRACTICE — Answer Key

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Solve the following story problems using the given formula for each.

1. $f = 711.784$

2. 10.954

3. 26.186 meters

4. $f = 293.972$

5. $V_e = 11,182.486$