Name Key Date

Chapter 5 Application Practice Honors Algebra 2

1) The frequency, F, of a vibrating guitar string is directly proportional to the square root of the tension, T, on the string and inversely proportional to the length, L, of the string.

a) Write an equation to model the frequency of a guitar string.

$F = \frac{k\sqrt{T}}{L}$

$T = 4,\ L = 1$

b) If both the tension on the string and the length are doubled, what would happen to the frequency?

Increase by factor of $\sqrt{2}$

$\frac{F = k\sqrt{4}}{1} \Rightarrow F = k\sqrt{4}$

$F = \frac{k\sqrt{8}}{2} \Rightarrow 2F = k\sqrt{8}$ $F = 2\sqrt{2}k$

$\frac{2F}{2} = \frac{2\sqrt{2}k}{2}$

c) You want to modify your guitar so that you can play bass guitar. What are two ways to cut the frequency of a string in half?

Length doubled or cut tension by a factor of 4

$2F = \frac{k\sqrt{T}}{L} \div 2$

2) A solution is heated from 0°C to 100°C. Between 0°C and 50°C, the rate of temperature increase is 1.5°C/min. Between 50°C and 100°C, the rate of temperature increase is 0.4°C/min. What is the average rate of temperature increase during the entire heating process?

Avg. rate $= \frac{\Delta temp}{\Delta time} = \frac{100}{158.3} = .6$ °C/min

Time $= \frac{50}{1.5} + \frac{50}{.4} = 158.3$

3) Sharon invites the cheerleaders to support the school's dive team at their recent competition. The trip will cost $145 per person plus $1000 deposit.

a) Write a function to represent the cost of the trip per person.

$f(x) = \frac{1000}{x} + 145$

b) What is the cost per person if 5 cheerleaders go on the trip?

$345.00

7 cheerleaders go on the trip?

$287.90

10 cheerleaders go on the trip?

$245.00

c) What is the increased cost for each of 10 cheerleaders to go with the dive team rather than to go with the robotics team?

4) A glassblower can produce a set of simple glasses in about 2 h. When the glassblower works with an apprentice, the job takes about 1.5 h. How long would it take the apprentice to make a set of glasses when working alone?

Glassblower = $\frac{1}{2}$

G+A = 1.5 h

$\frac{1}{2}(1.5) + \frac{1}{x}(1.5) = 1$

$\frac{1.5}{2} + \frac{1.5}{x} = 1$

$x = 6$

5) Marcus and Will are painting a barn. Marcus paints about twice as fast as Will. On the first day, they have worked for 6 h and completed 1/3 of the job when Will gets injured. If Marcus has to complete the rest of the job by himself, about how many additional hours will it take him?

h = # hours for Marcus 2h = Will

$\left(\frac{2}{3}\right)(27) = 18$

$\frac{1}{h}(6) + \frac{1}{2h}(6) = \frac{1}{3}$

$\frac{6}{h} + \frac{6}{2h} = \frac{1}{3}$

$12 + 6 = \frac{2}{3}h$

$h = 27$