Page 65 Warm-Up

21. The frequency of vibration of a guitar string varies inversely with the length of the guitar string. Suppose a guitar string is 0.65 meters long, and vibrates 4.3 times per second. At what frequency would a string that is 0.5 meters long vibrate?

$y = \frac{k}{x}$ $f = \frac{k}{\ell}$ $\frac{4.3}{1} = \frac{k}{.65}$ $f = \frac{2.795}{.5}$

$k = 2.795$ ≈ 5.59 tps

f = frequency
k = constant
ℓ = length

22. The amount of calories a person burns varies directly with the amount of miles that they run. Sonya ran 2 miles on a treadmill. The display reported that she burned 220 calories. She wants to treat herself with a hot fudge sundae after her workout. A hot fudge sundae has 380 calories. How far does Sonya have to run to burn off that many calories?

$y = kx$ $C = k(m)$ $\frac{220}{2} = \frac{k(2)}{2}$ $k = 110$ $\frac{380}{110} = \frac{110m}{110}$

≈ 3.45 miles

C = calories burnt
m = miles ran

23. The current in a simple electrical circuit is inversely proportional to the resistance. If the current is 80 amps when the resistance is 50 ohms, find the current when the resistance is 22 ohms.

$y = \frac{k}{x}$ $C = \frac{k}{r}$ $\frac{80}{1} = \frac{k}{50}$ $4000 = k$ $C = \frac{4000}{22}$

181.81 amps

C = current r = resistance

24. The amount of money you earn varies directly with amount of time that you work. If you work 6.5 hours, you will make $66.95. If you made $97.85, how many hours did you work?

$y = kx$ $m = kt$ $\frac{66.95}{6.5} = \frac{k(6.5)}{6.5}$ $10.30 = k$ $\frac{97.85}{10.3} = \frac{10.3t}{10.3}$

m = money
t = time

$10.30

9.5 hours

Developed by CHCCS and WCPSS
http://www.mesacc.edu/~scotz47781/mat120/notes/variation/inverse/inverse_practice.html

GO!

$$\frac{-b \pm \sqrt{(b)^2-4ac}}{2a}$$

Topic: Solve quadratic equations.

11. $x^2 - 5x + 10 = 0$

$\frac{5 \pm \sqrt{25-4(1)(10)}}{2}$

$\frac{5 \pm \sqrt{-15}}{2}$ $\frac{5 \pm i\sqrt{15}}{2}$

12. $-2x^2 + 4x + 6 = 15$

$-15 \quad -15$

$-2x^2+4x-9=0$

$\frac{-4 \pm \sqrt{(4)^2-4(-2)(-9)}}{2(-2)}$

$2|56$, $2|28$, $2|14$, 7

$\frac{-4 \pm \sqrt{-56}}{-4}$ $\frac{-4 \pm 2i\sqrt{14}}{-4} = \frac{-2 \pm i\sqrt{14}}{-2}$

13. $x^2 + 4x + 2 = 0$

$A=1 \quad B=4 \quad C=2$

$\frac{-4 \pm \sqrt{(4)^2-4(1)(2)}}{2(1)}$

$2|8$, $2|4$, 2

$\frac{-4 \pm \sqrt{8}}{2}$ $\frac{-4 \pm 2\sqrt{2}}{2} = -2 \pm \sqrt{2}$

14. $5x^2 - 5x + 2 = 3x^2 - 3x$

$-3x^2+3x \quad -3x^2+3x$

$2x^2-2x+2=0$

$= \frac{1 \pm i\sqrt{3}}{2}$

$\frac{2 \pm \sqrt{4-4(2)(2)}}{4}$

$2|12$, $2|6$, 3

$\frac{2 \pm \sqrt{-12}}{4}$ $\frac{2 \pm 2i\sqrt{3}}{4}$

15. $3x - 2 = 5x^2$

$-3x+2 \quad -3x+2$

$0 = 5x^2-3x+2$

$\frac{3 \pm \sqrt{9-4(5)(2)}}{10}$

$\frac{3 \pm \sqrt{-31}}{10}$ $\frac{3 \pm i\sqrt{31}}{10}$

16. $7 - 8x^2 = 6x + 16$

$-7+8x^2 \quad -7+8x^2$

$0 = 8x^2+6x+9$

$A=8 \quad B=6 \quad C=9$

$2|252$, $2|126$, $3|63$, $7|21$, 3

$\frac{-6 \pm \sqrt{(6)^2-4(8)(9)}}{2(8)}$

$\frac{-6 \pm \sqrt{-252}}{16}$ $\frac{-6 \pm 6i\sqrt{7}}{16}$ $\frac{-3 \pm 3i\sqrt{7}}{8}$

4. Substitute the solutions back into the functions to see if the outputs are elements in the range of each function.

$f(x) = x - 1$	$g(x) = \sqrt{2x + 6}$

5. Are all of the outputs elements in the range of both functions? Explain why or why not.

6. If the square root function was reflected over the x-axis, so that it's equation was $h(x) = -\sqrt{2x + 6}$, what would be the solution to the equation $x - 1 = -\sqrt{2(x + 3)}$?

76-77 #7-13

Solve the following equations algebraically. Be sure to check for extraneous solutions.

7) $\frac{2}{x} = 3x + 5$

8) $2x + 3 = \frac{5}{x}$

9) $\frac{6}{x} = 9 - 3x$

1) 2 intersection

10) $4x - 7 = \frac{2}{x}$

11) $\frac{3}{5}x + 5 = \sqrt{2x - 1} + 5$

12) $4x - 2 = \sqrt{x + 3}$

13) $\sqrt{4x} = -2x + 4$

14) $0.5x - 8 = 2 - 2\sqrt{x + 1}$

15) $x - 7 = -\sqrt{4x - 8}$