Name: _____ Student #:_____

Date:_____ T.A. #:_____

# Mathematics 12 Pre-Calculus
# LEARNING GUIDE 4 TEST – RADICAL FUNCTIONS

**/17**

***Full marks will NOT be given for the final answer only.**

When using a calculator, you should provide a decimal answer that is correct **to at least two decimal places** (unless otherwise indicated). Such rounding should occur **only** in the final step of the solution.

1. What transformations need to be made to the function $y = \sqrt{x}$ to obtain the graph of the function $y = 3\sqrt{-(x+2)} + 5$? (2 marks)

VE BAFO 3
REFLECTION y AXIS
LEFT 2
UP 5

2. Determine the equation of each radical function, which has been transformed from $f(x) = \sqrt{x}$ by a reflection in the y axis, a vertical expansion by a factor of 3, moved right 3 and down 4. (2 marks)

$f(x) = 3\sqrt{-(x-3)} - 4$

**/4**

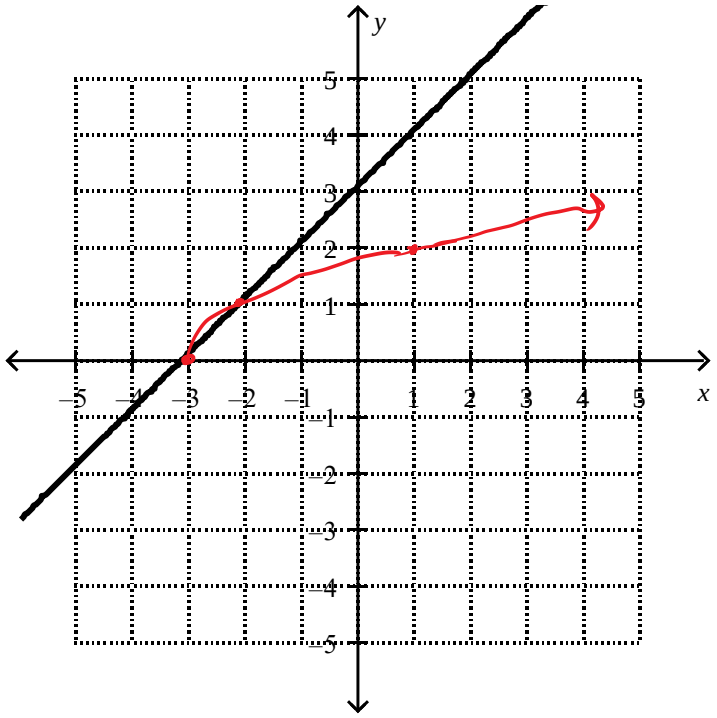
3. Determine the domain and range of the following function: (2 marks)

$f(x) = \sqrt{-2x} + 3$

D: $x \leq 0$

R: $y \geq 3$

4. Using each graph of $y = f(x)$, sketch the graph of $y = \sqrt{f(x)}$. (2 marks)




/4

5. Given the function $f(x) = 8 - x^2$, identify and explain any differences in the domains and ranges of $y = f(x)$ and $y = \sqrt{f(x)}$. (2 marks)

$f(x)$

D: $x \in R$

R: $y \leq 8$

$y = \sqrt{f(x)}$

D: $-2\sqrt{2} \leq x \leq 2\sqrt{2}$ $\quad f(x) \geq 0$

R: $0 \leq y \leq 2\sqrt{2}$

6. Solve the equation $x + 6 = \sqrt{-6 - x}$ algebraically. (2 marks)

$(x+6)^2 = -6 - x$

$x^2 + 12x + 36 = -6 - x$

$x^2 + 13x + 42 = 0$

$(x+7)(x+6) = 0$

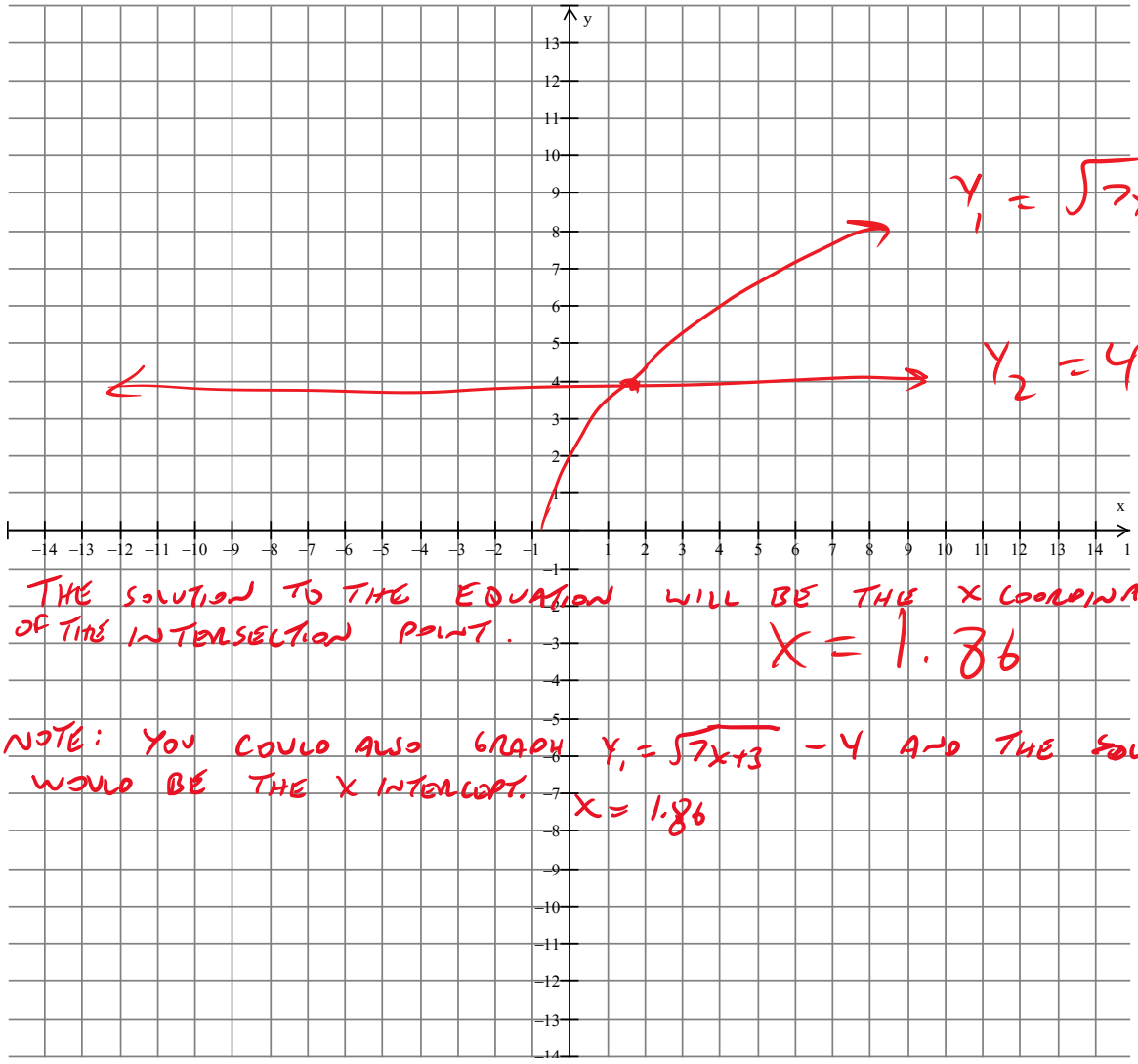
$x = -7, -6$

DOESN'T WORK.

$x = -6$

/4

7. Solve the equation $\sqrt{7x+3} = 4$ graphically. (2 marks)




THE SOLUTION TO THE EQUATION WILL BE THE X COORDINATE OF THE INTERSECTION POINT.

$X = 1.86$

* NOTE: YOU COULD ALSO GRAPH $Y_1 = \sqrt{7x+3} - 4$ AND THE SOLUTION WOULD BE THE X INTERCEPT.

$X = 1.86$

/2

8. The speed, *s*, in metres per second, of sound in dry air is can be described by the function $s = 331.3\sqrt{1 + \frac{T}{273.15}}$, where *T* is temperature, in degrees Celsius.

**a)** Determine the speed of sound, to the nearest tenth of a metre per second, when the temperature is –8°C. (1 mark)

$S = 331.3\sqrt{1 + \frac{-8}{273.15}}$

$= 326.4$ m/s

**b)** If the speed of sound is 355m/s, what is the air temperature? (2 marks)

40.49°C EITHER BY GRAPHING OR ALGEBRAICALLY

/3