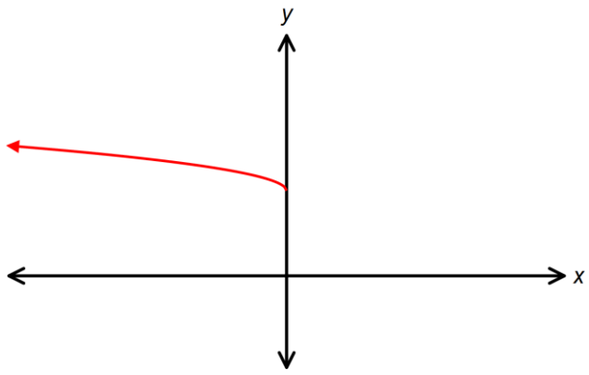
Mathematics 3200 Sample Test
Radical Functions

Part A: Selected Response: Place the letter of the correct response in the space provided. (8 marks)

1. Which function best represents the graph shown below? 1.____



A) $y = -\sqrt{x} - 4$

B) $y = -\sqrt{x} + 4$

C) $y = \sqrt{-x} - 4$

D) $y = \sqrt{-x} + 4$

2. The graph of the function $y = \sqrt{x}$ is stretched horizontally by a factor of 4 and translated 2 units left. What is the domain of the transformed function? 2.____

A) $x \mid x \geq -2, x \varepsilon R$ (B) $x \mid x \leq -2, x \varepsilon R$

(C) $x \mid x \geq 2, x \varepsilon R$ (D) $x \mid x \leq 2, x \varepsilon R$

3. If $f(x) = x + 1$, which point is on the graph of $y = \sqrt{f(x)}$? 3.____

(A) (0,0) (B) (0,1)

(C) (1,0) (D) (1,1)

4. Which function has a range of $y \mid y \leq 0, y \varepsilon R$? 4.____

A) $y = -\sqrt{x-3}$

B) $y = \sqrt{-x} - 3$

C) $y = \sqrt{-(x-3)}$

D) $y = -\sqrt{x} - 3$

5. Which are all of the invariant points for the graphs of $f(x) = 4x^2 + 3x$ and $y = \sqrt{f(x)}$? 5.____

A) $(1, 1), (\frac{3}{4}, 0), (0, 0), (-\frac{1}{4}, 1)$,

B) $(-1, 1), (\frac{3}{4}, 0), (0, 0), (-\frac{1}{4}, 1)$

C) $(1, 1), (-\frac{3}{4}, 0), (0, 0), (\frac{1}{4}, 1)$

D) $(-1, 1), (-\frac{3}{4}, 0), (0, 0), (\frac{1}{4}, 1)$

6. Which is the mapping rule that maps $y = \sqrt{x}$ onto $y = -4\sqrt{x+3} - 2$? 6. ____

A) $(x, y) \rightarrow (x-3, -4y-2)$

B) $(x, y) \rightarrow (x-3, -\frac{1}{4}y+2)$

C) $(x, y) \rightarrow (x+3, -4y-2)$

D) $(x, y) \rightarrow (x+3, -\frac{1}{4}y+2)$

7. If $y = \sqrt{x}$ is stretched horizontally by a factor of 4, which function results? 7.____

A) $y = \frac{1}{4}\sqrt{x}$

B) $y = 4\sqrt{x}$

C) $y = \sqrt{4x}$

D) $y = \sqrt{\frac{1}{4}x}$

8. What is the domain for $f(x) = \sqrt{6-3x}$? 8.____

(A) $\{x | x \leq 2, x \in R\}$ (B) $\{\{x | x \geq 2, x \in R\}$

(C) $\{x | x \leq 3, x \in R\}$ (D) $\{x | x \geq 3, x \in R\}\}$

Part B: Constructed Response: Show workings to all problems.

/2 9. Write the radical function that results from applying the following set of transformations to the graph $y = \sqrt{x}$:

- ✓ vertical stretch by a factor of 5
- ✓ horizontal stretch by a factor of $\frac{1}{2}$
- ✓ reflection in x- axis
- ✓ translation 5 units to the right.

/5 10. (i) Write the mapping rule that maps $y = \sqrt{x}$ onto the function $y = 3\sqrt{-2(x-4)} + 1$.

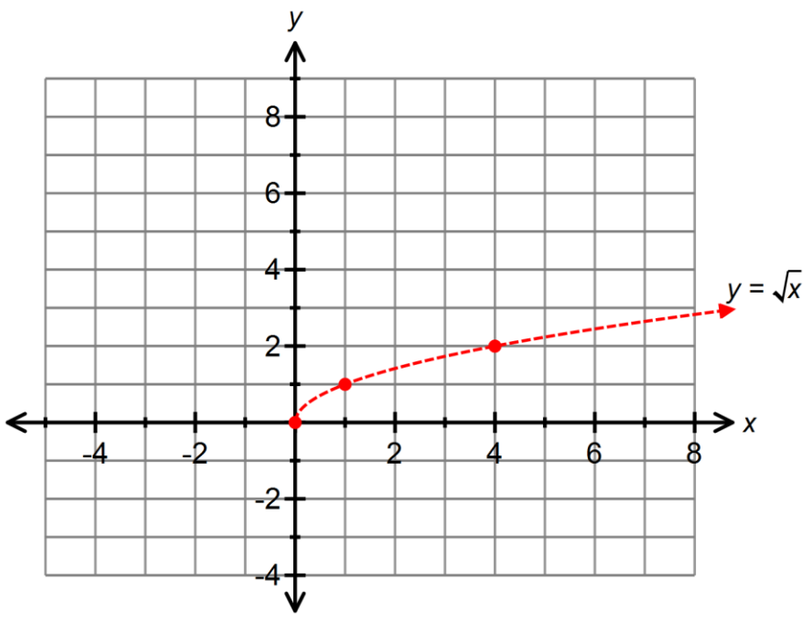
(ii) State the domain and range of the transformed function.

(iii) Sketch the graph on the grid provided, showing the image points for those shown on the graph of $y = \sqrt{x}$.

Mapping Rule: _____

Domain: _____

Range: _____

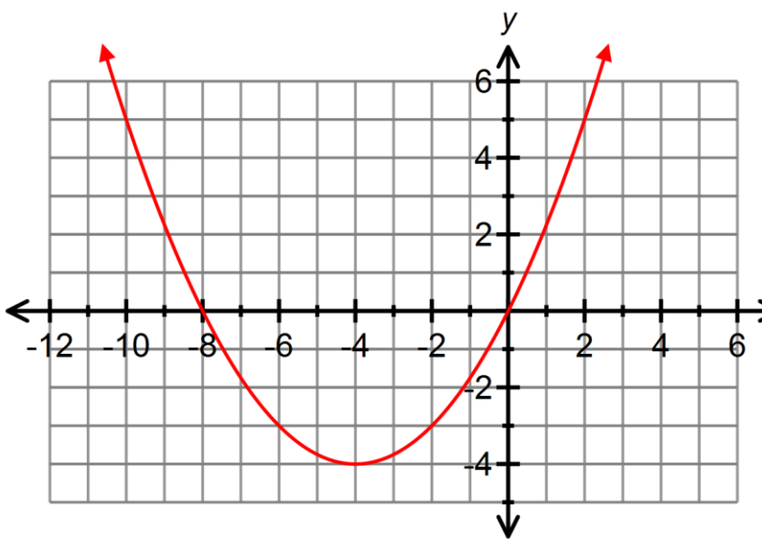


/5 11. The graph of $y = f(x)$ is shown. On the same grid, sketch the graph of the function $y = \sqrt{f(x)}$, including all invariant points. State the domain and range of $y = \sqrt{f(x)}$.

Domain:_____

Range:_____

Invariant points:_____



/3 12. Determine the domain and range of $y = \sqrt{-2(x-1)^2 + 8}$. Show algebraic workings.

/4 13. Determine the approximate solution to each equation graphically $\sqrt{-2x^2 + 9} = 3 - x$
Verify your answer algebraically.