

Math 01B: Quiz 3

12 April 2024

Name: Answer Key

This is the third quiz. There are 10 questions. Each is worth 10 points, for a total of 100.

At the end of the quiz are 1 make-up question for quiz 1 and 3 make-up questions for quiz 2. You do not have to do them if you are happy with your previous quiz grades. If you do any of make-up questions, I'll grade them and use them to replace your lowest-scored questions from the corresponding quiz.

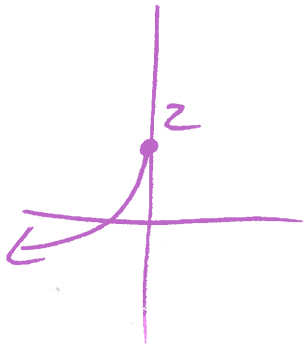
Carefully read each question and understand what is being asked before you start to solve the problem. Please show your work in an orderly fashion, and circle or mark in some way your final answers.

No calculators nor other electronic devices are allowed.

When you are finished, turn in both your exam and your index card with notes.

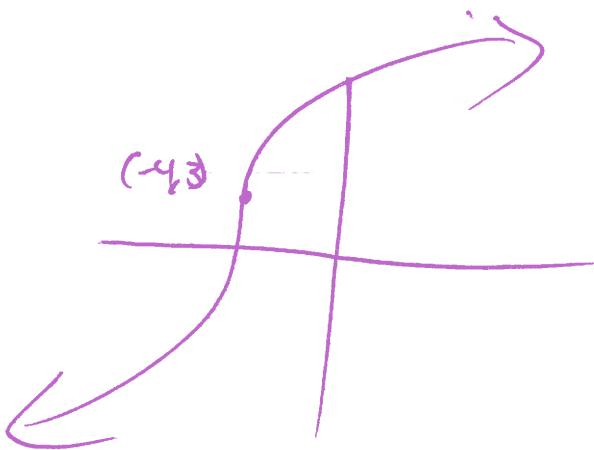
1		6	
2		7	
3		8	
4		9	
5		10	

1. Sketch a graph of $y = 2 - \sqrt{-x}$, identifying the corner of the graph. What are the domain and range?



dom: $x \leq 0$
ran: $y \leq 2$

2. Sketch a graph of $y = \sqrt[3]{x+4} + 3$, identifying the inflection point of the graph. What are the domain and range?



dom: all real #s
ran: all real #s

3. Solve the equation

$$2 - \sqrt[3]{x} = 1.$$

$$-\sqrt[3]{x} = -1$$

$$\sqrt[3]{x} = 1$$

$$x = 1^3$$

$$\underline{x = 1}$$

4. Solve the following simultaneous pair of equations:

$$y = 3x^2 - 2x + 1$$

$$-(y = x + 7)$$

$$0 = 3x^2 - 3x - 6$$

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

$$0 = (x-2)(x+1)$$

$$x = -1, 2$$

$$x = -1: y = 6$$

$$x = 2: y = 9$$

$$\underline{(-1, 6), (2, 9)}$$

5. Why do the following two curves not intersect? Justify your answer with a calculation.

$$\begin{array}{l} y = x^2 \\ -(y = x - 4) \end{array}$$

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

$$b^2 - 4ac = 1 - 4 \cdot 1 \cdot 4 = -15$$

No solution because ~~discriminant~~ < 0
discriminant

6. Solve $2\sqrt{2x-1} = 6$.

$$\sqrt{2x-1} = 3$$

$$2x-1 = 9$$

$$2x = 10$$

$$\underline{x = 5}$$

$$\text{check: } 2\sqrt{2x-1}$$

$$= 2\sqrt{9}$$

$$= 2 \cdot 3$$

$$= 6 \checkmark$$

7. Solve

$$\sqrt{4x-1} = \sqrt{9-x}$$

$$4x-1=9-x$$

$$5x=10$$

$$\underline{x=2}$$

check;

$$\text{LHS: } \sqrt{8-1} = \sqrt{7} \quad \checkmark$$

$$\text{RHS: } \sqrt{9-2} = \sqrt{7}$$

8. What is the domain of the following function?

$$y = \sqrt{18-4x}$$

$$18-4x \geq 0$$

$$-4x \geq -18$$

$$x \leq \frac{-18}{-4} = \frac{9}{2}$$

$$\underline{x \leq \frac{9}{2}}$$

9. Solve $y = 3x - 2$ for x .

$$y + 2 = 3x$$

$$\frac{y+2}{3} = x$$

10. Find the inverse of $b(x) = (x - 1)^3 + 2$.

$$y = (x - 1)^3 + 2$$

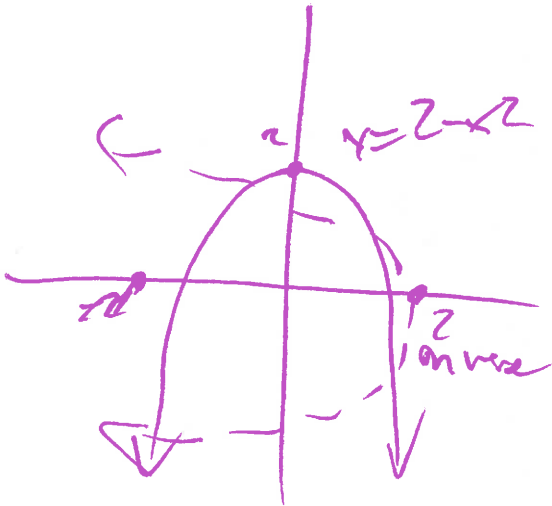
$$y - 2 = (x - 1)^3$$

$$\sqrt[3]{y - 2} = x - 1$$

$$1 + \sqrt[3]{y - 2} = x$$

$$b^{-1}(x) = 1 + \sqrt[3]{x - 2}$$

11. Extra credit (up to +5): Sketch graphs of the function $y = 2 - x^2$ and its inverse. Is the inverse a function? Explain why or why not.



inverse is not
a function because
it fails the vertical
line test

Quiz 1 make-up question

1	
---	--

1. Is the following function even, odd, or neither? Justify your answer with a calculation.

$$f(x) = 2x^2 + 4$$

$$f(-x) = 2(-x)^2 + 4$$

$$= 2x^2 + 4$$

$$= f(x)$$

even

Quiz 2 make-up questions

1		2		3	
---	--	---	--	---	--

1. Simplify the following expression. Your answer should have no perfect cubes inside the cube root.

$$\sqrt[3]{3^3 a^2 b x^7 y^{300}}$$

$$\sqrt[3]{3^3 x^6 y^{300}} \cdot \sqrt[3]{a^2 b x}$$

$$= 3x^2 y^{100} \sqrt[3]{a^2 b x}$$

Quiz 2 make-up questions

2. Solve the following equation by completing the square. You will not get points if you use another method.

$$x^2 - 2x = 8$$

$$x^2 - 2x + 1 = 8 + 1$$

$$(x-1)^2 = 9$$

$$x-1 = \pm 3$$

$$x = 1 \pm 3$$

$$x = -2, 4$$

3. Solve the following equation by completing the square. You do not need to simplify square roots. You will not get points if you use another method.

$$3x^2 + 3 = 12x$$

$$x^2 + 1 = 4x$$

$$x^2 - 4x = -1$$

$$x^2 - 4x + 4 = -1 + 4$$

$$(x-2)^2 = 3$$

$$x-2 = \pm\sqrt{3}$$

$$x = 2 \pm \sqrt{3}$$

(Extra space. Label which question the work is for.)