

Math 01B: Quiz 2

15 February 2024

Name: Answer Key

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

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

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. Simplify the following expression. Your final answer should have no perfect squares inside the square root.

$$\sqrt{8400}$$

Here's the prime factorization of 8400:

$$8400 = 2^4 \times 3 \times 5^2 \times 7 = 2 \times 2 \times 2 \times 2 \times 3 \times 5 \times 5 \times 7$$

$$\begin{aligned} \sqrt{2^4 \cdot 3 \cdot 5^2 \cdot 7} &= \sqrt{2^4 \cdot 5^2} \cdot \sqrt{3 \cdot 7} \\ &= 2^2 \cdot 5 \sqrt{21} \\ &= \underline{20\sqrt{21}} \end{aligned}$$

2. Rewrite the following expression to have no square roots in the denominator.

$$-\frac{2}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \underline{-\frac{2\sqrt{3}}{3}}$$

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

$$\sqrt[3]{2^5 3^3 a^2 x^6 y^{30} z^7}$$

$$\begin{aligned} &= \sqrt[3]{2^3 \cdot 3^3 \cdot x^6 \cdot y^{30} \cdot z^6} \cdot \sqrt[3]{2^2 \cdot a^2 \cdot z} \\ &= 2 \cdot 3 \cdot x^2 \cdot y^{10} \cdot z^2 \cdot \sqrt[3]{4a^2z} = \underline{6x^2y^{10}z^2 \cdot \sqrt[3]{4a^2z}} \end{aligned}$$

4. Solve the following equation. You do not need to simplify square roots.

$$x^2 = 17$$

$$x = \pm\sqrt{17}$$

5. Solve the following equation. Fully simplify all square roots.

$$(2x - 1)^2 + 1 = 10$$

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

$$2x - 1 = \pm\sqrt{9} = \pm 3$$

$$2x = 1 \pm 3$$

$$x = \frac{1 \pm 3}{2}$$

$$x = \frac{1+3}{2} \text{ or } \frac{1-3}{2}$$

$$= \frac{4}{2} \text{ or } \frac{-2}{2}$$

$$x = 2 \text{ or } -1$$

6. How many solutions are there to the following equation? Justify your answer with a calculation.

$$2x^2 - 5x + 4 = 0$$

$$b^2 - 4ac = 25 - 4 \cdot 2 \cdot 4$$

$$= 25 - 32$$

$$= -7$$

0 solutions

7. 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.

$$x^2 - 4x = 5$$

$$x^2 - 4x + 4 = 5 + 4$$

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

$$x-2 = \pm\sqrt{9} = \pm 3$$

$$x = 2 \pm 3$$

$$\underline{x = -1, 5}$$

8. 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.

$$2x^2 = 6x + 1$$

$$2x^2 - 6x = 1$$

$$x^2 - 3x = \frac{1}{2}$$

$$x^2 - 3x + \left(-\frac{3}{2}\right)^2 = \frac{1}{2} + \left(-\frac{3}{2}\right)^2$$

$$\left(x - \frac{3}{2}\right)^2 = \frac{1}{2} + \frac{9}{4} = \frac{11}{4}$$

$$x - \frac{3}{2} = \pm\sqrt{\frac{11}{4}}$$

$$= \pm\frac{\sqrt{11}}{2}$$

$$x = \frac{3}{2} \pm \frac{\sqrt{11}}{2}$$

$$\underline{x = \frac{3 \pm \sqrt{11}}{2}}$$

11. Extra credit (up to +5): Explain why the quadratic formula is a valid method to solve a quadratic equation. You do not need to go through every detail, but give a sketch of why it gives the correct answer.

do completing the square on

$$ax^2 + bx + c = 0, \text{ you}$$

get the quadratic formula.

Since completing the square gives
the correct solution, so too does
this formula

9. Solve the following equation by using the quadratic formula. You do not need to simplify square roots. You will not get points if you use another method.

$$2x^2 = 6x + 1$$

$$2x^2 - 6x - 1 = 0$$

$$\begin{aligned} b^2 - 4ac &= 36 - 4 \cdot 2 \cdot (-1) \\ &= 36 + 8 \\ &= 44 \end{aligned}$$

~~$$x = \frac{6 \pm \sqrt{44}}{4}$$~~

$$x = \frac{6 \pm \sqrt{44}}{4}$$

10. Solve the following equation using the method of your choice. You do not need to simplify square roots.

$$x^2 - 2x - 8 = 0$$

$$(x - 4)(x + 2) = 0$$

$$\underline{x = -2, 4}$$

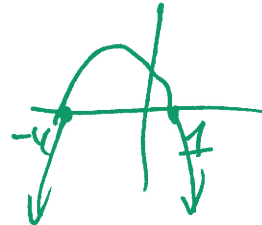
Quiz 1 make-up questions

1		2		3	
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1. Find the x-intercepts of the following quadratic function. Sketch a graph.

$$y = -2(x - 1)(x + 4)$$

x-ints $x = -4, 1$



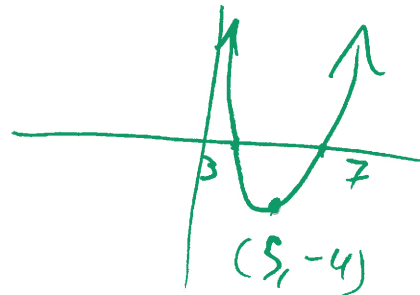
2. Find the vertex of the following function. Sketch a graph.

$$y = (x - 3)(x - 7)$$

x-ints $x = 3, 7$

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

$$\begin{aligned} y &= (5-3)(5-7) \\ &= 2(-2) \\ &= -4 \end{aligned}$$



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

$$f(x) = 3x^3 - \sqrt[3]{x}$$

$$\begin{aligned} f(-x) &= 3(-x)^3 - \sqrt[3]{-x} \\ &= -3x^3 + \sqrt[3]{x} \end{aligned}$$

~~$f(x)$~~
is odd

$$\begin{aligned} &= -(3x^3 - \sqrt[3]{x}) \\ &= -f(x) \end{aligned}$$

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