

Math 99 - Final Exam - Part 1

Version A - Fall 2018

All problems are worth 5 points. For full credit, **show all steps**, using correct notation. In case of word problems, you must set up and solve an equation or a system of equations; trial and error will get you a maximum of 1 point.

1. Simplify the given expression. $(2x - 3)^2 - (x - 1)(3x + 1)$

2. Perform the indicated operations and simplify. Use exact values. $(3\sqrt{2} - 1)^2$

3. Perform the indicated operations and simplify. Use exact values. Assume that all variables represent positive numbers. $\sqrt[3]{\frac{a^5b^{-2}}{a^{-4}b^4}}$

4. Compute the sum $139 + 145 + 151 + \dots + 289$

5. Solve the given equation over the complex numbers. Use exact values.

$$x^2 = 2x + 2$$

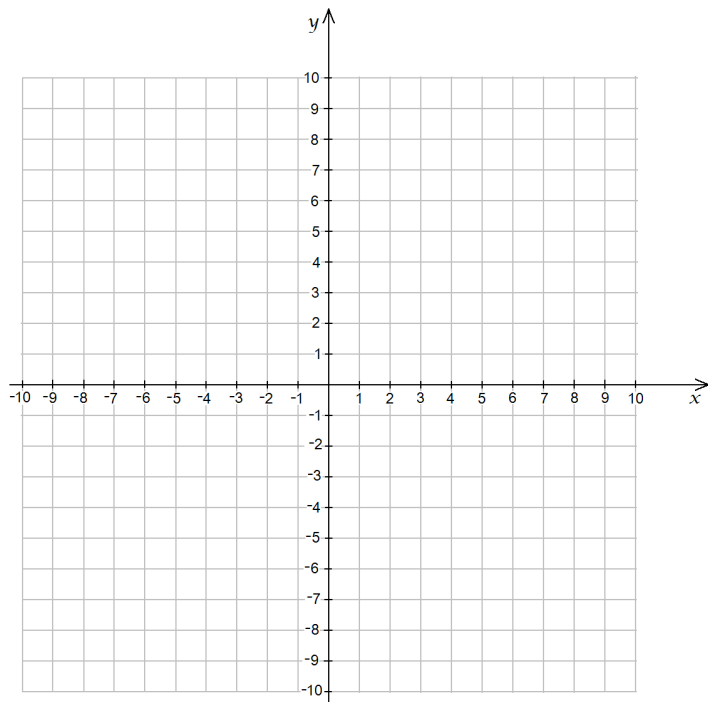
6. Solve the given compound inequality. Present your answer using interval notation.

$$\frac{2}{3}x - 1 \geq -3 \quad \text{or} \quad 5(x - 2) < -2x + 4$$

7. Solve the given equation over the real numbers. Use exact values.

$$\frac{x}{x+1} - \frac{3}{x-7} = \frac{-3x+5}{x^2-6x-7}$$

8. Sketch the graph of the function $f(x) = -2x^2 + 12x - 10$. Show all relevant computations.



9. Compute the perimeter of the triangle determined by $A(-1, 7)$, $B(-1, 3)$, and $C(3, 3)$. Use exact values.

10. We have a jar of coins, all quarters and dimes. All together, we have 289 coins, and the total value of all coins in the jar is \$54.55. How many quarters are there in the jar?

Answers

1. Simplify the given expression. $(2x - 3)^2 - (x - 1)(3x + 1) = x^2 - 10x + 10$
2. Perform the indicated operations and simplify. Use exact values. $(3\sqrt{2} - 1)^2 = 19 - 6\sqrt{2}$
3. Perform the indicated operations and simplify. Use exact values. Assume that all variables represent positive numbers. $\sqrt[3]{\frac{a^5 b^{-2}}{a^{-4} b^4}} = \frac{a^3}{b^2}$
4. Compute the sum $139 + 145 + 151 + \dots + 289$ 5564
5. Solve the given equation over the complex numbers. Use exact values.

$$x^2 = 2x + 2$$

$$1 \pm \sqrt{3}$$

6. Solve the given compound inequality. Present your answer using interval notation. $[-3, \infty) \cup (-\infty, 2) = \mathbb{R}$

$$\frac{2}{3}x - 1 \geq -3 \quad \text{or} \quad 5(x - 2) < -2x + 4$$

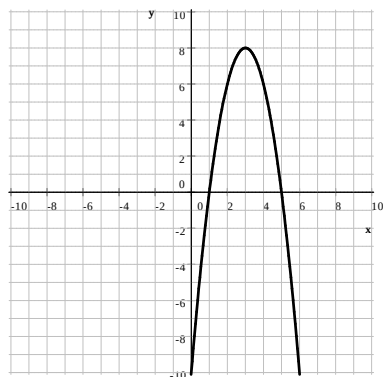
7. Solve the given equation over the real numbers. Use exact values.

$$\frac{x}{x+1} - \frac{3}{x-7} = \frac{-3x+5}{x^2-6x-7}$$

$$8 \quad (-1 \text{ is extraneous})$$

8. Sketch the graph of the function $f(x) = -2x^2 + 12x - 10$. Show all relevant computations.

$$-2(x - 3)^2 + 8$$



9. Compute the perimeter of the triangle determined by $A(-1, 7)$, $B(-1, 3)$, and $C(3, 3)$. Use exact values.
12 unit
10. We have a jar of coins, all quarters and dimes. All together, we have 289 coins, and the total value of all coins in the jar is \$54.55. How many quarters are there in the jar?
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