Math 103 Test 3 Review

Fall 24

1) Evaluate. Write your answer as a fraction in simplest form. $27^{-2/3}$

2) Combine the radical expressions, if possible.

$2\sqrt{75} + \sqrt{12}$

3) Perform the following operations and write the results in standard form.

    a) $(3 + 2i) - (7 - i)$

    b) $(5 + 2i)(3 - 7i)$

4) Simplify the following expressions. Use absolute value symbols when necessary.

    a) $\sqrt{32x^2}$

    b) $\sqrt[3]{8a^3b^6c^4}$

5) Multiply and simplify. $(4\sqrt{3x} + \sqrt{6})^2$

6) Rationalize the denominator of the expression and simplify as much as possible.

$$\frac{2}{\sqrt{6} - 3}$$

7) Find all real and complex solutions to the following equations. Give exact solutions.

    a) $\sqrt[3]{3x + 7} - 6 = 0$

    b) $x(x + 1) = 10x$

8) Rewrite the expression using rational exponents and simplify.

$$\sqrt{x}\sqrt[3]{x^2}$$

9) Find all real and complex solutions to the following equations. Give exact solutions.

a) $(x - 5)^2 = -36$

b) $\sqrt{x + 7} = x + 1$

c) $x^2 + 6 = -9(x + 1)$

10) Solve the equation using the quadratic formula. Give the exact solutions.

$5x^2 - 2x - 1 = 0$

11) Solve the equation by completing the square. Give exact solutions.

$2x^2 + 8x - 6 = 0$

12) Solve the equation of quadratic form. $x^{2/3} - 3x^{1/3} - 4 = 0$

13) A supporting wire is to be attached to the top of a 50-foot antenna. If the wire must be anchored 50-feet from the base of the antenna, what is the length of wire required? Round your answer to the nearest inch.

14) Find the solution set of the inequalities. Give you answers in interval notation.

a) $-x^2 + 6x < x - 14$

b) $\dfrac{3x}{x+4} > \dfrac{1}{x}$
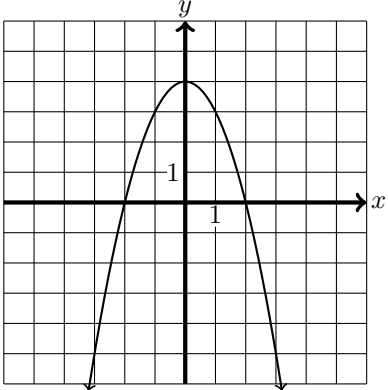
15) Graph the quadratic function: $f(x) = -x^2 + 4$
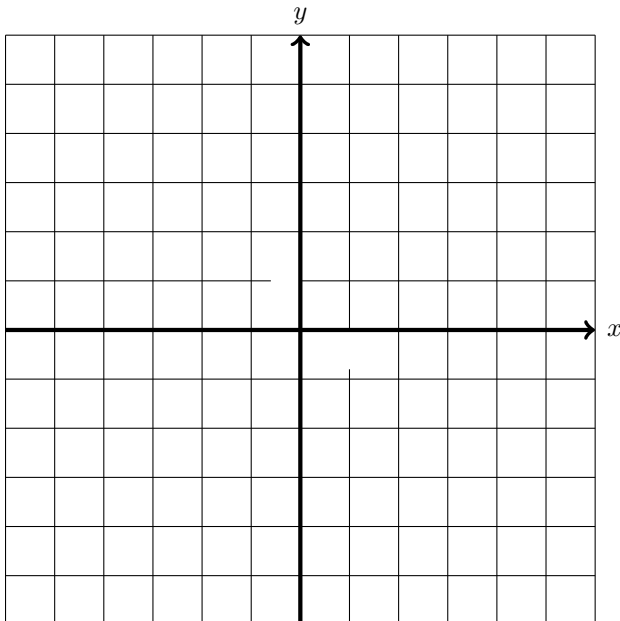
16) The following quadratic function describes the height in meters of a rocket as it travels through the air after t seconds. How many seconds does it take to reach its maximum height? What is the maximum height? Round your answers to the nearest tenth.

$$y(t) = -4.9t^2 + 30.6t + 6.3$$

Answers

1. $\dfrac{1}{9}$

2. $12\sqrt{3}$

3. a) $-4 + 3i$ b) $19 - 29i$

4. a) $4|x|\sqrt{2x}$ b) $2ab^3c\sqrt[3]{c}$

5. $48x + 24\sqrt{2x} + 6$

6. $-\dfrac{2\sqrt{6} + 3}{3}$

7. a) $x = \dfrac{209}{3}$, b) $x = 0, x = 9$

8. $x\sqrt[6]{x}$

9. a) $x = 5 \pm 6i$ b) $x = 2$ c) $x = \dfrac{-9 \pm \sqrt{21}}{2}$

10. $x = \dfrac{1 \pm \sqrt{6}}{5}$

11. $x = -2 \pm \sqrt{7}$

12. $x = -1, 64$

13. $l = 849$ in $= 70$ feet 9 inches

14. a) $(-\infty, -2) \cup (7, \infty)$ b) $(-\infty, -4) \cup (-1, 0) \cup \left(\dfrac{4}{3}, \infty\right)$

15.

16. It reaches max height (vertex) after 3.1 seconds. The maximum height is 54.1 meters.