
MATH 11010: Exam #2 (Fall 2012)

1. Simplify each expression. Write answer in the form $a + bi$, where a and b are real numbers.

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

(b) $\frac{5 + 4i}{3 + 2i}$

2. A soft drink vendor at a popular beach analyzes his sales records, and finds that if he sells x cans of soda pop in one day, his profit (in dollars) is given by

$$P(x) = -0.001x^2 + 3x - 1800.$$

- (a) (1 pt) How many cans must he sell for maximum profit?

- (b) (1 pt) What is his maximum profit?

3. Solve: $5(8 + 3x)^2 - 240 = 0$

4. Solve: $\frac{x + 5}{x - 2} - \frac{5}{x + 2} = \frac{28}{x^2 - 4}$

5. Solve: $4x(2x - 5) = 6$

6. Solve: $3|6 - 7x| + 8 = 44$

7. Solve: $9x^4 + 17x^2 + 8 = 0$

8. Solve: $\sqrt{2x + 13} = x + 5$

9. Solve: $32x^3 - 48x^2 - 14x + 21 = 0$

10. Solve: $2x^5 - 26x^3 + 24x = 0$

11. Solve: $6x^4 - 6x^3 - 9x^2 = 0$

12. Solve: $x^{1/2} + x^{1/4} - 12 = 0$

13. Solve: $(2x^2 - 5x)^2 + 10(2x^2 - 5x) + 16 = 0$

14. Solve: $\frac{5x - 3}{7x + 2} = 4$

15. Given $f(x) = 2x^2 - 24x + 8$.

- (a) Express the quadratic function in standard form.
- (b) Identify the vertex.
- (c) Identify the minimum or maximum of f . Label it as a minimum or maximum.
- (d) Find the interval(s) on which the function is increasing.
- (e) Find the interval(s) on which the function is decreasing.

ANSWERS

1. (a) $40 - 42i$ (b) $\frac{23}{13} + \frac{2}{13}i$
2. (a) 1500 cans (b) \$450
3. $x = \frac{-8 \pm 4\sqrt{3}}{3}$
4. $x = -4$; (Note: $x = 2$ does not check)
5. $x = \frac{5 \pm \sqrt{37}}{4}$
6. $x = -\frac{6}{7}$, $x = \frac{18}{7}$
7. $x = \pm \frac{2\sqrt{2}i}{3}$, $x = \pm i$
8. $x = -2$; (Note: $x = -6$ does not check)
9. $x = \frac{3}{2}$, $x = \pm \frac{\sqrt{7}}{4}$
10. $x = 0$, $x = \pm 2\sqrt{3}$, $x = \pm 1$
11. $x = 0$, $x = \frac{1 \pm \sqrt{7}}{2}$
12. $x = 81$; (Note: $x = 256$ does not check)
13. $x = \frac{5 \pm \sqrt{39}i}{4}$, $x = \frac{1}{2}$, $x = 2$
14. $x = -\frac{11}{23}$
15. (a) $f(x) = 2(x - 6)^2 - 64$
(b) $(6, -64)$
(c) minimum = -64
(d) $(6, \infty)$
(e) $(-\infty, 6)$