

Alg 2 Chapter 5 Review Fall 2018

Round decimals to the nearest hundredth unless noted otherwise. Give imaginary answers in standard form and with simplified radicals.

1. A company wants to minimize its costs. The following equation represents the company costs $C(e)$, in thousands of dollars, as a function of the number of employees e . $C(e) = 3e^2 - 96e + 870$.

- Find the number of employees that minimize the company's costs
- What are the minimum costs.

2. An object is shot into the air from the top of a 50 foot building. The following equation models the objects height $h(t)$ as a function of the amount of time t (sec) after the launch. $h(t) = -16t^2 + 144t + 50$

- Find the objects maximum height and the time it takes to reach that height.
- Find the amount of time it takes the object to come back down to the ground.
- Find the amount of time it takes the object to reach a height of 75 feet.

3. Graph each parabola using at least 5 points. (NO Graphing calculator allowed on these two)

a) $y = 2(x + 3)^2 - 5$ b) $y = -3x^2 - 6x + 4$

Use the Equations below for numbers 4 and 5.

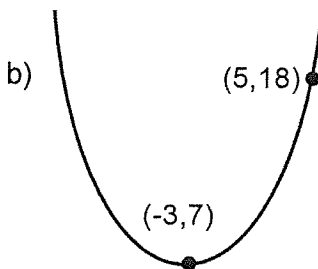
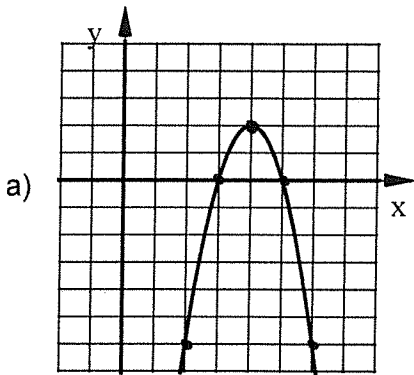
A $y = -33x^2 - 4x + 60$

B $y = 0.0042x^2 + 8x - 57$

C $y = -x^2 + 2x - 12$

- Does each parabola open up or down?
- Is each vertex a maximum or a minimum?

6. Write the equation of the parabola shown below in Vertex Form.



7. For each quadratic find the equation for the LOS, the coordinates of the Vertex, and the y-intercept.

a) $y = 4x^2 + 16x - 9$ b) $y = 5x^2 + 3$ c) $y = -2x^2 + 12x$ d) $y = -4(x + 8)^2 - 9$

8. Fill in the blanks to show the missing values that Complete the Square

a) $x^2 + 16x$ _____ $= (\text{_____})^2$

b) $x^2 - 24x$ _____ $= (\text{_____})^2$

c) $x^2 + 7x$ _____ $= (\text{_____})^2$

Factor each completely.

9. $12x^5 + 16x^3$

10. $x^2 - 625$

11. $80y^8 - 405$

12. $5m^3 - 45m$

13. $2x^4 + 26x^3 + 60x^2$

14. $x^2 - 5x - 36$

15. $2x^3 + 5x^2 - 18x - 45$

16. $2x^2 + 16x - 96$

17. $21x^2 + 69x + 18$

18. $4x^2 - 15x + 14$

Solve by factoring.

19. a) $x^2 - 2x = 24$

b) $8x^2 + 12 = -28x$

c) $4x^2 - x - 6 = x + 19 - 2x$

20. (a) $4x^2 + 10x = 0$

(b) $3x^3 + 24x^2 + 36x = 0$

(c) $6x^2 - 28x = 0$

21. (a) $6x^2 - 25x - 9 = 0$

(b). $4x^3 + 6x^2 - 64x - 96 = 0$

Find the EXACT Complex solutions, real and imaginary, to each by using square roots.

22. $5x^2 - 14 = 146$

23. $2x^2 + 103 = 59$

24. $(x - 2)^2 + 3 = -13$

For 25-28, find all Complex solutions, real and imaginary, by using the quadratic formula: $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

Give real answers rounded to the nearest hundredth. Give EXACT imaginary answers in simplified radical form.

25. $x^2 - 6x - 10 = 0$

26. $8x^2 - 40x + 50 = 0$

27. $x^2 - 4x + 13 = 0$

28. $9x^2 - 12x + 11 = 0$

Simplify each.

29. a) $(4 + 7i) + (6 - \sqrt{-64})$

b) $(-4 - \sqrt{-12}) - (8 + \sqrt{-75})$

30. $2i(8 - 4i)$

31. a) $(4 - 5i)(2 - 3i)$

b) $(7 + 2i)^2$

32. $(7 - 3i)(7 + 3i)$

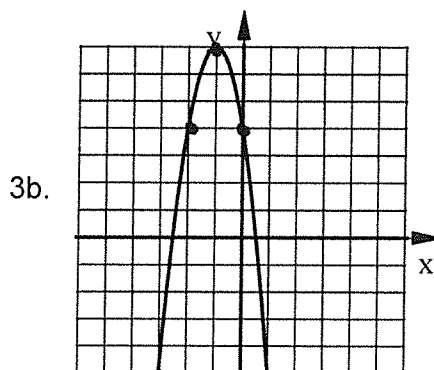
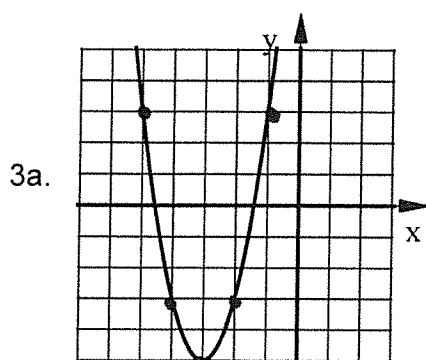
33. Find ALL EXACT COMPLEX solutions to each using Completing the Square.

a) $x^2 + 6x = 3$

b) $2x^2 - 16x + 82 = 0$

On the test you will be given some quadratics to solve using all methods at least once but you'll have to decide which methods to use on each problem.

1. a) # employees to min costs = 16. b) Minimum costs = 102 (which means \$102,000)
2. a). Max height of 374 feet after 4.5 sec b). The object will hit the ground after 9.33 sec
c). The object will be 75 high two times, after 0.18 sec and 8.82 sec.



4. A: Down B: Up C: Down 5. A: Max B: Min C: Max

6. a) $y = -2(x - 4)^2 + 2$ b) $y = \frac{11}{64}(x + 3)^2 + 7$

7. a) LOS: $x = -2$, Vertex $(-2, -25)$, $y - int = -9$

b) LOS: $x = 0$, Vertex $(0, 3)$, $y - int = 3$

c) LOS: $x = 3$, Vertex $(3, 18)$, $y - int = 0$

d) LOS: $x = -8$, Vertex $(-8, -9)$, $y - int = -265$

8. a) $x^2 + 16x + 64 = (x + 8)^2$ b) $x^2 - 24x + 144 = (x - 12)^2$ c) $x^2 + 7x + \frac{49}{4} = (x + \frac{7}{2})^2$

9. $4x^3(3x^2 + 4)$ 10. $(x \pm 25)$ 11. $5(2y^2 \pm 3)(4y^4 + 9)$ 12. $5m(m \pm 3)$

13. $2x^2(x + 10)(x + 3)$ 14. $(x + 4)(x - 9)$ 15. $(2x + 5)(x \pm 3)$

16. $2(x + 12)(x - 4)$ 17. $3(7x + 2)(x + 3)$ 18. $(4x - 7)(x - 2)$

19. a) $x = -4, 6$ b) $x = -\frac{1}{2}, -3$ c) $x = \pm \frac{5}{2}$

20. (a) $x = 0, -\frac{5}{2}$ (b) $x = -2, -6, 0$ (c) $x = \frac{14}{3}, 0$

21. a) $x = -\frac{1}{3}, \frac{9}{2}$ b) $x = -\frac{3}{2}, \pm 4$ 22. $x = \pm 4\sqrt{2}$ 23. $x = \pm i\sqrt{22}$ 24. $x = 2 \pm 4i$

25. $x = -1.36, 7.36$ 26. $x = \frac{5}{2}$ 27. $x = 2 \pm 3i$ 28. $x = \frac{2 \pm i\sqrt{7}}{3}$

29. a) $10 - i$ b) $-12 - 7i\sqrt{3}$ 30. $8 + 16i$ 31. a) $-7 - 22i$ b) $45 + 28i$

32. 58 33. a) $x = -3 \pm 2\sqrt{3}$ b) $x = 4 \pm 5i$