Algebra 2   Chapter 5 Review   Fall 2015

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

There WON'T be any scatter plots or regressions on this test.

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. $C(e) = 3e^2 - 96e + 870$.

a) Find the number of employees that minimize the company's costs

b) 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. $h(t) = -16t^2 + 144t + 50$

  a) Find the objects maximum height and the time it takes to reach that height.

  b) Find the amount of time it takes the object to come back down to the ground.

  c) Find the amount of time it takes the object to reach a height of 75 feet.

Use these quadratic functions for problems 3 and 4

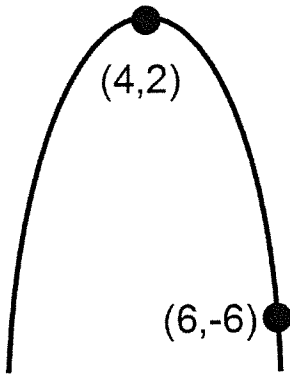A $y = -33x^2 - 4x + 60$ B $y = 0.0042x^2 + 8x - 57$ C $y = -x^2 + 2x - 12$

3. Does each parabola open up or down?

4. Is each vertex a maximum or a minimum?

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

6.   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) $y = -4(x + 8)^2 - 9$

For 7 and 8, graph the parabola with at least five points.

7. $y = -x^2 - 4x + 2$ 8. $y = 2(x - 1)^2 - 5$

Factor each completely.

9. $12x^5 + 16x^3$ 10. $x^2 - 100$ 11. $16y^2 - 81$

12. $5m^3 - 45m$ 13. $2x^4 + 26x^3 + 60x^2$ 14. $x^2 - 5x - 36$

15. $x^2 - 10x + 16$ 16. $2x^2 + 16x - 96$ 17. $7x^2 + 23x + 6$

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

Solve by factoring.

19. a) $x^2 - 2x = 24$ b) $12x^2 + 7 - 3x^2 - 32 = 0$

20. (a) $4x^2 + 10x = 0$ (b) $3x^2 + 24x + 36 = 0$

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

Find the EXACT solutions, real and imaginary, to each by using square roots. Give answers in simplified radical form.

22. $5x^2 - 14 = 146$ 23. $2x^2 + 103 = 59$ 24. $(x - 2)^2 + 3 = -13$

For 25-27, find all solutions, real and imaginary, by using the quadratic formula: $x = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

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

25. $x^2 - 6x - 10 = 0$ 26. $4x^2 - 20x + 25 = 0$ 27. $x^2 - 4x + 13 = 0$

Simplify each.

28. a) $(4 + 7i) + (6 - \sqrt{-64})$ b) $(-4 - \sqrt{-12}) - (8 + \sqrt{-75})$

29. $2i(8 - 4i)$ 30. $(4 - 5i)(2 - 3i)$ 31. $(7 - 3i)(7 + 3i)$

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

a) $x^2 + 16x$_____ $= ($_____$)^2$ b) $x^2 - 24x$_____ $= ($_____$)^2$

c) $x^2 + 7x$_____ $= ($_____$)^2$

33. Find the EXACT solutions, real and imaginary, to each by completing the square. Give answers in simplified radical form.

a) $x^2 + 6x = 3$ b) $x^2 - 8x + 41 = 0$

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 .17 sec and 8.82 sec.

3. A: Down   B: Up   C: Down   4. A: Max   B: Min   C: Max
5. $y = -2(x-4)^2 - 3$

6. 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) $y = -4(x+8)^2 - 9$
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$(3,18)$, $y - int = 0$
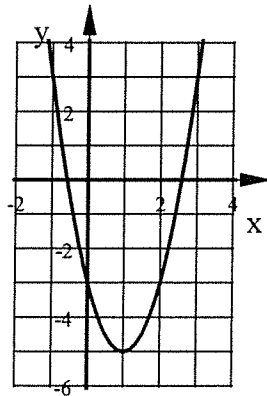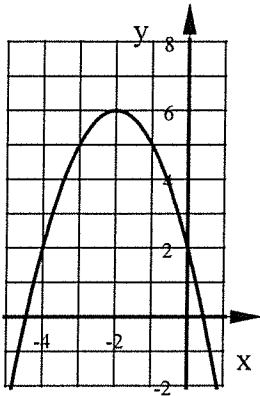d) LOS: $x = -8$, Vertex$(-8,-9)$, $y - int = -265$

7. LOS: $x = -2$ 8. LOS: $x = 1$
Vertex: $(-2,6)$ Vertex: $(1,-5)$
y-int: 2   y-int: -3

9. $4x^3(3x^2 + 4)$ 10. $(x \pm 10)$ 11. $(4y \pm 9)$ 12. $5m(m \pm 3)$
13. $2x^2(x + 10)(x + 3)$ 14. $(x + 4)(x - 9)$ 15. $(x - 2)(x - 8)$
16. $2(x + 12)(x - 4)$ 17. $(7x + 2)(x + 3)$ 18. $(4x - 7)(x - 2)$
19. a) $x = -4, 6$ b) $x = \pm\frac{5}{3}$
20. (a) $x = 0, -\frac{5}{2}$ (b) $x = -2, -6$ 21. $x = -\frac{1}{3}, \frac{9}{2}$

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. a) $10 - i$ b) $-12 - 7i\sqrt{3}$ 29. $8 + 16i$ 30. $-7 - 22i$ 31. 58

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

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