Name _____ Date _____

Cumulative Test 2

Simplify the expression. Write your answer using exponents.

1. $(-2)^2(-2)(-2)^5$ **2.** $(6^3)^5$ **3.** $\dfrac{4^{11}}{4^7}$

Simplify the expression.

4. $\dfrac{1}{5^{-8}}$ **5.** $(4m^2n)^2$ **6.** $\left(-\dfrac{3}{r}\right)^3$

Simplify the expression. Write your answer using only positive exponents.

7. $\left(\dfrac{2x^{-2}}{yz^{-3}}\right)^2$ **8.** $\left(\dfrac{1}{2a}\right)^2 \cdot \dfrac{3ab}{c^2}$ **9.** $(6m)^{-2} \cdot (2m^3)^4$

In Exercises 10 and 11, use the following information.

A company is offering its employees a retirement benefit of $24,000 per year and guarantees an annual cost of living increase of 2% of the benefit.

10. Write a function that models the retirement benefit over time. Assume that the retirement benefit only increases by the cost of living increase.

11. Use the function to find the amount of the retirement benefit after 6 years.

Find the sum or difference.

12. $(5x^2 - 11x + 9) + (7x - 13 - 3x^2)$

13. $(4x^2 - x + 7) - (6x^3 + x^2 - 5x + 8)$

14. $(3x^3 + 7x^2 - 5x + 3) + (x^3 - 3x)$

15. $(17y^2 - 6y + 5) - (11y^2 - 2y + 8)$

Find the product.

16. $(9r + 3)(2r - 1)$ **17.** $(7t + 2)(t^2 - 5t - 3)$

18. $(3a - 5b)^2$ **19.** $(9z + 2)(9z - 2)$

Factor the polynomial.

20. $x^2 + 10x + 21$ **21.** $4y^2 + 23y - 6$

22. $5x^2 + 20x + 20$ **23.** $x^2 - 121$

24. $-14n^2 - 17n + 6$ **25.** $t^3 + 2t^2 - 9t - 18$

Answers

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____
11. _____
12. _____
13. _____
14. _____
15. _____
16. _____
17. _____
18. _____
19. _____
20. _____
21. _____
22. _____
23. _____
24. _____
25. _____

Name _____ Date _____

Cumulative Test 2 *continued*

Solve the equation.

26. $x^2 + x - 56 = 0$ **27.** $z^2 + 169 = 26z$

28. $11n^2 + 21n = 2$ **29.** $r^3 = 36r$

In Exercises 30 and 31, use the following information.

A kangaroo jumps off the ground with an initial velocity of 18 feet per second.

30. Write an equation that gives the height (in feet) of the kangaroo as a function of time (in seconds) since it jumps.

31. After how many seconds does the kangaroo land on the ground?

In Exercises 32 and 33, use the following information.

A pizza box has a length of $(x + 11)$ inches, a width of $(x + 12)$ inches, and a height of $(x - 2)$ inches.
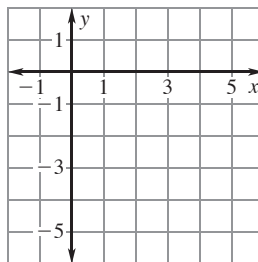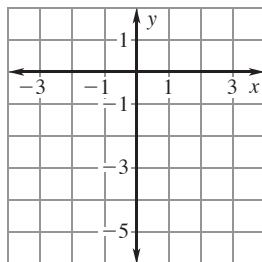
32. Write a polynomial that represents the volume of the pizza box.

33. The volume of the pizza box is 480 cubic inches. What are the length, width, and height of the pizza box?

Graph the function. Label the vertex and axis of symmetry.

34. $y = x^2 - 5$ **35.** $y = 2x^2 - 8x + 3$

Solve the equation. Round the solutions to the nearest hundredth, if necessary.

36. $x^2 - 225 = 0$ **37.** $81x^2 - 18 = 7$

Use the quadratic formula to solve the equation. Round the solutions to the nearest hundredth, if necessary.

38. $9x^2 - 11x + 3 = 0$ **39.** $7x^2 = 2x - 5$

Solve the system of equations using the substitution method.

40. $y = x^2 + 2x - 1$ **41.** $y = 2x^2 - 5$
     $y = -2x - 4$ $y = 11 - 4x$

Answers

26. _____

27. _____

28. _____

29. _____

30. _____

31. _____

32. _____

33. _____

    _____

34. _____

35. _____

36. _____

37. _____

38. _____

39. _____

40. _____

41. _____

Cumulative Test 2 *continued*

42. The distance d (in feet) that it takes a roller coaster train to come to a complete stop can be modeled by the equation $d = 0.7s^2 + 0.5s$ where s is the speed of the train (in feet per second). If the train has 30 feet to come to a complete stop, find the speed at which the train should be traveling. Round your answer to the nearest tenth of a foot per second.

43. Use the given information to decide which quadratic function has the greater maximum value.
  • Quadratic Function 1: The function whose equation is
    $y = -x^2 + 6x - 4$.
  • Quadratic Function 2: The function whose graph is shown below.

Answers

42. _____

43. _____

44. _____

45. _____

46. _____
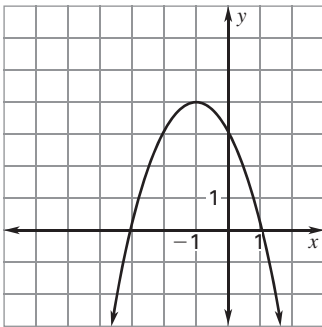
In Exercises 44–46, use the following information.

A typing class has a contest to determine who can correctly type the most words per minute. The students' scores are: 28, 28, 31, 38, 42, 42, 42, 46, 51, 53, 55, 57, 58.

44. What is the range of the typing scores?

45. Make a stem-and-leaf plot of the scores.

46. Make a box-and-whisker plot of the scores.

Cumulative Test 2 *continued*

For Exercises 47 and 48, use the following information.

There are a total of 28 juniors and seniors taking physics this semester and a total of 45 juniors and seniors taking trigonometry. No one is taking both courses.

47. If there are twice as many seniors taking trigonometry as there are juniors taking the course, how many seniors are taking trigonometry this semester?

48. If 18 seniors are taking physics this semester, how many juniors are taking either physics or trigonometry?

Evaluate the expression.

49. $7!$

50. $_{10}P_3$

51. $_9C_4$

52. $_{11}C_5$

In Exercises 53 and 54, use the following information.

A box contains 6 blue markers, 8 black markers, and 4 green markers. You randomly choose 2 markers, one at a time.

53. Find the probability that you choose a black marker and then a green marker if you replace the first marker.

54. Find the probability that you choose a black marker and then a green marker if you do not replace the first marker.

In Exercises 55 and 56, find the indicated probability. State whether *A* and *B* are disjoint events.

55. $P(A) = 0.35$

$P(B) = 0.77$

$P(A \text{ or } B) = 0.92$

$P(A \text{ and } B) = \underline{\ ?\ }$

56. $P(A) = 0.42$

$P(B) = \underline{\ ?\ }$

$P(A \text{ or } B) = 0.74$

$P(A \text{ and } B) = 0$

57. Events *A* and *B* are dependent. If $P(A) = 0.7$ and $P(A \text{ and } B) = 0.35$, what is $P(B|A)$?

Answers

47. _____

48. _____

49. _____

50. _____

51. _____

52. _____

53. _____

54. _____

55. _____

56. _____

57. _____