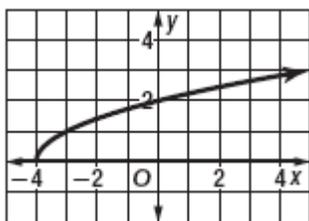


Algebra 2 Spring Final Review

1. Find $(f - g)(x)$ for $f(x) = x^2 + 8x$ and $g(x) = 3x + 5$.

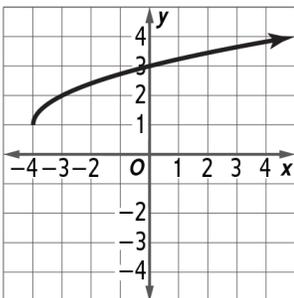
2. If $f(x) = x^2 - 3$, and $g(x) = 2x - 1$, find $[g \circ f](x)$.

3. State the domain and range of the function graphed below.



4. Find the inverse of $f(x) = 3 + 5x$.

5. Write the function that represents the following graph?



6. Solve the following equation

$$(5z - 1)^{\frac{1}{3}} - 3 = 1$$

7. Solve $\sqrt{3x + 6} - 1 \geq 5$.

8. The approximate time t in seconds that it takes an object to fall a distance of d feet is given by $t = \sqrt{\frac{d}{16}}$. How far will the object fall in 8 seconds?

9. Does the function $y = 16(0.4)^x$ represents exponential growth or decay?

10. Solve $4^{2x+7} = 32^{x+3}$.

11. Solve $\left(\frac{1}{81}\right)^t = 243^{t-2}$.

12. Solve $64^x < 32^{x+2}$.

13. Write the equation $\log_{243} 81 = \frac{4}{5}$ in exponential form.

14. Evaluate $9^{\log_9 54}$.

15. Solve $\log_{\frac{1}{8}} x = -1$.

16. Solve $\log_2(7x - 3) \geq \log_2(x + 12)$.

17. Solve $\log_3 a + \log_3(a - 8) = 2$.

18. Solve $3^{5x-1} \leq 30$. Round to the nearest ten-thousandth.

19. Suppose you deposit \$1000 in an account paying 4% annual interest, compounded continuously. Use $A = Pe^{rt}$ to find the balance after 10 years.

20. Solve $\ln(x + 2) = 3$.

21. Solve $e^{-9x} \leq 6$.

22. **CHEMISTRY** A particular compound decays according to the equation $y = ae^{-0.0736t}$, where t is in days. Find the half-life of this compound.

23. **FOOD PRICES** At a wholesale food distribution center, the price of sugar has increased 3.6% annually since 1985. Suppose sugar cost \$0.43 per pound in 1985 and this growth continues. What will a pound of sugar cost in 2022? Use $y = a(1 + r)^t$ and round to the nearest cent.

24. For what value(s) of x is the expression $\frac{x^2 - 4x + 4}{2x^2 - 3x - 2}$ undefined?

Simplify each expression.

25. $\frac{t^2 - 2t - 3}{t^2 - 1} \cdot \frac{3t - 3}{t^2 - 4t + 3}$

26. $\frac{m + 2f}{6} \div \frac{m^2 - 4f^2}{10}$

27. $\frac{\frac{3b^2 - 12}{6b^2 + 12b}}{5b - 10} \div \frac{10b^2 + 20b}{10b^2 + 20b}$

28. $\frac{30}{m^2 - 25} + \frac{3}{m - 5}$

29. $\frac{7}{m - 6} - \frac{m}{6 - m}$

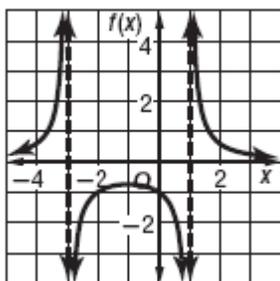
30. Find the LCM of $7m - 21$ and $14m - 42$.

31. What is the LCM of $t^2 - t - 12$ and $t^2 + 2t - 24$?

32. Determine the equations of any vertical asymptotes of the graph of $f(x) = \frac{2x+3}{x^2+2x-3}$.

33. Determine the values of x for any points of discontinuity in the graph of $f(x) = \frac{x+3}{x^2+5x+6}$.

34. Write a function to represent the graph below?



35. Solve $\frac{n}{n-3} + n = \frac{7n-18}{n-3}$.

36. Solve $7 - \frac{3}{m} > \frac{18}{m}$.

37. **FOOD** A cafeteria manager wants to know the purchasing habits of his customers. This situation calls for a _____.

From a survey of 450 employees, find the following population proportions.

38. 342 employees prefer a bonus over extra vacation days

39. 369 employees prefer 401K options over shares in a company

40. A survey is conducted to determine if citizens will attend a fire safety meeting. The result of the 105 citizens surveyed showed that 33% will attend the fire safety meeting. Find the margin of error.

Which of these could you use to simulate the outcome of each event?

Choose each answer from:

A using a spinner divided into 5 equal parts

B tossing a coin 5 times

C drawing, without replacement, from a bag of 5 marbles, each a different color

D rolling a die 5 times

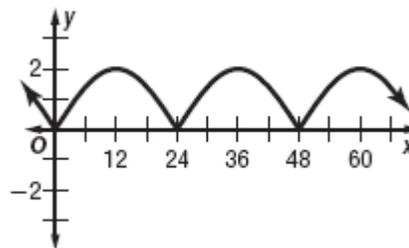
41. choosing to stay home or go to the park during the week when going to a park and staying home are equally likely

42. the results of a spelling bee with 5 participants if each of the people are equally likely to win

43. Find the exact value of $\cot(-315^\circ)$.

44. Find the exact value of $\sin\left(-\frac{\pi}{6}\right)$.

45. Determine the period of the function.



46. Find the period of $y = 2\sin\frac{2}{5}\theta$.

47. Find the vertical shift of $y = -3 + \tan \frac{1}{2} \left(\theta + \frac{\pi}{2} \right)$.

Find the exact value of each expression if $0^\circ < \theta < 90^\circ$.

52. $\csc \theta \tan \theta$

53. $\cot^2 \theta + 1$

54. $\frac{\csc \theta}{1 - \sin \theta} - \frac{\cos \theta}{1 + \sin \theta}$

55. Paula chooses a number from 1 to 10 and flips a coin. What is the probability of choosing an even number and the coin landing on heads?

Find the exact value of each expression if $180^\circ < \theta < 270^\circ$.

48. If $\cot \theta = \frac{1}{2}$, find $\sin \theta$.

49. If $\sin \theta = -\frac{15}{17}$, find $\sec \theta$.

50. If $\csc \theta = -\frac{3}{2}$, find $\cot \theta$.

Find the exact value of each expression if $270^\circ < \theta < 360^\circ$.

51. If $\cos \theta = \frac{1}{3}$, find $\cot \theta$.

Simplify each expression.

57. Jasmine has 4 red bracelets, 5 green bracelets, and 2 yellow bracelets. If she selects a bracelet at random from her collection, what is the probability that it is red or yellow?

56. The table shows how many players won a prize at the dart throw game and duck pond game during a day at a festival. Find the probability that a player did not win a prize given that he or she played the dart throw game.

Game	Prize	No Prize
Dart Throw	50	235
Duck Pond	53	289

Determine whether the events are *mutually exclusive* or *not mutually exclusive*. Then find the probability.

58. There were 150 customers at a car wash last Saturday. Of these, 112 customers had their cars washed, 48 had the interiors detailed, and 16 had both their cars washed and the interiors detailed. What is the probability that a randomly selected customer from last Saturday had their car washed or their interior detailed?

59. A coin jar contains 5 pennies, 8 nickels, 4 dimes, and 6 quarters. Suppose a coin is selected at random, replaced, and then another coin is selected at random. Are these events independent or dependent? What is the probability of selecting a nickel first and a quarter second?

60. A cookie jar contains 7 chocolate chip cookies, 10 oatmeal raisin cookies, and 8 peanut butter cookies. Hannah selects a cookie at random, does not replace it, and then selects another cookie. Are these events independent or dependent? What is the probability that she selects two oatmeal raisin cookies?

61. **PAINTING** Alice can paint a room in 8 hours. Her assistant can paint the same room in 12 hours. How long will it take if the two of them work together?

62. Find the inverse of $f(x) = 5x + 10$.

63. Determine whether $f(x) = 5x - 3$ and $g(x) = \frac{x+3}{5}$ are inverse functions.

64. Solve $\sqrt[3]{3m+1} = 4$.

65. Solve $4 - \sqrt{5y-10} \leq -1$.

Answer Key

1. c

2. d

3. b

4. c

5. b

6. d

7. c

8. c

9. a

10. b

11. b

12. d

13. b

14. b

15. a

16. d

17. c

18. b

19. a

20. b

21. d

22. b

23. a

24. b

25. d

26. a

27. d

28. d

29. b

30. d

31. a

32. c

33. a

34. c

35. b

36. a

37. c

38. d

39. c

40. c

41. b

42. c

43. a

44. a

45. d

46. a

47. a

48. c

49. a

50. b

51. d

52. a

53. c

54. b

55. d

56. a

57. These events are mutually exclusive because a bracelet cannot be both red and yellow.

$$P(\text{red or yellow}) = \frac{4}{11} + \frac{2}{11} = \frac{6}{11}$$

58. These events are not mutually exclusive because customers can have their car washed and the interior detailed.

$$P(\text{car washed or interior detailed}) = \frac{112}{150} + \frac{48}{150} - \frac{16}{150} = \frac{144}{150} = \frac{24}{25}$$

59. The events are independent because the outcome of the first event does not affect the outcome of the second event.

$$P(\text{nickel, then quarter}) = \frac{8}{23} \times \frac{6}{23} = \frac{48}{529}$$

60. The events are dependent. Because Hannah does not replace the first cookie, the outcome of the first event will affect the outcome of the second event.

$$P(\text{two oatmeal raisin cookies}) = \frac{10}{25} \times \frac{9}{24} = \frac{3}{20}$$

61. 4.8 h

$$62. f^{-1}(x) = \frac{1}{5}x - 2$$

63. yes

64. 21

65. $y \geq 7$