

1-27 odd 28-34 all 39-53 odd

Name _____ Class _____ Date _____

Chapter Test

Form A

Chapter 7

Simplify each radical expression. Use absolute value symbols as needed.

1. $\sqrt{400x^2y^6}$ 2. $\sqrt[3]{-125a^9}$ 3. $\sqrt[3]{81x^3y^9}$
 4. $\sqrt[3]{64a^6b^2}$ 5. $\sqrt{50x^2t^4}$ 6. $\sqrt[3]{256x^{16}y^{28}}$

Simplify each expression. Rationalize all denominators. Assume that all variables are positive.

7. $\frac{\sqrt{200x^3y}}{\sqrt{2xy^5}}$ 8. $(8 - 3\sqrt{2})(8 + 3\sqrt{2})$ 9. $\frac{1}{\sqrt{3} + 5}$
 10. $\sqrt{8x^3} \cdot \sqrt{2x^3}$ 11. $\sqrt{63} + 2\sqrt{28} - 5\sqrt{7}$ 12. $\frac{\sqrt{2} + 1}{\sqrt{4}}$
 13. $\frac{2}{1 + \sqrt{2}}$ 14. $\frac{\sqrt[3]{5}}{\sqrt[3]{4}}$ 15. $\sqrt{15}(1 - \sqrt{45})$

Simplify each expression. Assume that all variables are positive.

16. $\left(\frac{16x^5y^{10}}{81xy^2}\right)^{\frac{1}{2}}$ 17. $(-64)^{-\frac{2}{3}}$ 18. $a^{\frac{1}{2}} \cdot a^{\frac{1}{3}}$
 19. $(4x^{-2}y^4)^{-\frac{1}{2}}$ 20. $(8ab^2)^{-\frac{1}{2}}(8ab^2)^{\frac{1}{2}}$ 21. $(3^{\frac{1}{2}}b^{\frac{1}{3}})(a^{\frac{1}{4}}t^{\frac{1}{2}})$

Solve each equation. Check for extraneous solutions.

22. $\sqrt[3]{x-3} = 1$ 23. $\sqrt{x+7} = x+1$ 24. $\sqrt{3x-8} = 2$
 25. $(2x+1)^{\frac{1}{2}} = 3$ 26. $\sqrt{x^2-5} = 4$ 27. $3(x+1)^{\frac{1}{3}} = 48$

Let $f(x) = x^2 + 5$ and $g(x) = x - 7$. Perform each function operation. Then find the domain of each.

28. $\frac{f(x)}{g(x)}$ 29. $f(x) - 2g(x)$ 30. $f(x) \cdot g(x)$

For each pair of functions, find $f(g(x))$ and $g(f(x))$.

31. $f(x) = 3x + 5, g(x) = x^2 + 1$ 32. $f(x) = x^2 - 5x + 2, g(x) = 2x$
 33. $f(x) = \sqrt{2x-1}, g(x) = 5x + 3$ 34. $f(x) = -2x^2, g(x) = x + 4$

Rewrite each function to make it easy to graph using a translation. Describe the graph.

35. $y = \sqrt{9x-63} + 4$ 36. $y = \sqrt[3]{8x-64} - 5$
 37. $y = \sqrt{-27x-27} + 4$ 38. $y = \sqrt{16x-32}$

Name _____ Class _____ Date _____

Chapter Test (continued)

Form A

Chapter 7

Graph. Find the domain and range of each function.

39. $y = \sqrt{x-1} + 2$ 40. $y = -\sqrt{x+3} - 1$
 41. $y = \frac{1}{2}\sqrt{x} + 3$ 42. $y = -\sqrt{x+4} - 1$

Let $f(x) = 5x - 4$ and $g(x) = x^2 - 1$. Find each value.

43. $g(f(-1))$ 44. $f(g(2))$ 45. $g(f(0))$
 46. $f(g(\sqrt{6}))$ 47. $f(g(1))$ 48. $g\left(f\left(\frac{4}{5}\right)\right)$

Find the inverse of each function. Is the inverse a function?

49. $f(x) = (x+2)^2 - 4$ 50. $f(x) = 4x^3 - 1$ 51. $f(x) = \sqrt{x+4}$
 52. $f(x) = 3x + 2$ 53. $f(x) = x^2 - 5$ 54. $f(x) = \sqrt[3]{x+2}$

55. The children's park has become very popular since your club built new play equipment. Use the equation $f = 4\sqrt{A}$ to calculate the amount of fence f you need to buy based on the area A of the playground.

- a. The park currently has an area of 8100 ft². How many feet of fencing currently encloses the park?
 b. Suppose you want to increase the fenced play area to four times its current area. If you can reuse the fencing already at the park, how much new fencing do you need to buy?

56. Writing Explain how to rewrite a radical with an exponent. Include an example.

1-4 graph only, 8, 9-49 odd

Chapter Test

Form A

Chapter 8

Evaluate each function to the nearest hundredth for $x = -2, -1, 0, 1, 2, 3, 4$. Graph each function.

1. $y = 3(2)^x$ 2. $y = \frac{1}{2}(7)^x$ 3. $y = 20(0.5)^x$

4. **Writing** Describe the effect of different values of a on the function $y = ab^x$.

Write an exponential function of the form $y = ab^x$ that includes the given points.

5. (1, 2), (2, 8) 6. $(-1, \frac{2}{9}), (1, 2)$ 7. $(-1, \frac{3}{8}), (1, \frac{3}{2})$

8. **Investment** You put \$2000 into an account earning 4% interest compounded continuously. Find the amount at the end of 8 yr.

Describe how the graph of each function is related to the graph of its parent function.

9. $y = -2^x + 1$ 10. $y = 3^{x-4}$ 11. $y = 5^{x+1} - 2$

Evaluate each logarithm.

12. $\log_5 125$ 13. $\log_4 \frac{1}{4}$ 14. $\log_3 729$
 15. $\log_9 \frac{1}{3}$ 16. $\log_4 16$ 17. $\log_{25} \frac{1}{256}$

Graph each logarithmic function.

18. $y = 3 - \log_3 x$ 19. $y = \log_4(x + 1)$ 20. $y = \log_4 x$

Write each equation in logarithmic form.

21. $7^3 = 343$ 22. $(\frac{2}{3})^{-3} = \frac{27}{8}$ 23. $2^{-4} = 0.0625$

Write each logarithmic expression as a single logarithm.

24. $\log 2 + 3 \log 1$ 25. $\log a - \log ab$ 26. $\frac{1}{3}(\log_4 x + \log_4 z) - 2 \log_4 y$

Expand each logarithm.

27. $\log_3 6x$ 28. $\log \frac{y^2}{z}$ 29. $\log_5 \frac{x^2 y}{z}$

Write each expression as a single natural logarithm.

30. $2 \ln 10 - \ln 5$ 31. $5 \ln a + 3 \ln b$ 32. $2 \ln z - \frac{1}{2}(\ln x + 3 \ln y)$

Chapter Test (continued)

Form A

Chapter 8

Use the properties of logarithms to evaluate each expression.

33. $\log \sqrt{100}$ 34. $\log 5 + \log 10 + \log 2$ 35. $\log 900 - \log 9$
 36. $\log_8 4 + \log_8 16$ 37. $3 \log_3 9 - 4 \log_3 3$ 38. $3 \log_2 6 - \frac{3}{4} \log_2 81$

39. **Open-Ended** Give an example of an exponential equation whose solution is a negative number.

Solve each equation. Round to the nearest hundredth.

40. $\log 5x = 3$ 41. $\log x = \frac{1}{10}$ 42. $10^{2x} = 40$
 43. $\log(7x + 3) = 2$ 44. $2 \log x - \log 5 = 4$ 45. $\log_5(3x + 10) - 3 \log_5 4 = 2$

Use the Change of Base Formula to rewrite each expression using common logarithms.

46. $\log_4 12$ 47. $\log_2 5$ 48. $\log_8 14$

Use the properties of logarithms to simplify each equation and solve it. Round to the nearest hundredth.

49. $\ln(x - 3) = 1$ 50. $2 \ln x - \ln 3 = 2$ 51. $\ln(x + 2) + \ln(x - 2) = 0$

52. The electric current I in amperes of a circuit is given by the formula $\log_2 I = -t$. Find the current when t is 3 s.

53. The voltage input of an amplifier is 0.5 volts. Its voltage output is 52 volts. Use the formula $d = 10 \log \frac{E_0}{E_1}$, where d is the decibel voltage, E_0 is the output voltage, and E_1 is the input voltage to find the decibel voltage.

54. A parent raises a child's allowance by 15% each year. If the allowance is \$3 now, when will it reach \$15?

55. A scientist notes the bacteria count in a petrie dish is 50. Two hours later, he notes the count has increased to 80. If this rate of growth continues, how much more time will it take for the bacteria count to reach 100?

56. **Writing** Explain why $\frac{\log_2 x}{\log_6 y}$ does not equal $\log_6 x - \log_6 y$.

7-14 all 17-24 all

Name _____ Class _____ Date _____

Chapter Test

Form B

Chapter 9

Write a function that models each variation.

- $x = -4$ when $y = 2$. y varies inversely as x .
- $x = 6$ and $y = 4$ when $z = 3$. z varies directly with x and inversely with y .

Is the relationship between the values in the table a direct variation, an inverse variation, or neither? Write an equation to model any direct or inverse variation.

3.

x	-2	1	3
y	-8	4	12

4.

x	-1	2	8
y	2	-1	$-\frac{1}{4}$

Write an equation for the translation of $y = \frac{4}{x}$ with the given asymptotes.

- $x = -2, y = -1$
- $x = 3, y = 2$

For each rational function, identify any holes or horizontal or vertical asymptotes of its graph.

- $y = \frac{2x}{x+4}$
- $y = \frac{(x-4)}{(x-4)(x+9)}$
- $y = \frac{x-7}{(x-4)(x+4)}$
- $y = \frac{1}{x+2} + 3$

Sketch the graph of each rational function.

- $y = \frac{x}{x(x+3)}$
- $y = \frac{2}{x-1} + 4$

Simplify each rational expression. State any restrictions on the variable.

- $\frac{x^2 - 7x}{14 - 2x}$
- $\frac{2x - 10}{3x - 21} + \frac{x - 5}{4x - 28}$

Find the least common multiple of each pair of polynomials.

- $x^2 - 25$ and $3x + 15$
- $8(x+6)(x-3)$ and $2(x+6)^2$

Simplify each sum or difference.

- $\frac{3}{x+4} + \frac{x}{x-4}$
- $\frac{4x}{x^2 - 9} - \frac{1}{2x - 6}$

Name _____ Class _____ Date _____

Chapter Test (continued)

Form B

Chapter 9

Simplify each complex fraction.

19. $\frac{2 - \frac{4}{3}}{\frac{1}{2} + \frac{1}{6}}$

20. $\frac{2 - \frac{1}{2}}{3 + \frac{1}{2}}$

Solve each equation. Check each solution.

21. $\frac{2}{x} + \frac{2}{2x} = 3$

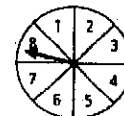
22. $\frac{4}{x} = \frac{x}{x+3}$

23. $\frac{x}{3} = \frac{4x}{5}$

24. $\frac{3x - 12}{x - 7} = 0$

A spinner is spun. State whether the events are mutually exclusive. Then find $P(A \text{ or } B)$.

- $A =$ an odd number
 $B =$ a number ≥ 6
- $A =$ an odd number
 $B =$ an even number

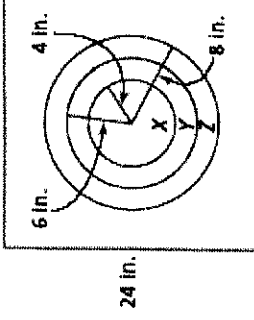


- Suppose you have a CD which contains a compilation of songs. Seven songs can be classified as rock, and three as blues. Today you hit the shuffle button on your CD player, which plays the songs in a random order. Tomorrow you do the same thing. What is the probability that the CD player plays a blues song first each day?

**PROBABILITY AND STATISTICS REVIEW
 SPRING FINAL EXAM – ALGEBRA II**

NO CALCULATORS!

Use the dartboard at the right for Problems 1–3.



1. If a dart hits the board, find the probability that it will land in region X.
2. If a dart hits the board, find the probability that it will land in region Y.
3. If a dart hits the board, find the probability that it will land in region Z.

Suppose a number is chosen at random from the sample space {5, 7, 9, 11, 13, 15, 17}. Find each probability.

4. $P(\text{less than } 13)$
5. $P(\text{odd})$
6. $P(\text{mult of } 3)$
7. $P(\text{a number greater than } 17)$

Dr. Math has a total of 150 math students. The scores on the final examination are normally distributed and have a mean of 72 and a standard deviation of 6.

8. Sketch a normal curve and label the mean and each standard deviation.
9. 68% of the students will be expected to receive a final exam grade between _____ and _____.
10. What percent of the students will get a passing grade of 60 or above?

A survey asked upper classmen about whether they will take French or Spanish. The table shows the results of the survey. Complete the table to answer the questions. Write answers in reduced fraction form.

	French	Spanish	Total
Junior			58
Senior	22		
Total		88	120

11. $P(\text{studying Spanish} \mid \text{Senior})$
12. $P(\text{French})$
13. $P(\text{Senior} \mid \text{studying French})$
14. $P(\text{studying French and is a junior})$
15. You are playing a game that involves drawing numbers from a box. The numbers 1-30 are in the box. If you draw one number from the box, what is the probability that the number is greater than 20 or divisible by 3. Write your answer in fraction form.

PROBABILITY AND STATISTICS REVIEW
SPRING FINAL EXAM – ALGEBRA II

CALCULATORS ARE PERMITTED FOR THESE PROBLEMS:

Find each probability as a fraction and percent.

16. Tasha's bowl contains 4 red, 6 green and 3 brown candies. She randomly chooses and keeps 3 candies from the bowl. What is the probability she will choose all brown?
17. There are 3 nickels, 2 dimes, and 5 quarters in a purse. Three coins are selected in succession, without replacement after each coin is selected. Find the probability of selecting 1 nickel, then 1 dime, and then 1 quarter.
18. Two cards are selected at random, with replacement, from a deck of 52 playing cards. What is the probability of selecting a diamond and then a king of clubs?
19. Two fair dice are tossed, one that is red and one that is white. What is the probability that the red die shows a number greater than 1 and the white die shows a 5 or 6?
20. Kenny has a stack of 8 baseball cards, 5 basketball cards, and 6 soccer cards. If he selects a card at random from the stack, what is the probability that it is a baseball or a soccer card?
21. One tile with each letter of the alphabet is placed in a bag, and one is drawn at random. What is the probability of selecting a vowel or a letter from the word *equation*? Hint: there are 26 letters in the English alphabet.

For each set of data, find the mean, median, mode, Q1, Q3, interquartile range, and the standard deviation. Then, make a box-and-whisker plot for each set of values. Last, find the 40th percentile.

22. 2 8 3 7 3 6 4 9 10 15 21 29 32 30 5 7 32 4 11 13 11 14 10 12 13

23. 43.4 46.5 47.9 51.0 50.2 49.5 42.5 41.6 46.8 50.0

On a certain day the chance of rain is 80% in San Francisco. On the days it doesn't rain, there is still a 25% chance that it's foggy. On the days it does rain, there is a 56% chance that there is also fog. Create a tree diagram for this situation and answer the following.

24a. P(rainy and foggy)

24b. P(clear and foggy)

A set of data has a mean of 77 and a standard deviation of 6.8.

25a. Find the z-score of the value of 89.

25b. Find the z-score of the value of 58.

TRIGONOMETRY REVIEW (13.2 – 13.6, 13.7, 14.2, 14.3, 14.4)
SPRING FINAL EXAM - ALGEBRA II

NO CALCULATORS!

The measure θ of an angle in standard position is given. Find the exact values of $\cos \theta$, $\sin \theta$ and $\tan \theta$ for each angle measure.

1. 210° 2. 135° 3. $\frac{5\pi}{3}$ radians 4. $\frac{\pi}{6}$ radians

Convert each angle measure into its equivalent in radians or degrees.

5. 315° 6. $\frac{5\pi}{6}$ radians 7. $\frac{3\pi}{4}$ radians 8. 400°
9. $\frac{\pi}{9}$ radians 10. 270° 11. $\frac{4\pi}{3}$ radians 12. 135°

In which quadrant does the terminal side of each angle lie?

13. 145° 14. -102° 15. $\frac{4\pi}{3}$ 16. $\frac{11\pi}{6}$

Find two co-terminal angles, one positive and one negative, to the given angle.

17. -102 18. 433° 19. $\frac{2\pi}{9}$ 20. $\frac{\pi}{4}$

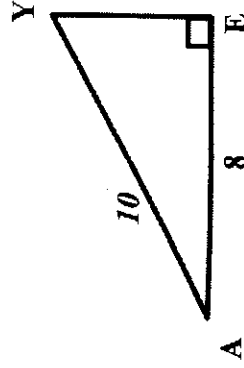
Find the exact value of each.

21. $\cos 45^\circ$ 22. $\sin 240^\circ$ 23. $\tan \frac{2\pi}{3}$ 24. $\sin \frac{7\pi}{4}$

Suppose $\cos \theta = \frac{5}{13}$, find the exact value of each, as a fraction.

25. $\sin \theta$ 26. $\csc \theta$ 27. $\sec \theta$ 28. $\cot \theta$

Given the diagram below, find the exact value of all 6 trig functions, written as a simplified fraction.



29. $\sin Y$ 30. $\cos Y$ 31. $\tan Y$
32. $\csc Y$ 33. $\sec Y$ 34. $\cot Y$

Graph the following over one period.

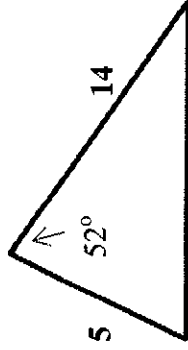
35. $y = 2 \cos x + 1$ 36. $y = -3 \sin \left(x + \frac{\pi}{2} \right)$ 37. $y = -\cos 2x$ 38. $y = 5 \sin \left(4 \left(x - \frac{\pi}{8} \right) \right) - 2$

CALCULATORS ARE PERMITTED FOR THESE PROBLEMS.

39. In triangle JOB, $\angle O$ is the right angle. Two measures are given. Find the remaining sides and angles to the nearest tenth.

$m\angle B = 20^\circ$ and $j = 6$

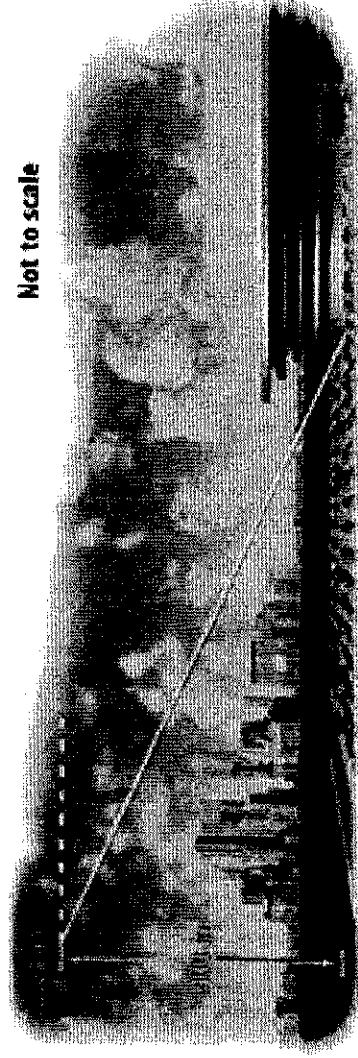
40. Find the area of the triangle. Round to the nearest tenth.



Solve each problem. Round to the nearest tenth.

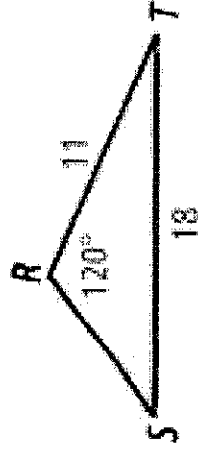
41. The world's tallest unsupported flagpole is a 282-ft-tall steel pole in Surrey, British Columbia. The shortest shadow cast by the pole during the year is 137 ft long. What is the angle of elevation of the sun when casting the flagpole's shortest shadow?

42. **Aerial Television** A blimp provides aerial television views of a football game. The television camera sights the stadium at a 7° angle of depression. The altitude of the blimp is 400 m. What is the line-of-sight distance from the television camera to the base of the stadium? Round to the nearest hundred meters.



Not to scale

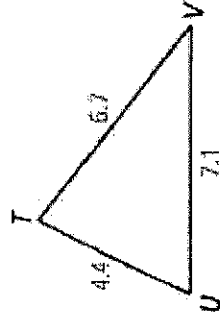
43. Find the measure of $\angle S$.



44. Find the measure of b .



45. Find the measure of $\angle V$.



46. Find the measure of x and y .

