

Advanced Algebra with Trigonometry

Semester 2 Final Review

Chapter 6: Rational Exponents and Radical Functions

2. $\sqrt[3]{729}$

3. $\sqrt[3]{343}$

6. $\frac{27^{-1/3}}{27^{-4/3}}$

7. $\sqrt{80} - \sqrt{245}$ 8. $\sqrt[3]{-125x^3}$

Let $f(x) = x^2 - 4$, and $g(x) = -x^3$. Perform the indicated operation and state the domain.

10. $f(x) - g(x)$

11. $g(x) \cdot g(x)$

12. $g(f(x))$

Verify that f and g are inverse functions.

14. $f(x) = 3x - 4, g(x) = \frac{x+4}{3}$

Find the inverse of the function.

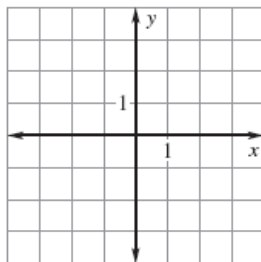
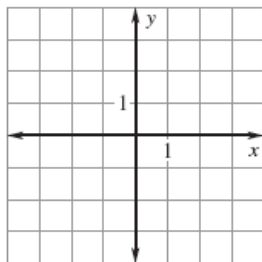
16. $f(x) = 3x^8, x \leq 0$

17. $g(x) = \frac{3}{2}x^3 + 4$

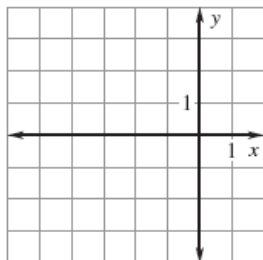
Graph the function. Then state the domain and range.

18. $y = \frac{2}{3}\sqrt{x}$

19. $y = -\frac{3}{4}\sqrt[3]{x}$



20. $y = \frac{3}{5}\sqrt{x+4} - 1$



Solve the equation.

22. $\sqrt[5]{4x-8} = 2$

23. $60 - \frac{1}{20}(x+75)^{3/2} = 10$

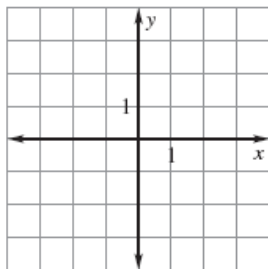
24. $x+1 = \sqrt{19-x}$

25. $4\sqrt{x}-2 = \sqrt{5-x}$

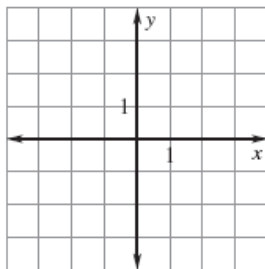
Chapter 7: Exponential and Logarithmic Functions

Graph the function. State the domain and range.

1. $y = \frac{1}{2} \cdot 2^x$

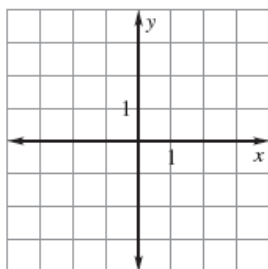


2. $y = -2 \cdot 3^{x+1} + 2$

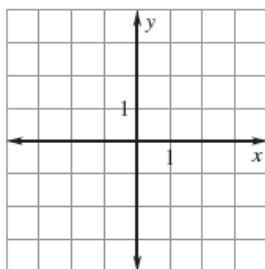


Graph the function. State the domain and range.

3. $y = 2\left(\frac{2}{3}\right)^x$



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



5. On your birthday you receive a PDA for \$300. The value of the PDA decreases by 20% each year. What will its value be 4 years from now?

Find the inverse of the function.

8. $y = \log_4(x + 3)$

9. $y = 2e^{x-2}$

Simplify the expression.

10. $(2e^{-2x}) \cdot e^{2x}$

11. $\sqrt[3]{16e^{12}}$

12. $\log_5 625^x$

13. $4^{\log_2 8x}$

Graph the function. State the domain and range.

14. $y = \log_7 x$

15. $y = \log_3(x + 2) - 2$

Expand the expression.

16. $\log_{1/2} \sqrt{xy}$

17. $\ln xy$

Solve the equation by equating exponents.

20. $4^{(2x+4)} = 16^{(3x-6)}$

21. $(0.25)^{x+8} = (0.5)^{x^2+1}$

Condense the expression.

18. $\ln 4xy^2 - 2 \ln x^2y$

19. $\log_5 \sqrt[3]{x^2y} + \log_5 \sqrt[3]{xy^5}$

Solve the equation.

22. $\log_2(x^2 + 2x) = 3$

23. $\log_3 x + \log_3(x - 6) = 3$

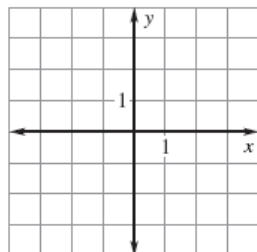
Chapter 8: Rational functions

The variables x and y vary inversely. Use the given values to write an equation relating x and y . Then find y when $x = 2$.

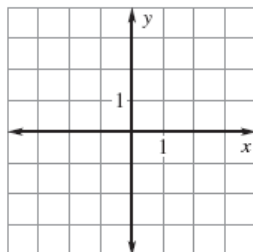
1. $x = 3, y = 4$

Graph the function. State the domain and range.

5. $y = \frac{-2}{x}$



6. $y = \frac{2}{x+1} - 1$



Simplify the rational expression, if possible.

11. $\frac{x^2 + 7x + 12}{x^2 - 7x + 12}$

12. $\frac{x^2 + 5x}{x^2 + 6x + 5}$

Find the least common multiple of the polynomials.

15. $x^2 + 4x + 3$ and $x^2 - 9$

16. $x^2 - 4x$ and $x^3 - 8x^2 + 16x$

Perform the indicated operation and simplify.

13. $\frac{5x^2y}{4y^3} \cdot \frac{12x^2y^2}{30x^3}$

14. $\frac{2x^3}{7xy^2} \div \frac{6xy^2}{14y^3}$

Perform the indicated operation and simplify.

17. $\frac{7}{5x} - \frac{4}{3x}$

18. $\frac{2x}{x^2 - 1} + \frac{2x - 3}{x^2 + 5x + 4}$

Solve the equation by cross multiplying.

19. $\frac{x + 4}{3x + 5} = \frac{2x - 1}{3x + 1}$

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

Solve the equation by using the LCD.

21. $\frac{3 + x}{2} + 2x = \frac{6x + 1}{4 - x}$

22. $\frac{x + 5}{2x + 3} + \frac{x + 1}{-2x} = -1$

Chapter 13: Trigonometric Ratios and Functions

Let θ be an acute angle of a right triangle. Find the value of the other five trigonometric functions of θ .

1. $\sin \theta = \frac{5}{13}$

2. $\tan \theta = \frac{2}{5}$

5. Find one positive angle and one negative angle that are coterminal with the angle $\frac{5\pi}{3}$.

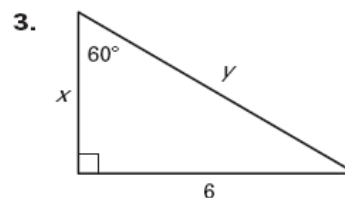
Convert the degree measure to radians or the radian measure to degrees.

6. 390°

7. $-\frac{3\pi}{4}$

8. Find the arc length and area of a sector with a radius of 8 feet and central angle of $\theta = 135^\circ$.

Find the exact values of x and y .



Use the given point on the terminal side at angle θ in standard position to evaluate the six trigonometric functions of θ .

9. $(-4, 2)$

Evaluate the function without using a calculator.

11. $\sin(-120^\circ)$

12. $\tan 225^\circ$

Evaluate the expression without using a calculator. Give your answer in both radians and degrees.

13. $\cos^{-1}\left(\frac{1}{2}\right)$

14. $\tan^{-1}(1)$

15. Solve the equation for θ .

$$\sin \theta = -0.72; 270^\circ \leq \theta \leq 360^\circ$$

16. An escalator ascends 45 feet over a horizontal distance of 30 feet. What is the angle of elevation?

Solve $\triangle ABC$.

Solve $\triangle ABC$.

17. $B = 105^\circ, C = 36^\circ, b = 8$

18. $A = 46^\circ, b = 4, a = 6$

21. $C = 64^\circ, a = 3, b = 9$

22. $a = 8, b = 5, c = 8$

23. Find the area of $\triangle ABC$ with side lengths $a = 20, b = 12,$ and $c = 16$.

24. A sign in the shape of a triangle has sides of 4 feet, 5 feet, and 6 feet. What is the area of this sign?

Find the area of $\triangle ABC$ with the given side lengths and included angle.

19. $C = 112^\circ, b = 5, a = 10$

20. $B = 8^\circ, a = 42, c = 44$

Chapter 14: Trigonometric Graphs, Identities, and Equations

Graph the function.

1. $y = 3 \cos\left(\frac{\pi}{2}x\right)$

2. $f(x) = 2 \tan(2x)$

3. $y = 1 + \sin(2x)$

4. $f(x) = \tan\left(x - \frac{\pi}{2}\right) - 2$

Simplify the expression.

7. $\sin^2\left(\frac{\pi}{2} - \theta\right) + \cos^2\left(\frac{\pi}{2} - \theta\right)$

8. $\tan^2\left(\frac{\pi}{2} - \theta\right) + 1$

9. Verify the identity $1 - \sin^2(-\theta) = \cos^2(-\theta)$.

10. Solve the equation $\cot^2 x - 2 = 1$ in the interval $0 < x < \pi$.

11. Find the general solution of the equation $\cos^2 x + \sin^2 x = 2 \sin x$.