

**Chapter 7 - Exponents and Exponential Functions**

- 7.1 - Zero and Negative Exponents
- 7.2 - Multiplying Powers with the Same Base
- 7.3 - More Multiplication Properties of Exponents
- 7.4 - Division Properties of Exponents
- 7.5 - Exponential Functions
- 7.6 - Exponential Functions
- 7.7 - Exponential Growth and Decay

CHAPTER 7 HOMEWORK: pp 479 #1-5, 14-18, 20

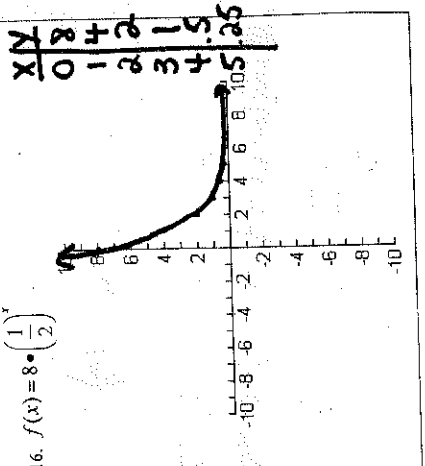
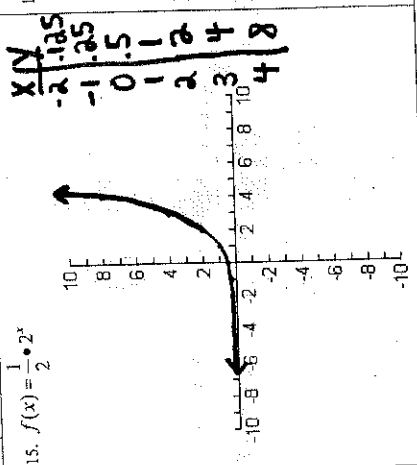
Simplify each expression. Use positive exponents.

1. $(x^6)^3$ $x^{30}$	2. $(7x^4)(5x^7)$ $35x^{11}$	3. $5^0$ $1$	4. $(2x^3)(4x^5)(2y^7)$ $16x^{10}y^3$
5. $\frac{5x^{-3}}{x^2} = \frac{5}{x^2x^3}$ $\frac{5}{x^5}$	6. $(x^3y^4)(x^2y)$ $x^5y^5$	7. $(2x^2y^4z^3)^3$ $8x^6y^{12}z^9$	8. $\frac{5}{x^{-3}}$ $5x^3$
9. $\frac{3x^3y^2z^4z^2}{12x^2y^4} = \frac{xz^2}{4y^2}$ $\frac{3x^2z^5}{12y^2} = \frac{x^2z^5}{4y^2}$	10. $\left(\frac{x^4yz}{x^3y^2z^2}\right)^0$ $1$	11. $(2x^3)^3(3x^2)^2$ $(8x^9)(9x^4)$ $72x^{13}$	12. $\left(\frac{2}{3}\right)^{-2}$ $\left(\frac{3}{2}\right)^2$ $\frac{9}{4}$

Evaluate each function for  $x = -1, 1,$  and  $3$ .

13. $f(x) = 3 \cdot 5^x$ $f(-1) = 3 \cdot 5^{-1} = \frac{3}{5}$ $f(1) = 3 \cdot 5^1 = 15$ $f(3) = 3 \cdot 5^3 = 375$	14. $f(x) = \frac{1}{4} \cdot 2^x$ $f(-1) = \frac{1}{4} \cdot 2^{-1} = \frac{1}{8}$ $f(1) = \frac{1}{4} \cdot 2^1 = \frac{1}{2}$ $f(3) = \frac{1}{4} \cdot 2^3 = 2$
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Graph each function. Plot as many points as you can on the graph provided.



17. A population of 2000 fish increases at an annual rate of 7.5%. How many fish will there be in 10 years?

$y = 2000(1 + 0.075)^x$   
 $y = 2000(1.075)^{10}$   
 $\approx 4122$  fish

18. The function  $y = 41 \cdot 0.95^x$  models the difference (in minutes) between men's and women's finishing times for the Boston Marathon. The number of years since women first officially ran the race in 1972 is represented by  $x$ . Does the exponential function represent growth or decay? Estimate the difference between finishing times in 1990? Predict the difference between finishing times in 2015.

decay ( $0.95 < 1$ )  
 $y = 41 \cdot 0.95^{18} \approx 16.29$  min  
 $y = 41 \cdot 0.95^{43} \approx 4.52$  min

19. Suppose you deposit \$2000 in a savings account that pays 5.3% interest compounded annually. How much will you have in your account after 8 years?

$A = P(1 + r)^t$   
 $A = 2000(1 + 0.053)^8$   
 $\approx 3023.13$

20. Suppose you deposit \$1525 in an investment account that pays 3.25% interest compounded annually. How many more years will it take until you have over \$2500 in your account?

$A = 1525(1 + 0.0325)^t$   
 $A = 1525(1.0325)^t$   
 $16$  years

Chapter 8 - Polynomials and Factoring

- 8.1 - Adding and Subtracting Polynomials
- 8.2 - Multiplying and Factoring
- 8.3 - Multiplying Binomials
- 8.4 - Multiplying Special Cases
- 8.5 - Factoring  $x^2 + bx + c$
- 8.6 - Factoring  $ax^2 + bx + c$
- 8.7 - Factoring Special Cases

CHAPTER 8 HOMEWORK: PG 539 #1-20, 25

Simplify each sum or difference.

1.  $(5x^4 - 3x^3 + 5x^2 - 5) + (2x^3 - 3x^2)$

$5x^4 - x^3 + 2x^2 - 5$

3.  $(2x^2 - 1) - (3x^2 + 5x + 7)$

$-x^2 - 5x - 8$

2.  $(2x - 12x^2 - 2) - (x^2 + 4x - 1)$

$-13x^2 - 2x - 1$

4.  $(8x^3 - 3x + 1) + (4x^2 + 5x - 3)$

$12x^3 + 2x - 2$

Multiply.

5.  $2x^2(x^4 - 3x^3)$

$2x^6 - 6x^5$

6.  $(x+1)(2x-3)$

$2x^2 - 3x + 2x - 3$   
 $2x^2 - x - 3$

7.  $(4x+1)(4x-1)$

$16x^2 - 1$

8.  $(x-1)(x^2 + 5x - 3)$

$x^2$	$5x$	$-3$
$x^3$	$5x^2$	$-3x$
$-1$	$-x^2$	$-5x$
		$3$

$x^3 + 4x^2 - 8x + 3$

9.  $(2x-3)(4x+9)$

$8x^2 + 18x - 12x - 27$   
 $8x^2 + 6x - 27$

10.  $(3x+1)(3x+1)$

$9x^2 + 3x + 3x + 1$   
 $9x^2 + 6x + 1$

Factor each polynomial.

11.  $24x - 9$

$3(8x - 3)$

12.  $24x^3 - 40x^2 + 72x$

$8x(3x^2 - 5x + 9)$   
 ~~$8x(3x^2 - 5x + 9)$~~

13.  $9x^2 - 100$

$(3x+10)(3x-10)$

14.  $x^2 - 11x + 28$

$(x-7)(x-4)$

15.  $49a^2 - 56a + 16$

~~$(7a-4)^2$~~   
 $(7a-4)(7a-4)$

16.  $m^2 + 2m - 35$

$(m+7)(m-5)$

17.  $8h^2 + 36h + 16$

$4(2h^2 + 9h + 4)$   
 $4(2h+1)(h+4)$

18.  $3x^2 - 13x + 12$

$(3x-4)(x-3)$

19.  $8x^2 + 60x + 72$

$4(2x^2 + 15x + 18)$   
 $4(2x+3)(x+6)$

20. The area of a rectangular coffee table is given by the trinomial  $x^2 + 7x - 8$ . The table's length is  $(x+8)$ . What is the table's width?

$x^2 + 7x - 8 = (x+8)(x-1)$   
area = length · width  
 $x-1$

21. If the perimeter of a quadrilateral is represented by  $15x+3$  and three of the sides are represented by  $2x-1$ ,  $3x+5$ , and  $4x+3$ , what is the length of the fourth side of the quadrilateral?

$15x+3 = (2x-1) + (3x+5) + (4x+3) + ?$   
 $15x+3 = 9x+7 + ?$   
 $6x-4$

Chapter 9 - Quadratic Functions and Equations

- 9.1 - Quadratic Graphs and Their Properties
- 9.2 - Quadratic Functions
- 9.3 - Solving Quadratic Equations
- 9.4 - Factoring to Solve Quadratic Equations
- 9.5 - Completing the Square
- 9.6 - The Quadratic Formula and the Discriminant
- 9.7 - Linear, Quadratic, and Exponential Models
- 9.8 - Systems of Linear and Quadratic Equations

CHAPTER 9 HOMEWORK: pg 607 #1-22

Find the equation of the axis of symmetry and the coordinates of the vertex of each function.

1.  $y = x^2 + 6x - 9$   $(-3, -16)$   $-9$   $-4(0)^2 + 3$   $x = -\frac{1}{2}$

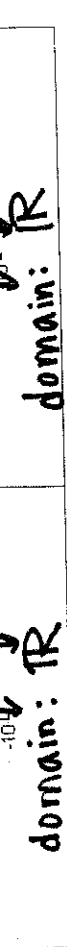
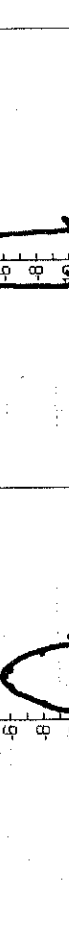
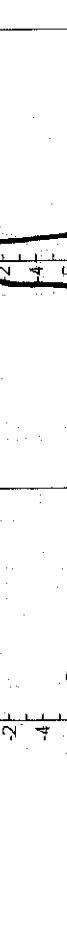
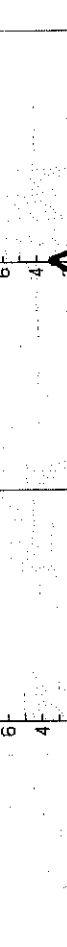
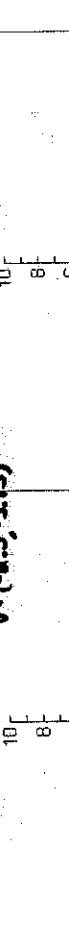
2.  $y = x^2 + 7x + 10$   $(-3.5, -7.25)$   $10$   $x = -\frac{1}{2}$

3.  $y = x^2 + 7x + 10$   $(-3.5, -7.25)$   $10$   $x = -\frac{1}{2}$

4.  $y = x^2 + 5x - 12$   $x = -\frac{5}{2}$   $x = -2.5$   $V: (-2.5, -5.125)$   $AOS: x = -3.5$   $V: (-3.5, -2.25)$

5.  $y = -4x^2 + 3$   $V: (0, 3)$   $AOS: x = -3.5$   $V: (-3.5, -2.25)$

Graph each function. Plot as many points fit on the graph provided. Identify the domain of each function.



Solve the system of equations

6.  $y = 2x^2 - 3$   $3x - 1 = 2x^2 - 3$   $-3x + 1 = -2x^2 + 3$   $0 = 2x^2 - 3x + 2$   $0 = (2x - 1)(x - 2)$   $x = \frac{1}{2}$   $x = 2$   $y = -2.5$   $y = 5$   $(-2.5, -2.5)$   $(2, 5)$

7.  $y = x^2 - x + 2$   $x + 5 = x^2 - x + 2$   $-x - 5 = x^2 - x + 2$   $0 = x^2 - 2x - 3$   $0 = (x - 3)(x + 1)$   $x = 3$   $x = -1$   $y = 8$   $y = 4$   $(3, 8)$   $(-1, 4)$

Find the number of real-number solutions of each equation.

8.  $0 = 4x^2 + 9$   $b^2 - 4ac$   $0^2 - 4(4)(9) = -144$   $b^2 - 4ac$   $0^2 - 4(4)(9) = -144$   $NO REAL SOLUTIONS$

9.  $0 = 3x^2 + x - 4$   $b^2 - 4ac$   $1^2 - 4(3)(-4) = 49$   $b^2 - 4ac$   $1^2 - 4(3)(-4) = 49$   $TWO REAL SOLUTIONS$

10.  $0 = x^2 - 6x + 9$   $b^2 - 4ac$   $(-6)^2 - 4(1)(9) = 0$   $b^2 - 4ac$   $(-6)^2 - 4(1)(9) = 0$   $ONE REAL SOLUTION$

Find the value of n such that each expression is a perfect square trinomial.

11.  $p^2 + 10p + n$   $(25)$

12.  $y^2 - 60y + n$   $(900)$

13.  $x^2 - 14x + n$   $(49)$

Solve each equation by completing the square. If necessary, round to the nearest hundredth.

14.  $x^2 - 18x = 19$   $x^2 - 18x + 81 = 19 + 81$   $(x - 9)^2 = \sqrt{100}$   $x - 9 = \pm 10$   $x = 9 \pm 10$   $x = 19$   $x = -1$

15.  $x^2 + 6x = 16$   $x^2 + 6x + 9 = 16 + 9$   $(x + 3)^2 = \sqrt{25}$   $x + 3 = \pm 5$   $x = -3 \pm 5$   $x = 2$   $x = -8$

17.  $5x^2 - 245 = 0$   $+245$   $5x^2 = 245$   $\frac{5x^2}{5} = \frac{245}{5}$   $x^2 = \sqrt{49}$   $x = \pm 7$

16.  $x^2 - 121 = 0$   $+121$   $x^2 = \sqrt{121}$   $x = \pm 11$

18.  $x^2 - 4x - 7 = 0$   $x = \frac{4 \pm \sqrt{4^2 - 4(1)(-7)}}{2}$   $x = \frac{4 \pm \sqrt{44}}{2}$   $x = 4 \pm \frac{\sqrt{44}}{2}$

19.  $2x^2 - 5x - 12 = 0$   $x = \frac{5 \pm \sqrt{5^2 - 4(2)(-12)}}{2(2)}$   $x = \frac{5 \pm \sqrt{121}}{4}$   $x = \frac{5 \pm 11}{4}$

Solve each equation by using factoring.

20.  $2x^2 - 9x + 5 = 0$

$(2x + 1)(x - 5) = 0$

$x = -\frac{1}{2}$   $x = 5$

21.  $x^2 - 7x + 12 = 0$

$(x - 4)(x - 3) = 0$

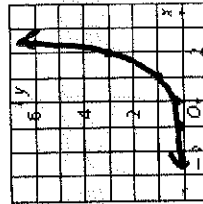
$x = 4$   $x = 3$

Which model (linear, exponential, or quadratic) is most appropriate for the data shown in the graph or table?

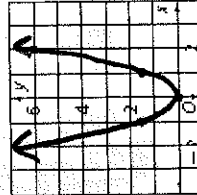
22.

x	y
0	5
1	7
2	9
3	11
4	13

linear



exponential

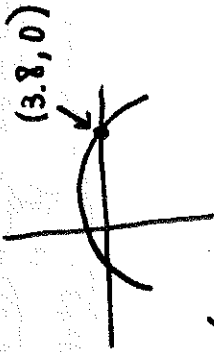


quadratic

25. A ball is thrown into the air with an initial upward velocity of 60 ft/s. Its height  $h$  in feet after  $t$  seconds is given by the function  $h = -16t^2 + 60t + 6$ .

After how many seconds will the ball hit the ground?

$3.8 \text{ sec}$



What will the height be at  $t = 3$  seconds?

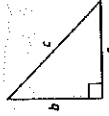
$h(3) = -16(3)^2 + 60(3) + 6$   
 $= 42 \text{ Ft}$

Chapter 10 - Radical Expressions and Equations

- 10.1 - Pythagorean Theorem
- 10.2 - Simplifying Radicals
- 10.3 - Operations with Radical Expressions
- 10.4 - Solving Radical Equations

CHAPTER 10 HOMEWORK: pg. 657 #1-21, 25-26

Use the triangle at the right. Find the length of the missing side.



1.  $a = 16, b = 63$

$16^2 + 63^2 = c^2$   
 $4225 = c^2$   
 $c = 65$

2.  $b = 2.1, c = 2.9$

$a^2 + 2.1^2 = 2.9^2$   
 $a^2 + 4.41 = 8.41$   
 $a^2 = 4$   
 $a = 2$

3.  $a = 65, c = 97$

$65^2 + b^2 = 97^2$   
 $4225 + b^2 = 9409$   
 $b^2 = 5184$   
 $b = 72$

4.  $a = 6, b = 8$

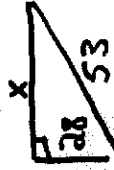
$6^2 + 8^2 = c^2$   
 $100 = c^2$   
 $c = 10$

5. How long is the diagonal of a 9 inch by 40 inch rectangle?



$9^2 + 40^2 = c^2$   
 $1681 = c^2$   
 $c = 41$

6. A car travels 28 miles north and then turns east. How far did the car travel east if the destination is 53 miles from the starting point?



$x^2 + 28^2 = 53^2$   
 $x^2 + 784 = 2809$   
 $x^2 = 2025$   
 $x = 45 \text{ miles}$

Determine whether the given lengths can be the side lengths of a right triangle.

7. 60 km, 91 km, 109 km

$60^2 + 91^2 \neq 109^2$   
 $\text{Yes}$

8. 39 mm, 80 mm, 89 mm

$39^2 + 80^2 \neq 89^2$   
 $\text{Yes}$

9. 18 ft, 85 ft, 87 ft

$18^2 + 85^2 \neq 87^2$   
 $\text{No}$

Chapter 11 - Rational Expressions and Functions

- 11.1 - Simplifying Rational Expressions
- 11.2 - Multiplying and Dividing Rational Expressions
- 11.3 - Dividing Polynomials
- 11.4 - Adding and Subtracting Rational Expressions
- 11.5 - Solving Rational Equations

CHAPTER 11 HOMEWORK: pg 719 #8-12, 14-19

Simplify each radical expression.

10. $\sqrt{25 \cdot 16} = 5\sqrt{6}$	11. $\sqrt{45n^4} = 3n^2\sqrt{5}$	12. $\sqrt{72} = 6\sqrt{2}$
13. $3\sqrt{7} + 8\sqrt{7} = 11\sqrt{7}$	14. $14\sqrt{5} - 10\sqrt{5} = 4\sqrt{5}$	15. $4\sqrt{2} - 3\sqrt{18} = 4\sqrt{2} - 9\sqrt{2} = -5\sqrt{2}$
16. $25\sqrt{7} - 2\sqrt{63} = 25\sqrt{7} - 6\sqrt{7} = 19\sqrt{7}$	17. $4\sqrt{54} - 3\sqrt{150} = 12\sqrt{6} - 15\sqrt{6} = -3\sqrt{6}$	18. $2\sqrt{18} = 6\sqrt{2}$
19. $\sqrt{81} = 9$	20. $\sqrt{\frac{25}{81}} = \frac{5}{9}$	21. $2\sqrt{3x} \cdot 3\sqrt{6x} = 6\sqrt{18x^2} = 18x\sqrt{2}$

Solve each radical equation. Check your solution.

22. $\sqrt{3c+5} = -7$ $(\sqrt{3c+5})^2 = (-7)^2$ $3c+5 = -7$ $3c = -12$ $c = -4$ No solution	23. $(2x+3)\sqrt{6x-1} = (6x-1)$ $2x+3 = \sqrt{6x-1}$ $-2x+1 = -2x+1$ $4 = 4x$ $x = 1$
24. $(3x-2)\sqrt{x} = 18$ $3x-2 = \frac{18}{\sqrt{x}}$ $(3x-2)\sqrt{x} = 18$ $3x\sqrt{x} - 2\sqrt{x} = 18$ $3x^2 - 2x = 36$ $3x^2 - 2x - 36 = 0$ $(3x+8)(x-4.5) = 0$ $x = 4.5$	25. $\sqrt{x+4} = 16$ $x+4 = 256$ $x = 252$

Chapter 11 - Rational Expressions and Functions

CHAPTER 11 HOMEWORK: pg 719 #8-12, 14-19

Simplify each expression. State any excluded values.

1. $\frac{6x-18}{2x-16} = \frac{3(x-3)}{2(x-3)} = \frac{3}{2}, x \neq 3$	2. $\frac{3x^2+2x-1}{a^2-1} = \frac{(3x-1)(x+1)}{(a+1)(a-1)}, a \neq \pm 1$	3. $\frac{4+x}{x^2+5x+4} = \frac{(x+4)}{(x+4)(x+1)}, x \neq -4, -1$
4. $\frac{2x-6}{4x-12} = \frac{2(x-3)}{4(x-3)} = \frac{1}{2}, x \neq 3$	5. $\frac{2a+2}{a^2-1} = \frac{2(a+1)}{(a+1)(a-1)}, a \neq 1, -1$	6. $\frac{x^2-3x-10}{x^2-4} = \frac{(x-5)(x+2)}{(x+2)(x-2)}, x \neq -2, 2$

Multiply or divide.

7. $\frac{2x+4}{x+2} \cdot \frac{3x}{4x+1} = \frac{2(x+2)(3x)}{(x+2)(4x+1)} = \frac{6x}{4x+1}$	8. $\frac{2n-1}{n^2-4} \cdot \frac{n^2}{n+2} = \frac{(2n-1)(n^2)}{(n-2)(n+2)(n+2)} = \frac{2n-1}{(n-2)(n+2)}$	9. $\frac{4a^2+4a-3}{2a+3} \div \frac{2a-1}{a} = \frac{(2a+3)(2a-1)}{(2a+3)(2a-1)} = 1$
10. $(2n^2+5n-10)(n-1) = 2n^3 - 2n^2 + 5n^2 - 5n - 10n + 10 = 2n^3 + 3n^2 - 15n + 10$	11. $(8x^2+12x-3)(x-1) = 8x^3 - 8x^2 + 12x^2 - 12x - 3x + 3 = 8x^3 + 4x^2 - 15x + 3$	12. $(2x^2+6x^2-3x) \cdot 3x = 12x^3 + 18x^3 - 9x^2 = 30x^3 - 9x^2 = 3x(10x^2 - 3x)$

Add or subtract.

13.  $\frac{3}{2a} + \frac{5}{2a}$

$$\frac{8}{2a} = \frac{4}{a}$$

14.  $\frac{6}{b-1} - \frac{7}{b-1}$

$$\frac{-1}{b-1}$$

15.  $\frac{x^2-1}{x^2-x-2} - \frac{x-1}{x+1}$

$$\frac{(x-2)(x+1) - (x^2-1)(x+1)}{(x-2)(x+1)} = 0$$

16.  $\frac{5}{x-1} + \frac{3}{x-1}$

$$\frac{8x-5}{x(x-1)}$$

17.  $\frac{4}{2-m} + \frac{1}{2-m}$

$$\frac{8-5m}{(2-m)m}$$

18.  $\frac{3-d}{d} - \frac{d+4}{2d}$

$$\frac{(6-2d) - (d+4)}{2d} = \frac{-3d+2}{2d}$$

Solve each equation. Check your solutions.

19.  $\frac{y}{y+1} + \frac{2}{y+1} = 5$

$$y+10=5y$$

$$-y - y = -10$$

$$\frac{10}{4} = \frac{4y}{4}$$

$$\frac{10}{4} = y$$

$$\frac{5}{2} = y$$

20.  $\frac{x^2}{x-1} = \frac{9}{x-1}$

$$x^2 = 9$$

$$x = \pm 3$$

21.  $\frac{d}{d-1} = \frac{4d}{3d-2}$

$$d(3d-2) = 4d(d-1)$$

$$3d^2 - 2d = 4d^2 - 4d$$

$$-3d^2 + 2d = -4d^2 + 4d$$

$$d = d^2 - 2d$$

$$0 = d(d-2)$$

$$d = 0 \quad d = 2$$