

Activities

Algebra 2

Fourth Edition



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1 Basic Algebra

Simplifying Expressions

State the degree of each polynomial. Then classify each as monomial, binomial, trinomial, or other polynomial.

_____ 1. $-9x^3y^2$

_____ 3. $-5a^3b + 4ab^2 + 6b^4$

_____ 2. $7x^2 - y$

_____ 4. $8x^2 + 6x - 2$

Simplify each expression.

5. $(6x^2 + 9x - 5) + (3x^2 - 12)$

6. $(7a^3 + 3a + 9) - (6a^2 + 2a + 5)$

7. $(-4x^2 + 3x - 8) + (5x^2 - 2x - 17)$

8. $(4a^2b)^3$

9. $(-2x^2yz)^2(6xy)$

10. $(7x^3yz)(6x^4z^3)$

11. $\left(\frac{a^2b}{5c^3}\right)^3$

12. $(8x^3y)^0$

13. $(-4a^3b)^2 + 2a^6b^2$

14. $12(z^5 + 3z^3 + 1) - z(z+4)^2$

15. $3(x^4y^3)^2 - 2(5x^8y^6)$

16. $\frac{(a^3bc^4)^2}{b^{-2}c^3}$

17. $\left(\frac{2}{3}a^2 + 4a - \frac{5}{2}\right) + \left(\frac{1}{4}a + \frac{1}{3}\right)^2$

18. $5(x+y)^2 - 3xy + (x-2y)^2$

19. $(a-2b)^2 + \left(\frac{2}{5}a+b\right)^2$

20. $9(d+b)^2 - 6(d-2b)^2 + \frac{1}{3}(18b+15db)$

Using Technology—Evaluating Expressions

Suggested technology: TI-84 Plus CE graphing calculator

In this activity you will learn to enter various expressions and find their values.

Your calculator's **mode** screen allows you to choose the settings for this activity.

You should become familiar with the way that the TI-84 expressions compare to the mathematical expression.

```
MATHPRINT CLASSIC
NORMAL SCI ENG
FLOAT 0 1 2 3 4 5 6 7 8 9
RADIAN DEGREE
FUNCTION PARAMETRIC POLAR SEQ
THICK DOT-THICK THIN DOT-THIN
SEQUENTIAL SIMUL
REAL a+bi re^(θi)
FULL HORIZONTAL GRAPH-TABLE
FRACTIONTYPE: D/F Un/d
ANSWERS: AUTO DEC
STAT DIAGNOSTICS: OFF ON
STAT WIZARDS: ON OFF
SET CLOCK 01/01/15 12:00AM
LANGUAGE: ENGLISH
```

MATHEMATICAL EXPRESSION	TI-84
2^6	$2 \wedge 6 \text{ enter}$
$3(6 + 2)$	$3 ((6 + 2)) \text{ enter}$
-5 (Don't use the subtraction key.)	$(-) 5 \text{ enter}$
Clear screen	clear
Delete character	del
Return to Home Screen	2nd mode

From this point forward, the numbers themselves (e.g., 2, 3, 5) will replace the keystrokes (e.g., 2 , 3 , 5) to indicate number values.

$$2((-2+15)^3/13)^2 \quad \dots \quad 57122$$

EXAMPLE 1: SIMPLE CALCULATIONS

Evaluate $2[(-2 + 15)^3 \div 13]^2$. Use the following keystrokes on the calculator.

$2 (((- 2 + 15) \wedge 3 \div 13) \wedge 2 \text{ enter}$

Many times, we wish to evaluate a function or formula for a given value or values. The calculator lets us write the rule or formula and then evaluate it with different choices of the variable.

EXAMPLE 2: MORE COMPLICATED CALCULATIONS

Evaluate $\frac{3V^2H}{5R^4}$ for $V = 1.5$, $H = 7.25$, and $R = 2.5$.

In this case, we need to tell the calculator the values of V , H , and R . Use the **sto→** as shown below.

$V = 1.5$	$1.5 \text{ sto→ } \alpha 6$
$H = 7.25$	$7.25 \text{ sto→ } \alpha \wedge$
$R = 2.5$	$2.5 \text{ sto→ } \alpha \times$

Press **enter** after each line, or you can enter all the values on a single line if you use the colon ($\alpha \text{ :}$) to separate them.

Then enter the formula on the home screen:

$((3 \times \alpha 6 \times \alpha \wedge 2 \times \alpha \wedge) \text{ math } \div \text{ enter } 5 \times \alpha \times \alpha \wedge 4 \text{ enter } 4 \text{ enter}$

$$1.5 \rightarrow V : 7.25 \rightarrow H : 2.5 \rightarrow R \quad \dots \quad 2.5$$

$$\frac{3V^2H}{5R^4} \quad \dots \quad 7.783712258$$

EXERCISES

Evaluate each expression. Round to the nearest hundredth if necessary.

_____ 1. 5.75^5

_____ 2. $\sqrt[3]{-227}$

_____ 3. $\frac{3.21(5 - 72)^2}{\sqrt{85(3^3)}}$

_____ 4. $\frac{25}{12} + \frac{19}{24} + \frac{11}{30}$

_____ 5. $\frac{1}{46} + \frac{26(13 - 11)^4}{14} + \frac{35}{\sqrt{9^6}}$

_____ 6. $\left[\frac{1 - (1.07)^{14}}{4\sqrt{12}} \right] + 5$

_____ 7. $\frac{48 - (58.01)^7}{19\sqrt{-55}} + \frac{-21(76.48)}{-2 + 3(11)^{18}}$

Evaluate each expression using the given variable(s). Round to the nearest hundredth if necessary.

_____ 8. $5(x - 2)^3 + 2x - 1$; given: $x = 8$

_____ 9. $-10x^3 + 14x^2 - 12x + 11$; given: $x = 15$

_____ 10. $3x^4 - 2x^3 + 9x^2 + 21x - 7$; given: $x = 2, 3, 5$

_____ 11. $7x^4 - 2(x + 4)^2 - x + 3$; given: $x = 4, 6, 10$

_____ 12. $\sqrt{s(s - a)(s - b)(s - c)}$; given: $a = 5, b = 7, c = 10, s = \frac{a + b + c}{2}$

Solving Equations

Solve each equation. Round to the nearest hundredth if necessary.

_____ 1. $3x + 19 = 7$

_____ 2. $\frac{2}{3}x - 5 = 9 - \frac{4}{5}x$

_____ 3. $-7.3x + 18.2 = 6.1 - 2.4x$

_____ 4. $7(3a + 1) - 8a - (6a - 5) = 4a + 6$

_____ 5. $\frac{2}{9}y - 11 = \frac{3}{4}(y + 2) - \frac{2}{3}(y + 6)$

Solve each literal equation for the indicated variable. State any excluded values.

_____ 6. $A = 4\pi r^2$ for r

_____ 7. $T = \frac{1}{2}pl + B$ for l

_____ 8. $a^2 + b^2 = c^2$ for b

_____ 9. $C = 2\pi\sqrt{\frac{a^2 + b^2}{2}}$ for a

_____ 10. $A = P + Prt$ for P

Write an equation and solve.

11. Roy needs to make a 2-part rectangular kennel with a common side for 2 different sizes of dogs. The length of the large dogs' kennel is twice the length of the small dogs' kennel. The width of each kennel is the same and is one-third of the length of the large dogs' kennel. If 720 ft of fencing is used, find the width and length of each kennel.
12. Two jets depart at the same time from airports 2556 miles apart and fly toward each other. If they pass one another after 2 hr and 39 min and one jet is 74.5 mi/hr faster than the other, what are their average speeds?
13. A total of \$3490 is invested in 2 accounts: one with 3% simple interest and the other with 5.2% simple interest. How much money should be invested in each account to earn at least \$170 in interest in the first year?
14. Hope has 30 gal of a 15% saltwater solution. How much water should evaporate to cause the solution to be a 20% salt solution?

Solving Inequalities

Solve and graph the solution set.

1. $7x + 2 > 9x + 3(x + 1)$

2. $-6(x + 4) \leq 3x + 12$

3. $5(x + 9) + 2(4x - 7) \neq 8x$

Solve each inequality.

4. $6(0.35x + 0.08) + 0.16(2x - 15) < -1.25(x - 0.4)$

5. $18(2y - 6) - 26(5y - 1) \leq 10(y + 4) - 9(8y - 2)$

6. If $8 < 2x < 20$, then $a < x^2 < b$. Find a and b .

Write and solve an inequality to answer each question.

7. Find all numbers such that the sum of twice the number and 19 is greater than -15 .

8. Actuaries estimate that the remaining number of years that an average 17-year-old male expects to live is 57.22 yr. They estimate that an average 17-year-old female's remaining life expectancy is 62.9 yr. Write each of these estimates as an inequality.

9. To earn a C, Samantha's test average must be greater than or equal to 70 and less than 80. If the scores on her first 4 tests were 68, 81, 72, and 65, find the range of scores she needs on her fifth test to earn a C.
10. Kristen's credit card is offering a one-time 15% discount on a laptop purchased for college. The computers she is considering range in price from \$450 to \$950. If her parents chip in \$50, how much of her own money can she expect to spend on the computer?

Solve and graph the solution set.

11. $-14 < x + 8 < 14$

12. $-2 < 2x + 16 \leq 28$

13. $5x + 4 \geq 19 \wedge -3x < 9x + 24$

14. $-\frac{7}{2}x + 9 < 23 \vee 4x + 5 > -31$

15. $-30 < 3(x - 4) - 12 < 12$

16. A car salesperson agrees to a commission of \$1000 per sale plus 30% of the sale price. The range of commission the car salesperson earns per sale varies from \$8500 to \$27,100. What is the range of car prices?
17. Dolbear's Law gives the relationship between outdoor temperature and the number of times a cricket chirps per minute. The relationship is modeled by $T = 50 + \frac{N - 40}{4}$, where T = temperature in degrees Fahrenheit and N is the number of chirps per minute. If this law applies for temperatures ranging from 55°F to 100°F, write a compound inequality representing this relationship. Then solve for N to determine the range of number of chirps per minute.