Algebra 2a

Unit 1

Mr. VanAlstine

Name: _____

Name_____ Class_____ Date_____

Lesson 1-1

Properties of Real Numbers

Lesson Objectives	NAEP 2005 Strand: Number Properties and Operations
1 Graphing and ordering real numbers 2 Identifying and using properties of real numbers	Topics: Number Sense; Properties of Number and Operations Local Standards: _____

Vocabulary and Key Concepts

Subsets of Real Numbers

Natural numbers $1, 2, 3, 4, \ldots$

Natural numbers are _____

Whole numbers $0, 1, 2, 3, 4, \ldots$

Whole numbers are _____

Integers $\ldots -3, -2, -1, 0, 1, 2, 3, 4, \ldots$

The integers are _____

Each negative integer is the [ ], or additive [ ], of a positive integer.

Rational numbers

Rational numbers are _____

Each quotient must have a [ ] denominator.

Some rational numbers can be written as _____

All other rational numbers can be written as _____

Examples $\frac{7}{5}, \frac{-3}{2}, -\frac{4}{5}, 0, 0.3, -1.2, 9$

Irrational numbers

Irrational numbers are _____

Their decimal representations neither [ ] nor [ ].

If a positive rational number is not a perfect square such as 25 or $\frac{4}{9}$, then its square root is [ ].

Examples $\sqrt{2}, \sqrt{7}, \sqrt{\frac{2}{3}}, \pi, 1.011011101111011111 \ldots$

The opposite or additive inverse of any number a is _____

The reciprocal or multiplicative inverse of any nonzero number a is _____

The absolute value of a real number is its _____

Name_____ Class_____ Date _____

Properties of Real Numbers

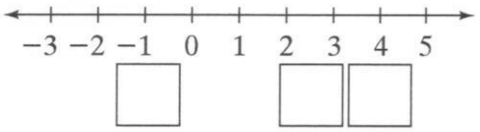
Let a, b, and c represent real numbers.

Property	Addition	Multiplication
	$a + b$ is a real number	ab is a real number
	$a + b = b + a$	$ab = ba$
	$(a + b) + c = a + (b + c)$	$(ab)c = a(bc)$
	$a + 0 = a, \quad 0 + a = a$	$a \cdot 1 = a, \quad 1 \cdot a = a$
	$a + (-a) = 0$	$a \cdot \frac{1}{a} = 1, \quad a \neq 0$
	$a(b + c) = ab + ac$	

Examples

1 Graphing Numbers on the Number Line Graph the numbers $-\frac{3}{4}$, $\sqrt{7}$, and 3.6 on a number line.

$-\frac{3}{4}$ is between ☐ and 0. Use a calculator to find that $\sqrt{7} \approx$ ☐.



2 Ordering Real Numbers Compare -9 and $-\sqrt{9}$. Use the symbols $<$ and $>$.

$\sqrt{9} =$ ☐, so $-\sqrt{9} =$ ☐.

Since $-9 < -3$, it follows that $-9 <$ ☐.

Quick Check

1. Graph the numbers $-\sqrt{2}$, $0.\overline{3}$, and $-2\frac{1}{4}$.

2. Compare $-\sqrt{0.08}$ and $-\sqrt{0.1}$ using the symbols $<$ and $>$.

Name_____ Class_____ Date_____

Examples

❸ Finding Inverses Find the opposite and the reciprocal of each number.

a. $-3\frac{1}{7}$

Opposite: $-\left(-3\frac{1}{7}\right) =$ ☐

Reciprocal: $\frac{1}{-3\frac{1}{7}} = \frac{1}{-\frac{22}{7}} =$ ☐

b. 4

Opposite: ☐

Reciprocal: ☐

❹ Identifying Properties of Real Numbers Which property is illustrated?

a. $(-7)(2 \cdot 5) = (-7)(5 \cdot 2)$

☐

b. $3 \cdot (8 + 0) = 3 \cdot 8$

☐

❺ Finding Absolute Value Simplify $\left|4\frac{1}{3}\right|$, $|-9.2|$, and $|3 - 8|$.

$4\frac{1}{3}$ is $4\frac{1}{3}$ units from 0, so $\left|4\frac{1}{3}\right| =$ ☐.

-9.2 is 9.2 units from 0, so $|-9.2| =$ ☐.

$|3 - 8| = |$☐$|$ and ☐ is ☐ units from 0; $|$☐$| =$ ☐, thus $|3 - 8| =$ ☐.

Quick Check

3. Find the opposite and reciprocal of each number.

a. $4\frac{1}{5}$

☐

b. -0.002

☐

c. $-\frac{4}{9}$

☐

4. Which property is illustrated?

a. $(3 + 0) - 5 = 3 - 5$

☐

b. $-5 + [2 + (-3)] = (-5 + 2) + (-3)$

☐

5. a. Simplify $|-10|$, $|1.5|$, $|0 - 3|$.

☐

b. For what values of x does $|x| = -x$?

☐

Name_____ Class_____ Date _____

Lesson 1-2

Algebraic Expressions

Lesson Objectives	NAEP 2005 Strand: Algebra
1 Evaluating algebraic expressions	Topic: Variables, Expressions, and Operations
2 Simplifying algebraic expressions	Local Standards: _____

Vocabulary and Key Concepts

Properties for Simplifying Algebraic Expressions

Let a, b, and c represent real numbers.

Definition of ☐

$a - b = a + (-b)$

Definition of ☐

$a \div b = \frac{a}{b} = a \cdot \frac{1}{b}, b \neq 0$

Distributive Property for ☐

$a(b - c) = ab - ac$

Multiplication by 0

☐ $\cdot a = 0$

Multiplication by −1

☐ $\cdot a = -a$

Opposite of a ☐

$-(a + b) = -a + (-b)$

Opposite of a ☐

$-(a - b) = b - a$

Opposite of a ☐

$-(ab) = -a \cdot b = a \cdot (-b)$

Opposite of an ☐

$-(-a) = a$

A variable is _____

An algebraic expression or a variable expression is an expression that contains _____

_____

To evaluate an expression, _____

_____

A term is _____

A coefficient is _____

Examples

1 Evaluating an Expression with Exponents Evaluate $(k - 18)^2 - 4k$ for $k = 6$.

Name_____ Class_____ Date_____

❷ Elections The expression $-0.08y^2 + 3y$ models the percent increase of voters in a town from 1990 to 2000. In the expression, y represents the number of years since 1990. Find the approximate percent of increase of voters by 1998.

The number of voters had increased by about ☐%.

❸ Combining Like Terms Simplify $2h - 3k + 7(2h - 3k)$ by combining like terms.

Quick Check

1. Evaluate each expression for $c = -3$ and $d = 5$.
   a. $c^2 - d^2$
   b. $c(3 - d) - c^2$
   c. $-d^2 - 4(d - 2c)$

2. **a.** Assume that the model in Example 2 holds for future years. What percent of the eligible voters will vote in 2012? In 2020?

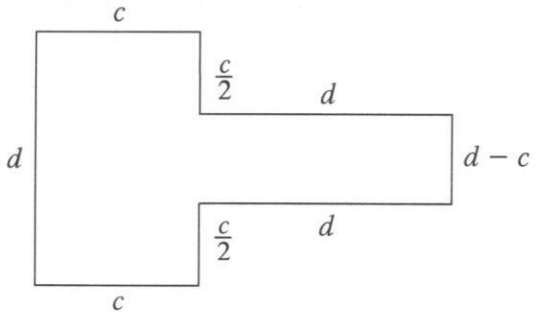
   b. Critical Thinking Give some reasons that the model may not hold in future years.

3. Simplify by combining like terms.
   a. $2x^2 + 5x - 4x^2 + x - x^2$
   b. $-2(r + s) - (2r + 2s)$

Name_____ Class_____ Date _____

Example

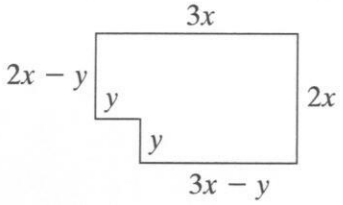
❹ Finding Perimeter Find the perimeter of this figure. Simplify the answer.



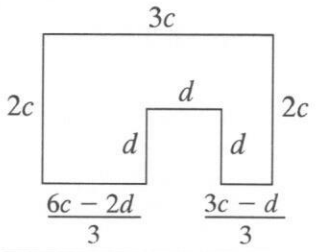
Quick Check

4. Find the perimeter of each figure. Simplify the answer.

a.



b.



Name_____ Class_____ Date_____

Lesson 1-3

Solving Equations

Lesson Objectives	NAEP 2005 Strand: Algebra
1 Solving equations 2 Writing equations to solve problems	**Topics:** Variables, Expressions, and Operations; Equations and Inequalities **Local Standards:** _____

Vocabulary and Key Concepts

Properties of Equality

Let a, b, and c represent real numbers.

_____ **Property**
$a = a$

_____ **Property**
If $a = b$, then $b = a$.

_____ **Property**
If $a = b$ and $b = c$, then $a = c$.

_____ **Property**
If $a = b$, then b may be substituted for a in any expression to obtain an equivalent expression.

_____ **Property**
If $a = b$, then $a + c = b + c$.

_____ **Property**
If $a = b$, then $a - c = b - c$.

_____ **Property**
If $a = b$, then $ac = bc$.

_____ **Property**
If $a = b$ and $c \neq 0$, then $\frac{a}{c} = \frac{b}{c}$.

A solution of an equation is _____

Example

1 Using the Distributive Property Solve $4(m + 9) = -3(m - 4)$.

Quick Check

1. Solve each equation. Check your answers.

a. $2(y - 3) + 6 = 70$

b. $6(t - 2) = 2(9 - 2t)$

Name_____ Class_____ Date _____

Examples

❷ Solving a Formula for One of Its Variables The formula for the surface area of a rectangular prism ℓ units long, w units wide, and h units high is $A = 2(\ell w + \ell h + wh)$. Solve the formula for w.

❸ Solving an Equation for One of Its Variables Solve $\frac{x}{a} + 8 = b$ for x. Find any restrictions on a and b.

Quick Check

2. The formula for the area of a trapezoid is $A = \frac{1}{2}h(b_1 + b_2)$. Solve it for b_1.

3. Solve each equation for x. Find any restrictions.

a. $ax + bx - 15 = 0$

b. $d = \frac{2x}{a} + b$

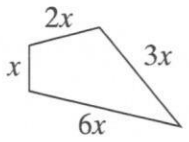
Name_____ Class_____ Date_____

Examples

4 Using Ratios The sides of a quadrilateral are in the ratio 1 : 2 : 3 : 6. The perimeter is 138 cm. Find the lengths of the sides.

Relate Perimeter equals the sum of the lengths of the four sides.

Define Let ☐ = the length of the shortest side.



Then ☐ = the length of the second side.

Then ☐ = the length of the third side.

Then ☐ = the length of the fourth side.

Write $138 =$ ☐ $+$ ☐ $+$ ☐ $+ 6x$

The lengths of the sides are ☐ cm, ☐ cm, ☐ cm, and ☐ cm.

5 Aeronautics A plane takes off and flies east at a speed of 350 mi/h. Thirty-five minutes later, a second plane takes off from the same airport and flies east at a higher altitude at a speed of 400 mi/h. How long does it take the second plane to overtake the first plane?

Relate distance second plane travels = ☐

Define Let ☐ = the time in hours for the second plane.

Then $t + \frac{35}{60} = t + \frac{\square}{12}$ = the time in hours for the first plane.

Write

$t =$ ☐ h or 4 h 5 min

Check Is the answer reasonable? In 4 h, the second plane travels ☐ mi. In $4\frac{2}{3}$ h, the first plane travels about ☐ mi. The answer ☐ reasonable.

Name_____ Class_____ Date _____

Quick Check

4. The sides of a triangle are in the ratio 12 : 13 : 15. The perimeter is 120 cm. Find the lengths of the sides of the triangle.

5. A space probe leaves Earth at the rate of 3 km/s. After 100 days, a radio signal is sent to the probe. Radio signals travel at the speed of light, about 3×10^5 km/s. About how long does the signal take to reach the probe?

Name_____ Class_____ Date_____

Lesson 1-4

Solving Inequalities

Lesson Objectives	NAEP 2005 Strand: Algebra
1 Solving and graphing inequalities 2 Compound inequalities	Topic: Equations and Inequalities Local Standards: _____

Vocabulary and Key Concepts

Properties of Inequalities

Let a, b, and c represent real numbers.

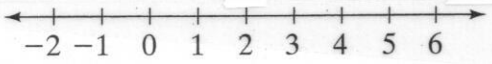
_____	Property	If $a \le b$ and $b \le c$, then $a \le c$.
_____	Property	If $a \le b$, then $a + c \le b + c$.
_____	Property	If $a \le b$, then $a - c \le b - c$.
_____	Property	If $a \le b$ and $c > 0$, then $ac \le bc$. If $a \le b$ and $c < 0$, then $ac \ge bc$. ← Notice that the inequality is reversed when c is negative.
_____	Property	If $a \le b$ and $c > 0$, then $\frac{a}{c} \le \frac{b}{c}$. If $a \le b$ and $c < 0$, then $\frac{a}{c} \ge \frac{b}{c}$. ← Notice that the inequality is reversed when c is negative.

A compound inequality is _____

_____

Example

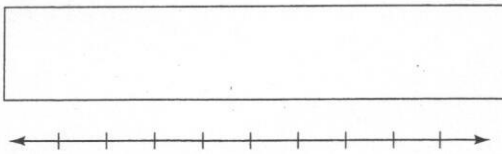
1 Solving and Graphing Inequalities Solve $-2x < 3(x - 5)$. Graph the solution.



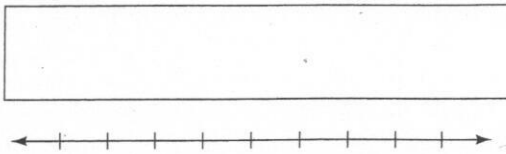
Quick Check

1. Solve each inequality. Graph the solution.

a. $3x - 6 < 27$



b. $12 \ge 2(3n + 1) + 22$



Name_____ Class_____ Date _____

Examples

❷ No Solutions or All Real Numbers as Solutions Solve $7x \geq 7(2 + x)$. Graph the solution.

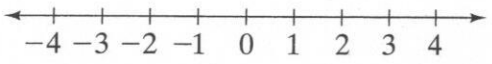
❸ Compound Inequality Containing *And* Graph the solution of $2x - 1 \leq 3x$ and $x > 4x - 9$.

$2x - 1 \leq 3x$ and $x > 4x - 9$

$-1 \leq \square$ | $\square > 3x$

$\square \leq x$ and $\square > x$

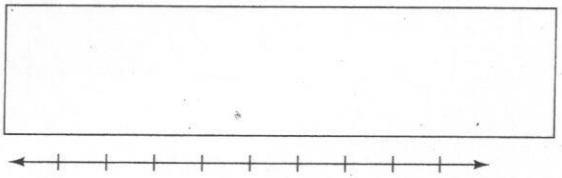
This compound inequality can be written as $-1 \square x \square \square$.



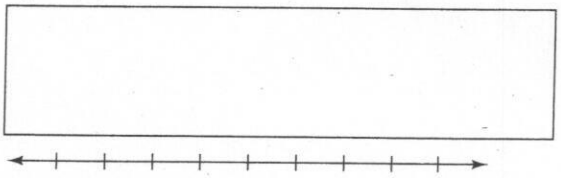
Quick Check

2. Solve each inequality. Graph the solution.

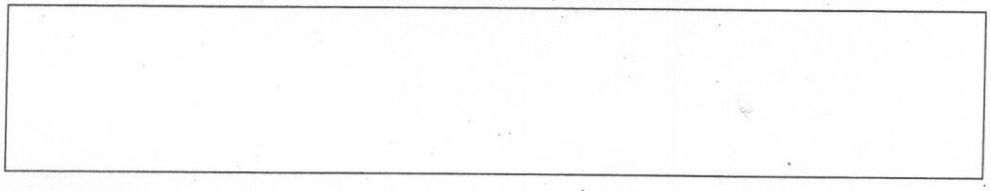
a. $2x < 2(x + 1) + 3$



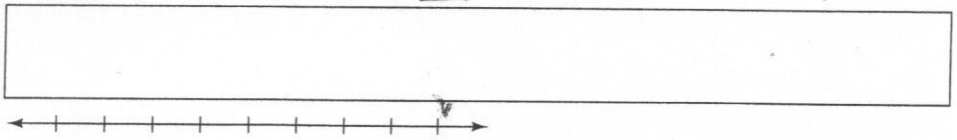
b. $4(x - 3) + 7 \geq 4x + 1$



c. Critical Thinking Find values of a such that $2x + a > 2x$ has no solution. Then find values of a such that all real numbers are solutions.



3. Graph the solution of $2x > x + 6$ and $x - 7 < 2$.



Name_____ Class_____ Date_____

Examples

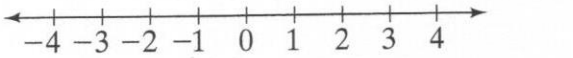
combine both graphs... they both are true

4 Compound Inequality Containing *Or* Graph the solution of $3x + 9 < -3$ or $-2x + 1 < 5$.

$3x + 9 < -3$ or $-2x + 1 < 5$

$3x <$ ☐ | $-2x <$ ☐

$x <$ ☐ or x ☐ ☐



5 Applying Compound Inequalities A strip of wood is to be 17 cm long with a tolerance of ±0.15 cm. How much should be trimmed from a strip 18 cm long to allow it to meet specifications?

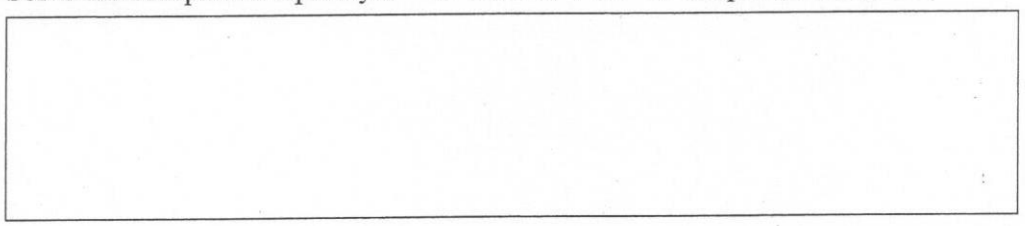
Relate minimum length ≤ final length ≤ maximum length

Define Let x = number of centimeters to remove.

At least ☐ cm and no more than ☐ cm should be trimmed.

Quick Check

4. Solve the compound equality $x - 1 < 3$ or $x + 3 > 8$. Graph the solution.



5. The plans for a circular part in a medical instrument require a diameter to be within 0.2 in. of 1.5 in. A machinist finds that the diameter is now 1.73 in. By how much should the diameter be decreased? Do just like ex #5

Name_____ Class_____ Date _____

Lesson 1-5

Absolute Value Equations and Inequalities

Lesson Objectives	NAEP 2005 Strand: Number Properties and Operations; Algebra
1 Absolute value equations 2 Absolute value inequalities	Topics: Number Sense; Equations and Inequalities Local Standards: _____

Vocabulary and Key Concepts

Algebraic Definition of Absolute Value

If $x \geq 0$, then $|x| =$ ☐. If $x < 0$, then $|x| =$ ☐.

Absolute Value Inequalities

Let k represent a positive real number.

$|x| \geq k$ is equivalent to $x \leq$ ☐ or $x \geq$ ☐.

$|x| \leq k$ is equivalent to $-k \leq$ ☐ $\leq k$.

An extraneous solution is _____

_____

The tolerance is _____

_____

Examples

1 Solving Multi-Step Absolute Value Equations Solve $4 - 2|x + 9| = -5$.

1st step: Isolate the Abs. Value

$4 - 2|x + 9| = -5$

$-2|x + 9| =$ ☐ Add ☐ to each side.

$|x + 9| =$ ☐ Divide each side by ☐.

$x + 9 =$ ☐ or $x + 9 =$ ☐ Rewrite as two equations.

$x =$ ☐ or $x =$ ☐ Subtract ☐ from each side of both equations.

Check

$4 - 2|x + 9| = -5$

$4 - 2|$☐$ + 9| \stackrel{?}{=} -5$

$4 - 2|$☐$| \stackrel{?}{=} -5$

$4 - 2($☐$) \stackrel{?}{=} -5$

☐ $= -5$ ✔

$4 - 2|x + 9| = -5$

$4 - 2|$☐$ + 9| \stackrel{?}{=} -5$

$4 - 2|$☐$| \stackrel{?}{=} -5$

$4 - 2($☐$) \stackrel{?}{=} -5$

☐ $= -5$ ✔

Name_____ Class_____ Date_____

a solution that does not work if "checked"

2 Checking for Extraneous Solutions Solve $|3x - 4| = -4x - 1$.

$|3x - 4| = -4x - 1$

$3x - 4 =$ or $3x - 4 = -($ $)$ Rewrite as two equations.

Solve each equation.

$x =$ $\square$ or $x =$ $\square$

Check $|3x - 4| = -4x - 1$ $|3x - 4| = -4x - 1$

$\square$ is an extraneous solution. The only solution is $\square$.

3 Solving Inequalities of the Form $|A| \geq b$ Solve $|2x - 5| > 3$. Graph the solution.

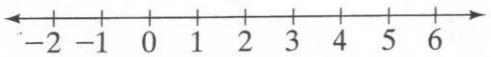
$|2x - 5| > 3$

* you must flip the sign and flip the inequality

$2x - 5 <$ $\square$ or $2x - 5 >$ $\square$ Rewrite as a compound inequality.

$2x <$ $\square$ $2x >$ $\square$ Solve for x.

$x <$ $\square$ or $x >$ $\square$



Quick Check

Solve each equation. Check for extraneous solutions.

1. $2|3x - 1| + 5 = 33$

2. $|2x + 3| = 3x + 2$

3. Solve $|2x - 3| > 7$. Graph the solution.

Name_____ Class_____ Date _____

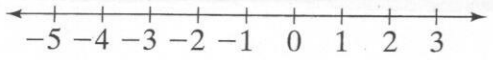
Examples

❹ Solving Inequalities of the Form $|A| < b$ Solve $-2|x + 1| + 5 \geq -3$. Graph the solution.

$-2|x + 1| + 5 \geq -3$

$-2|x + 1| \geq$ ☐ **Isolate the absolute value expression.**

Subtract ☐ **from each side.**



❺ Writing an Absolute Value Inequality The area A in square inches of a square photo is required to satisfy $8.5 \leq A \leq 8.9$. Write this requirement as an absolute value inequality.

$\frac{8.9 - 8.5}{2} = \frac{0.4}{2} =$ ☐ **Find the tolerance.**

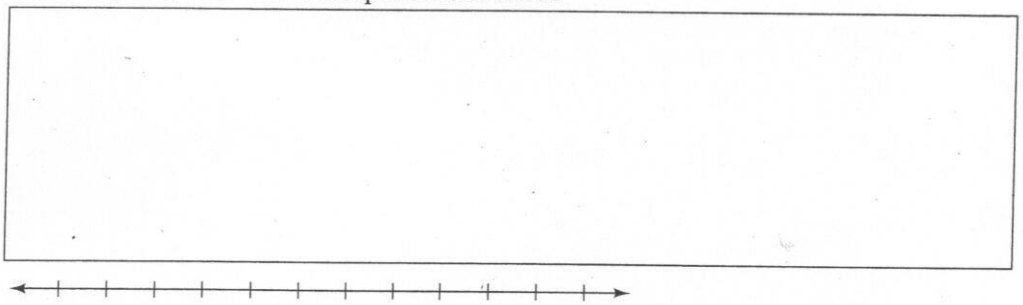
$\frac{8.9 + 8.5}{2} = \frac{\square}{2} =$ ☐ **Find the average of the maximum and minimum values.**

$-0.2 \leq A -$ ☐ $\leq$ ☐ **Write an inequality.**

$|A -$ ☐ $| \leq$ ☐ **Rewrite as an absolute value inequality.**

Quick Check

4. Solve $|5z + 3| - 7 < 34$. Graph the solution.



5. The specification for the circumference C in inches of a basketball for junior high school is $27.75 \leq C \leq 28.5$. Write the specification as an absolute value inequality.

Name _____ Class _____ Date _____

Must show work on sep. paper and attach!

Practice 1-5

Absolute Value Equations and Inequalities

Write each specification as an absolute value inequality.

1. $6.3 \leq h \leq 10.3$
2. $-2.5 \leq a \leq 2.5$
3. $22 \leq x \leq 33$

Solve each inequality. Graph the solutions.

4. $|x + 5| > 12$
5. $|k - 3| \leq 19$
6. $|x + 2| \geq 0$
7. $2|t - 5| < 14$
8. $|3x - 2| + 7 \geq 11$
9. $5|2b + 1| - 3 \leq 7$
10. $|2 - 3w| \geq 4$
11. $-3|7m - 8| < 5$
12. $|2u| > 6$

Solve each equation. Check for extraneous solutions.

13. $|4x| = 28$
14. $|3x + 6| = -12$
15. $|z - 1| = 7z - 13$
16. $|s + 12| = 15$
17. $|-3x| = 63$
18. $2|5x + 3| = 16$
19. $|6x + 7| = 5x + 2$
20. $|7r - 4| = 24$
21. $|3c| + 2 = 11$
22. $5|x + 1| + 6 = 21$
23. $|3x + 5| - 2x = 3x + 4$
24. $-|d + 2| = 7$

Write an absolute value inequality and a compound inequality for each length x with the given tolerance.

Answer

25. a length of 4.2 cm with a tolerance of 0.01 cm $|x-4.2| \leq .01$
26. a length of 3.5 m with a tolerance of 0.2 cm
27. a length of 10 ft with a tolerance of 1 in.
28. Write an absolute value inequality and a compound inequality for the temperature T that was recorded to be as low as 65°F and as high as 87°F on a certain day.
29. The weight of a 40-lb bag of fertilizer varies as much as 4 oz from the stated weight. Write an absolute value inequality and a compound inequality for the weight w of a bag of fertilizer.
30. The duration of a telephone call to a software company's help desk is at least 2.5 minutes and at most 25 minutes. Write an absolute value inequality and a compound inequality for the duration d of a telephone call.

Name_____ Class_____ Date_____

Lesson 1-6

Probability

Lesson Objectives	**NAEP 2005 Strand:** Data Analysis and Probability
1 Experimental probability	**Topic:** Probability
2 Theoretical probability	**Local Standards:** _____

Vocabulary and Key Concepts

Experimental Probability

experimental probability of event = P(event)

$$= \frac{\text{number of times the } \square \text{ occurs}}{\text{number of } \square}$$

Theoretical Probability

If a sample space has n equally likely outcomes and an event A occurs in m of these outcomes, then the theoretical probability of event A is $P(A) = \frac{\square}{\square}$.

A simulation is _____

A sample space is _____

Examples

1 Finding Experimental Probability A player hit the bull's-eye on a circular dartboard 8 times out of 50. Find the experimental probability that the player hits the bull's-eye.

P(bull's-eye) = $\frac{\square}{50}$ = $\square$, or $\square$%

2 Finding Theoretical Probability Find the theoretical probability of getting a multiple of 3 when you roll a number cube.

$\square$ outcomes result in a multiple of 3. → $\frac{2}{\square}$ ← $\square$ equally likely outcomes are in the sample space.

$= \frac{\square}{\square}$

Name_____ Class_____ Date _____

3 Biology Brown is a dominant eye color for human beings. If a father and mother each carry a gene for brown eyes and a gene for blue eyes, what is the probability of their having a child with blue eyes?

		Gene from Mother	
		B	b
Gene from Father	B	BB	Bb
	b	Bb	bb

Let [B] represent the dominant gene for brown eyes. Let [b] represent the recessive gene for blue eyes.

The sample space {[ ], [ ], [ ], [ ]} contains [ ] equally likely outcomes.

The outcome [ ] is the only one for which a child will have blue eyes.

So, P(blue eyes) = [ ]. The theoretical probability that the child will have blue eyes is [ ], or [ ]%.

Quick Check

1. A basketball player has made 32 free throws in 50 tries. What is the experimental probability of her making a free throw?

2. Find the theoretical probability of getting a prime number when you roll a number cube.

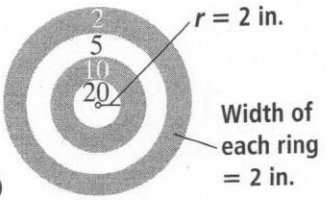
3. Use the information from Example 3. What is the probability the parents will have a child with brown eyes?

Name_____ Class_____ Date_____

Area circle = $\pi \cdot r^2$

Example

4 Finding Geometric Probability Find the probability that a dart that lands at random on the dartboard hits the outer ring.



$$P(\text{outer ring}) = \frac{\text{area of outer ring}}{\text{area of circle with radius } 4r}$$

$$= \frac{(\text{area of circle with radius } 4r) - (\text{area of circle with radius } 3r)}{\text{area of circle with radius } 4r}$$

$$= \frac{\pi(\square)^2 - \pi(\square)^2}{\pi(4r)^2}$$

$$= \frac{\square\pi r^2 - \square\pi r^2}{\square\pi r^2}$$

$$= \frac{\square\pi r^2}{\square\pi r^2}$$

$$= \square$$

The theoretical probability of hitting the outer ring is $\square$, or about $\square$%.

Quick Check

4. Use the dartboard from Example 4. Find each probability.

a. P(scoring 20 points)

b. P(scoring 5 points)

Name _____ Class _____ Date _____

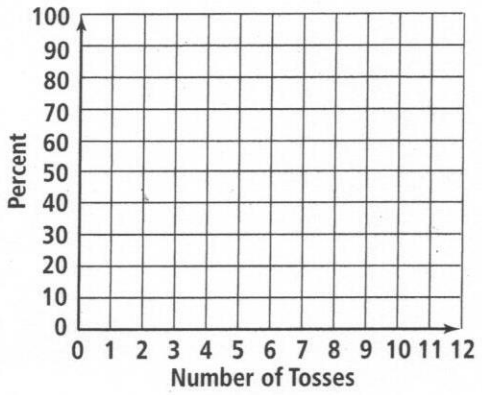
Activity 32: It's a Toss-Up Alg 2 1.6

MATERIALS: coin

Toss a coin 12 times. Make a check (✔) beside "Tails" each time a tail appears and beside "Heads" each time a head appears. To generate the next row, write the total number of tails (or heads) you have obtained so far over the total number of tosses. Find the percent by dividing the numerator by the denominator and multiplying the result by 100. Round to the nearest whole number.

Tosses	1	2	3	4	5	6	7	8	9	10	11	12
Tails												
$\frac{\text{Total tails}}{\text{Total tosses}}$												
Percent of Tails												
Heads												
$\frac{\text{Total heads}}{\text{Total tosses}}$												
Percent of Heads												

Make a double line graph to show your results. Use a solid line for the percent of tails obtained. Use a dotted line for the percent of heads.



1. Analyze the graph. What do you notice?

_____

_____

2. Predict what happens to the percentage of heads and tails if you increase the number of tosses to 100.

_____

_____

Name _____ Class _____ Date _____

Practice 1-6

Probability

1. You select a number at random from the sample space {1, 2, 3, 4, 5}. Find each theoretical probability.
   a. P(the number is 2)
   b. P(the number is even)
   c. P(the number is prime)
   d. P(the number is less than 5)

2. In a class of 19 students, 10 study Spanish, 7 study French, and 2 study both French and Spanish. One student is picked at random. Find each probability.
   a. P(studying Spanish but not French)
   b. P(studying neither Spanish nor French)
   c. P(studying both Spanish and French)
   d. P(studying French)

3. In a telephone survey of 150 households, 75 respondents answered "Yes" to a particular question, 50 answered "No," and 25 were "Not sure." Find each experimental probability.
   a. P(answer was "Yes")
   b. P(answer was "No")
   c. P(answer was "Not sure")
   d. P(answer was not "Not sure")

4. A wallet contains four bills with denominations of \$1, \$5, \$10, and \$20. You choose two of the four bills from the wallet at random and add the dollar amounts.
   a. What is the sample space? How many outcomes are there?
   b. What is the probability of getting \$15?
   c. What is the probability of getting \$50?
   d. What is the probability of getting at least \$25?

5. A basketball player has attempted 24 shots and made 13. Find the experimental probability that the player will make the next shot that she attempts.

6. A baseball player attempted to steal a base 70 times and was successful 47 times. Find the experimental probability that the player will be successful on his next attempt to steal a base.

For Exercises 7–8, define a simulation by telling how you represent correct answers, incorrect answers, and the quiz. Use your simulation to find each experimental probability.

7. If you guess the answers at random, what is the probability of getting at least three correct answers on a four-question true-false quiz?

8. A five-question multiple-choice quiz has four choices for each answer. If you guess the answers at random, what is the probability of getting at least four correct answers?

9. A circular pool of radius 12 ft is enclosed within a rectangular yard measuring 50 ft by 100 ft. If a ball from an adjacent golf course lands at a random point within the yard, what is the probability that the ball lands in the pool?

10. Five people each flip a coin. What is the theoretical probability that all five will get heads?

Name _____ Class _____ Date _____

1D: Visual Vocabulary Practice

For use after Lesson 1-6

Study Skill The Glossary contains the key vocabulary for this course.

Concept List

absolute value
algebraic expression
coefficient
compound inequality
experimental probability
multiplicative inverse
opposite
term
variable

Write the concept that best describes each exercise. Choose from the concept list above.

1. x	**2.** $7y$ in the expression $7y - 3z$	**3.** -2 in the expression $-2a + 15$
4. a and $-a$	**5.** $\lvert -4x + 12 \rvert$	**6.** $x \leq -2$ or $x < 3$
7. a and $\frac{1}{a}$ (for $a \neq 0$)	**8.** $r + 7s$	**9.** $P(\text{event}) = \frac{\text{number of times the event occurs}}{\text{number of trials}}$