NAME: _____ **PERIOD _____**

Chapter 1 – Variable Expressions and Integers

Disclaimer: This packet is your notes for all of chapter 1. It is expected you will take good notes and work the examples in class with your teacher **in pencil**. It is expected that you bring your packet to class every day and do not lose it! Should you be absent, it is expected that you get the notes and examples you missed. This packet will be collected and graded out of 50 points the class after the chapter 1 test.

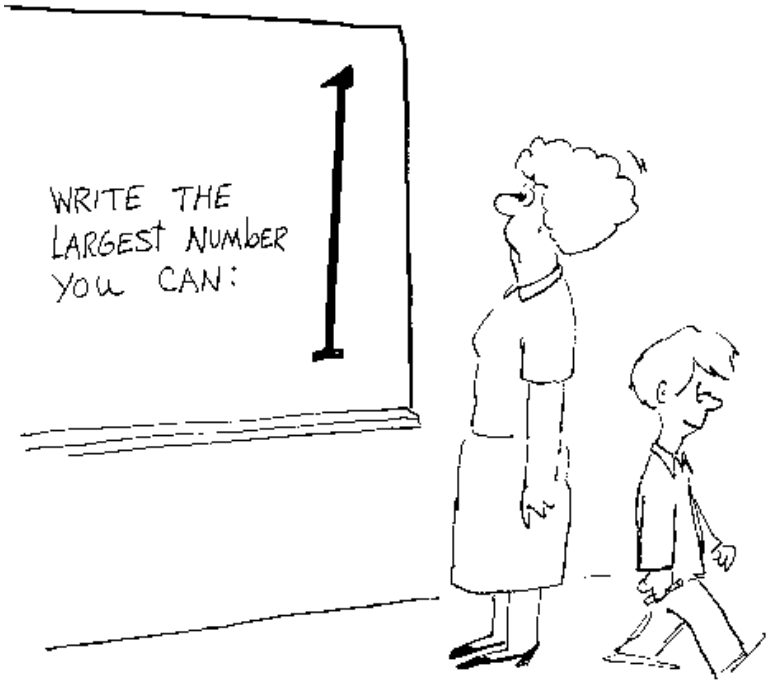
Notes	_____/20
Examples	_____/20
Neatness	_____/10
Total	_____/50

Comments:

6.A.2 - Use substitution to evaluate algebraic expressions (may include exponents of one, two and three)
6.A.4 - Translate two-step verbal sentences into algebraic equations
6.N.23 - Represent repeated multiplication in exponential form
6.N.24 - Represent exponential form as repeated multiplication
7.A.1 - Translate two-step verbal expressions into algebraic expressions
7.A.6 - Evaluate formulas for given input values (surface area, rate, and density problems)
7.N.4 - Develop the laws of exponents for multiplication and division
7.N.11 - Simplify expressions using order of operations *Note: may include absolute value and/or integral exponents greater than 0.*
7.N.12 - Add, subtract, multiply, and divide integers
7.PS.6 - Represent problem situations verbally, numerically, algebraically, and graphically
7.PS.12 - Interpret solutions within the given constraints of a problem
7.CN.4 - Model situations mathematically, using representations to draw conclusions and formulate new situations

Day	Topic	Assignment
1	1.2A Powers and Exponents **TB needed for class**	Assign 1.2A: WS 1.2A
2	1.2B Order of Operations	Assign 1.2B: WS 1.2B
3	1.2C Order of Operations with Exponents and Powers **TB needed for class**	Assign 1.2C: WS 1.2C
4	1.3A Variables and Expressions	Assign 1.3A: WS 1.3A
5	1.3B Translating Expressions	Assign 1.3B: WS 1.3B
6	1.4 Translating Expressions and Equations	Assign 1.4: WS 1.4

Day	Topic	Assignment
7	Quiz Review	Study for Quiz
8	Quiz	None
9	1.5A Solving Equations (addition and subtraction)	Assign 1.5A: WS 1.5A
10	1.5B Equations and Solutions (multiplication and division)	Assign 1.5B: WS 1.5B
11	1.6 Variables in Familiar Formulas	Assign 1.6: WS 1.6
12/13	Review	Complete Review Sheet Study for Test
14	Test	None

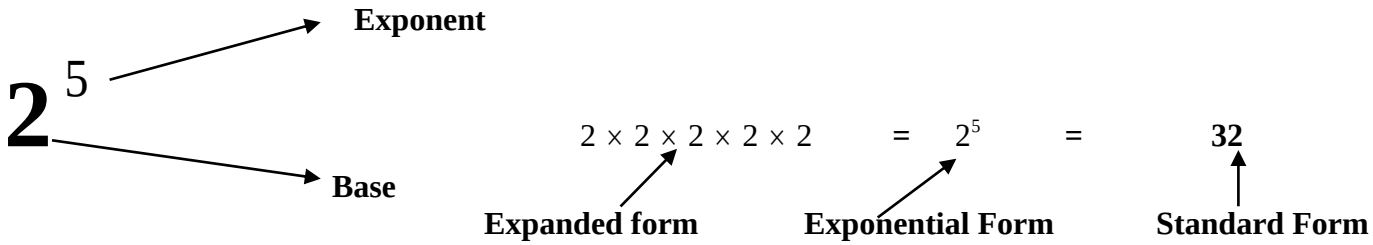


Guided Notes for Lesson 1.2A – Evaluating expressions with powers **Date: _____**

Repeated multiplication of the same number can be written with an _____.

The _____ is the number being multiplied and the _____ shows how many times the base is used as a factor.

$2 \times 2 \times 2 \times 2 \times 2 = 2^5$ and it is read as "2 to the fifth power"



***Any number raised to the power of zero equals _____ Ex. $3^0 = 1$ $43^0 = 1$ $10^0 = 1$

Example 1: **Write the following using exponents.**

a) $8 \cdot 8 \cdot 8 =$ _____	b) $6 \cdot 6 \cdot 6 \cdot 6 \cdot 6 =$ _____	c) $9 \cdot 9 \cdot 9 \cdot 9 =$ _____
d) $10 \cdot 10 \cdot 10 =$ _____	e) $2 \cdot 2 \cdot 2 \cdot 3 \cdot 3 =$ _____	f) $5 \cdot 5 \cdot 4 \cdot 4 \cdot 5 =$ _____
g) $c \cdot c \cdot c \cdot c \cdot c =$ _____	h) $d \cdot d \cdot d =$ _____	i) $a \cdot a \cdot d \cdot d \cdot a =$ _____

Example 2: Write each in standard form without using your calculator.

a) 3^2	b) 5^3	c) 6^4
d) 4^1	e) 12^0	d) $3^2 \times 2^3$

Using your calculator.

To raise a number to the second power with your calculator, also known as squaring it, you can use $\boxed{x^2}$ key on your calculator. Example: 3^2 would be entered as $3\boxed{x^2}$.

The carat symbol is used to raise a number to a power higher than 2, on your calculator.
Example: 5^3 power would be entered as $5\ \boxed{\wedge}\ 3$.

Example 3: Write each in standard form using your calculator.

a) 15^2 (two ways?)	b) 25^2	c) 7^4
d) 5^7	e) 4^5	f) 6^5
g) $12^3 \times 5^4$	h) 14^8	i) $9^{12} \div 3^6$

Example 4 : Compare using >, <, or = without using your calculator.

a) 2^4 _____ 4^3	b) 6^3 _____ 2^{10}	c) 10^4 _____ 10^2
d) 2^6 _____ 8^2	e) 15^4 _____ 16^4	f) 24^0 _____ 75^0

You try these: Page 21

#6	#7	#9
#11	#15	#17

Guided Notes for Lesson 1.2B – Order of operations **Date: _____**

Numerical expression : _____

Evaluate: _____

Order of operations: _____

_____

Order of Operations (Please Excuse My Dear Aunt Sally)

To _____ an expression that has more than one operation:

1. Evaluate expressions inside the _____ symbols. (parentheses, brackets, and the division bar)
2. Evaluate Powers.
3. _____ and _____ from left to right.
4. _____ and _____ from left to right.

} in the order it appears.

You can express multiplication by using parentheses or the symbols $\cdot$ or $\times$.

$6(3) = 18$ new way
get comfortable using it

$6 \cdot 3 = 18$ new way
get comfortable using it

6×3 old way
begin to use it less and less

Example 1: Evaluate the expressions. Your work should look like a V.

a) $9 - 18 \div 6 \times 2$	b) $(16 + 9) \cdot 4$	c) $\dfrac{6 \times 10}{7 + 5}$
d) $48 \div \left[120 \div (4 \cdot 5)\right]$	e) $15 + 9 \div 3$	f) $32 - 9 \times 2 + 7$

g) $5 \bullet 8 - 2 \bullet 14$	h) $11 \bullet \left[(15 - 3) \div 3 \right]$	i) $\dfrac{41 + 13}{9 \times 3}$

Example 2: Evaluate the expressions. Your work should look like a V.

a) $9 \div \left[3 \bullet \left(\dfrac{5}{3} + \dfrac{4}{3} \right) \right]$	b) $(1.5 - 0.5) \times 2$
c) $6 \times (2.4 - 0.4 + 3)$	d) $3 \bullet (12 - 5) + \dfrac{23 - 9}{7}$

Guided Notes for Lesson 1.2C - Evaluate expressions with powers **Date: _____**

Numerical expression: _____

Evaluate: _____

Order of operations: _____

_____

Order of Operations (Please Excuse My Dear Aunt Sally)

To _____ an expression that has more than one operation:

1. Evaluate expressions inside the _____ symbols. (parentheses, brackets, and the division bar)
2. Evaluate Powers.
3. _____ and _____ from left to right.
4. _____ and _____ from left to right.

} in the order it appears.

You can express multiplication by using parentheses or the symbols $\cdot$ or $\times$.

$6(3) = 18$ new way	$6 \cdot 3 = 18$ new way	6×3 old way
get comfortable using it	get comfortable using it	begin to use it less and less

Example 1: Evaluate the expression. Your work should look like a V.

a) $(7-3)^3 - 28 + 8^2$	b) $3 \cdot (2+4)^2 \div 3^2$
c) $(6+5)^2 + 7 - 5^3$	d) $9^3 + 16 \div (7-5)^4$

Page #21

#19	#20	#21
#22	#23	#24

Example 2: Evaluate the expression. Your work should look like a V.

a) $\frac{14}{3^2 - 2}$	b) $\frac{28 - 7}{4^2 - 13}$	c) $\frac{4(3 \bullet 6 - 3)}{2}$
d) $\frac{3 \bullet 4^2}{6 + 10}$	e) $\frac{3^2 + 4}{3(6) - 5}$	f) $2(20 - 5) + \frac{34 - 14}{4}$

Guided Notes for Lesson 1.3A – Evaluating variable expressions **Date: _____**

A _____ is a letter that is used to represent a quantity whose value may change or vary.

A _____ is a mathematical phrase that can be made up of _____ , numbers and operations.

Example Identify the variable(s) in each of the following expressions.

a) $2x + 5$ _____ b) $2a - 4y$ _____ c) $\frac{t+2}{5h}$ _____

The act of replacing variables with numbers in an expression is called _____.
When you substitute numbers in for variables, you **must** follow the order of operations.

Example 1: Evaluate $k + 12$ for each value of k.

a) $k = 14$	b) $k = 7$

Example 2: Evaluate $15 - h$ for each value of h. Show all work.

a) $h = 2$	b) $h = 10$

Example 3: Evaluate $x - 45$ for each value of x.

a) $x = 78$	b) $x = 89$

Example 4: Evaluate $3r$ for each value of r.

a) $r = 8$	b) $r = 5$

Example 5: Evaluate $2y + 5$ for each value of *y*.

a) $y = 7$	b) $y = 3$

Example 6: Evaluate each of the following for $x = 2$, $y = 3$, $z = 5$, and $w = 7$.

a) $5w - 3z$	b) $2x + 3w$	c) $7x + 3y$
d) $w - xy$	e) $zw - y$	f) $wx + yz$
g) $3(x + z)$	h) $2(x + y - z)$	i) $5(2w - z)$
j) $\frac{w + z}{6}$	k) $\frac{w + z}{w - z}$	l) $\frac{2w - x}{3y - z}$
m) $(xy)^2$		n) xy^2

Guided Notes for Lesson 1.3B – Variable expressions **Date: _____**

A _____ is a mathematical phrase that can be made up of _____ , numbers and operations.

Writing Expressions
The following common words and phrases indicate addition, subtraction, multiplication, division, and equals.

Addition	Subtraction	Multiplication	Division	Equals
plus the sum of increased by more than added to combined, together total of	minus difference of difference between decreased by fewer than less than fewer than subtracted from diminished by	times product of multiplied by of twice doubled tripled	divided by the quotient of per out of the ratio of each half (divide by 2) a third (divide by 3)	**is** **gives** **yields**

Example 1: Translate the words into mathematics expressions. Use the variable that you see in parentheses.

a) A number (x) increased by 15 _____

b) The difference of a number (y) and 6 _____

c) The product of a number (t) and 4 _____

d) The quotient of a number (z) and 3 _____

e) Six times a number (b) plus 14 _____

f) Five times a number (h) decreased by 7 _____

g) A number (e) divided by 3, increased by 6_____

h) The quotient of a number (k) and 2, minus 17 _____

Example 2: Translate each of the following one-step expressions into words.

a) $x + 5$ _____

b) $y - 8$ _____

c) $7k$ _____

e) $\frac{f}{9}$ _____

Example 3: Translate each of the following two-step expressions into words.

a) $4x + 3$ _____

b) $9y - 8$ _____

c) $\frac{f}{2} + 7$ _____

Example 4: If Tom is *t* years old, translate the words into mathematics expressions.

a) Twice tom's age _____

b) Eight years older than Tom _____

c) 20 years younger than Tom _____

d) One third of Tom's age _____

e) Six more than five times Tom's age _____

f) 40 years minus 8 times Tom's age _____

Guided Notes for Lesson 1.4 – Translating equations **Date: _____**

An _____ is a mathematical sentence showing two equal expressions.

The two expressions are separated by the word _____, meaning equals.

Example1: Translate these equations into words two different ways.

a) $x + 5 = 12$ _____

_____

b) $k - 6 = 18$ _____

_____

c) $6k = 18$ _____

_____

d) $\frac{t}{9} = 4$ _____

_____

Example 2: Translate these words into an equation. Use the variable that you see in parentheses.

a) A number (x) increased by 3 is 16. _____

b) A number (y) minus 15 is 27. _____

c) Three times a number (x) is 18. _____

d) The quotient of a number (y) and 5 is 11. _____

e) Seventy two is 25 more than a number (x). _____

f) The product of 17 and a number *(x)* is 51. _____

g) Twelve less than the product of 5 and a number (*y)* is 60. _____

h) Jeanne has $17and needs *(d)* more dollars buy a game that costs $68. _____

i) Ellen is (*x)* years old. In thirteen years she will be twenty-four years old. _____

j) Each candy bar costs $2.00. The price of *h* candy bars is $38.00. _____

k) Sue made a withdrawal of (*d)* dollars from account. Her old balance was $350 and her new balance is $280. _____

l) A pizza with 15 slices is shared among (*p)* students so that each student's share is 3 slices.

_____

m) Eric had $197 in his savings account before he was paid his weekly salary (*s)*. His current savings balance is $429. Can write this equation two different ways?

_____

_____

Chapter 1 Quiz Review: Section 1.1-1.4 Date: _____

When you see the saw graphic, SHOW ALL WORK to receive full credit. Calculators are not allowed.

For 1–6 evaluate the expression.

1) $21 - 2 \cdot 7$	2) $16 \div 8 + 9 \cdot 3$	3) $\dfrac{35}{12 - 5}$
4) $27 \div \left[(10 + 8) \div 6 \right]$	5) $3^3 + (8 + 1)^2$	6) $6^2 + 4 \cdot 18$

For 7–10 evaluate the expression for the given value of the variable.

7) $7a - 4 - 11$ when $a = 5$	8) $3 \cdot 7 + b \cdot 9$ when $b = 9$
9) $(c + 8)^2 - 4 \cdot 5$ when $c = 2$	10) $16 \cdot 6 \div (8 - x)^3$ when $x = 6$

For 11-14, translate the words into a variable expression. Let *x* represent the number.

11) A number decreased by 2. _____

12) The quotient of 6 and a number. _____

13) A number divided by 8, increased by 5. _____

14) Fifteen less than the product of a number and 7. _____

For 15-16, translate the words into an equation. Let *x* represent the number.

15) Twenty more than a number is 31. _____

16) The difference of 41 and 8 times a number is 57. _____

17) To rent an RV it will cost you $750 each month.

a) Write a variable expression for the cost of renting for *m* months.

a) _____

b) Using your answer from part a), find the cost for 4 months.

b) _____

Guided Notes for Lesson 1.5A – One step equations (addition/subtraction) Date: _____

An _____ is a mathematical sentence showing two equal expressions.

To solve an equation means to find the only value of the variable that makes the equation _____.

For example, in the equation $x + 6 = 10$, $x = 4$ is the only _____ When 4 is substituted in for x, then $4 + 6 = 10$. The number 4 makes the equation true.

Example 1: Decide if the given number is a solution to the equation (answer yes or no). This is called a check.

a) $x + 5 = 12$ $\overset{?}{x = 7}$	b) $k - 6 = 18$ $\overset{?}{k = 12}$	c) $t - 5 = 17$ $\overset{?}{t = 22}$

To solve an equation you use the _____**.** You must always do the same inverse operation to both sides of the equation.

Keep in mind you want the _____ all alone on one side of the equation.

Example 2: **Solve the given equation and check your solution! These are called one-step equations.**

a) $x - 5 = 12$	b) $x + 8 = 15$
c) $13 = n + 9$	d) $17 = n - 14$

You try these: Solve the given equation and <u>check</u> your solution!

a) $y + 5 = 9$	b) $k - 47 = 23$
c) $36 = w - 8$	d) $27 = y + 18$

Use a let statement to define your variable. Write an equation to model the situation. Solve the equation.

Example 2: Lisa is cooking muffins. The recipe calls for 7 cups of sugar. She has already put in 2 cups. How many more cups does she need to put in?

Example 3: Last week Julia ran 30 miles more than Paula. Together they ran 77 miles. How many miles did Paula run?

Example 4: Trevor lost $41. He now has $29. How much money did he originally have?

Example 5: Jordon gave 22 baseball cards to his best friend. He now has 86 baseball cards. How many baseball cards did he start with?

Guided Notes for Lesson 1.5B – One step equations (multiplication/division) Date: _____

An _____ is a mathematical sentence showing two equal expressions.

To solve an equation means to find the only value of the variable that makes the equation _____.

Example 1: Decide if the given number is a solution to the equation (answer yes or no). This is called a check.

a) $5x = 75 \quad x \overset{?}{=} 25$	b) $6k = 18 \quad k \overset{?}{=} 3$	c) $\frac{t}{9} = 4 \quad t \overset{?}{=} 36$

To solve an equation you use the _____. You must always do the same inverse operation to both sides of the equation.

Keep in mind you want the _____ all alone on one side of the equation.

Example 2: Solve the given equation and check your solution! These are called one-step equations.

a) $15d = 300$	b) $168 = 8x$
c) $\frac{f}{6} = 32$	d) $12 = \frac{s}{4}$

You try these: Solve the given equation and <u>check</u> your solution!

a) $7w = 105$	b) $144 = 9u$
c) $5 = \frac{x}{7}$	d) $\frac{z}{5} = 12$

Use a let statement to define your variable. Write an equation to model the situation. Solve the equation.

Example 2: How many packages of diapers can you buy with $40 if one package costs $8?

Example 3: At a restaurant, Mike and his three friends decided to divide the bill evenly. If the bill came to $52, how much did each person pay?

Example 4: How many video games can you buy with $125 if one video game costs $5?

Example 5: Amanda and her best friend found $186 buried in a field. They split the money evenly. How much money did each girl get?

Guided Notes for Lesson 1.6 – Using Formulas **Date: _____**

A **_____** is a rule showing relations among quantities. Example $F = ma$

A **_____** (letter) is used to represent a quantity whose value may change or vary.

In the formula $F = ma$, the variables are _____.

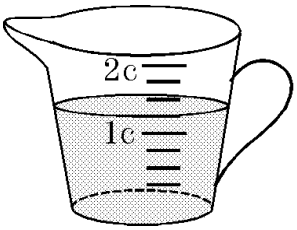
Example 1: The formula to find the cost (C) of a tank of gas is given by $C = p\,g$, where p is the price per gallon in dollars and g the number of gallons purchased.

a) Find the cost of a tank of gas, if the price per gallon p is \$3.75 and the number of gallons g is 12.

b) If it costs \$52.50 to fill up your car, how many gallons of gas did you need?

Example 2 The formula for changing fluid ounces (f)into cups (c) is given by the formula $c = \frac{f}{8}$.

a) Find the number of cups in 32 fluid ounces.



b) A recipe calls for 12 cups of water, how many fluid ounces are needed?

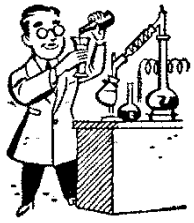
Example 3 The formula to find the distance traveled (d) of a vehicle traveling a rate of speed (r) for (t) hours is given by $d = rt$.

a) Find the distance traveled by bus traveling at speed of 60 miles per hour for 8 hours.

b) If you have traveled 1054 miles in 17 hours, how fast were you traveling?

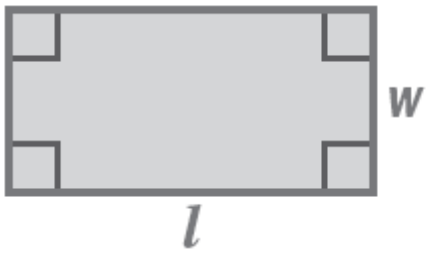
Example 4 The formula to find the density (D) of an object that has a mass (M) and a volume (V) is given by $D = \frac{M}{V}$.

a) Find the density of an object that has a mass of 75 g and a volume of 120 ml.



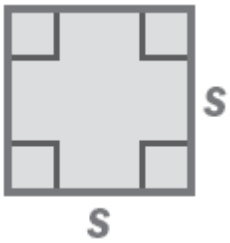
b) If an object has a density of 0.35 g/ml and a volume of 500 ml, find its mass.

Example 5 The formula to find the perimeter (P) of a rectangle with side lengths (L) and side widths (W) is given by the formula $P = 2L + 2W$. Find the perimeter of a rectangle that has side lengths of 5 meters and side widths of 3 meters.



Example 7 The breaking distance (d) in feet that a vehicle traveling at a speed (s) miles per hour once the breaks are applied on dry pavement is given by the formula $d = 2s^2$. Find the braking distance needed to stop a car traveling at a rate of speed of 60 miles per hour.

Example 8 The formula to find the perimeter (P) of a square with side lengths (s) is given by the formula $P = 4s$. Find the perimeter of a square that has side lengths of 10 meters.



Chapter 1 Test Review Date: _____

Multiple Choice Questions: For 1-5, circle the best answer to the question. Although it is multiple choice, when you see the saw graphic SHOW ALL WORK. Calculators are not allowed on this section.

1) Which step should be performed first when evaluating the expression $6 \times 8 + 17$?

A) $6 + 17$

B) $8 + 17$

C) 6×8

D) 17×6

2) What is the value of the expression $15 + 3 \times (13 - 9)^2 \div 2$?

A) 27

B) 39

C) 72

D) 144

3) What is the solution of $\frac{x}{15} = 5$

A) 3

B) 10

C) 20

D) 75

4) Which equation represents this statement: The product of 18 and a number is 12.

A) $18n = 12$

B) $18 + n = 12$

C) $\frac{18}{n} = 12$

D) $\frac{n}{12} = 12$

5) The formula to find the density (D) of an object that has a mass (M) and a volume (V) is given by $D = \frac{M}{V}$. Find the density of an object that has a mass of 25g and a volume of 100 ml.

A) 250 g/ml

B) 125 g/ml

C) 0.25 g/ml

D) 75 g/ml

Short Response Questions: For 6-28, when you see the saw graphic, SHOW ALL WORK in the space provided. No credit will be given for just an answer. Calculators are allowed on this section.

For 6-11, evaluate the expression.

6) $11 \times 6 + 20 - 20 \div 2$	7) $8 + (6 \times 5) \div 2$
8) $\dfrac{14 + 30}{13 - 2}$	9) $24 \div \left[2 \bullet (3.7 - 1.7)\right]$
10) $135 \div (15 - 12)^3 + 11$	11) $140 - (13 - 3)^2 + 3 \times 2^3$

For 12-15, evaluate the expression when $x = 8$ and $y = 10$.

12) $120 - 6x$	13) $3 \bullet (x - 4) + 2y - 12$
14) $\dfrac{x}{2} + \dfrac{y}{5}$	15) $\dfrac{4x + y - 2}{0.5y}$

For 16-17, tell whether the value of the variable is a solution to the equation. Answer yes or no.

16) $58 - c = 18 \qquad c \stackrel{?}{=} 40$	17) $\frac{b}{8} = 9 \qquad b \stackrel{?}{=} 81$

For 18-19, solve the equation and check.

18) $9 + n = 25$	19) $m - 6 = 27$
20) $12p = 120$	21) $\frac{r}{15} = 7$

For 22-23, use the distance formula *d = rt* to find the unknown value.

22) If d = 154 miles and r = 11 miles per hour, find t.

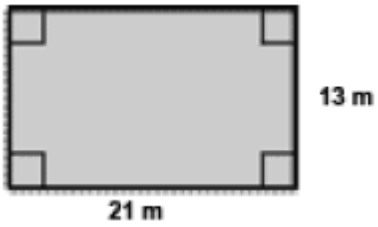
22) _____ hours

23) If r = 60 feet per second and t = 2.5 seconds, find d.

23) _____ feet

For 24-25 using the given formula, find the perimeter of the figure.

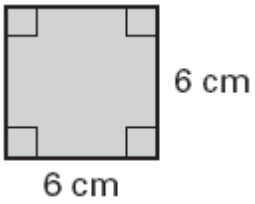
24)



$P = 2L + 2W$

24) Perimeter _____m

25)

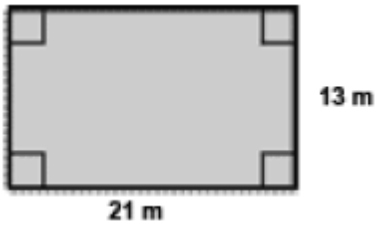


$P = 4s$

25) Perimeter _____cm

For 26-27 using the given formula, find the area of the figure.

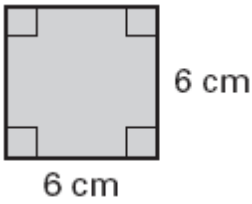
26)



$A = LW$

26) Area _____ m^2

27)



$A = s^2$

27) Area _____ cm^2

28) Anne is saving for a $280 mountain bike. She is paid $7.00 per hour for babysitting. How many hours of babysitting must she do to earn the money? Use a let statement to define your variable. Write an equation to model the situation. Solve the equation.

28) _____ hours

Extended Response Question: This question is worth three points. Calculators are allowed on this section.

29) Mrs. Kaminski put the following problem on the board: $3 \bullet 3 + 63 \div 9$.
One of her students solved it like this:

$$\begin{aligned} 3 \bullet 3 + 63 \div 9 &= 9 + 63 \div 9 \\ &= 72 \div 9 \\ &= 8 \end{aligned}$$

Did the student solve the question correctly? If he did not, explain specifically what mistake or mistakes he made.