Day 1 – Algebraic Expressions – Mixed Review

Standard(s): _____

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Evaluating Expressions

When you **evaluate** an expression, you are replacing the variable with what the variable equals:

> **Evaluate** $4x - 5$ when $x = 6$
>
> $4(6) - 5$
> $24 - 5$
> $\boxed{19}$

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$(-2)^2 = -2 \cdot -2 = 4$

Practice: Evaluate the following expressions if $m = 7$, $r = 8$, and $t = -2$.

a. $5m - 6$

$5(7) - 6$
$35 - 6$
$\boxed{29}$

b. $\dfrac{r}{t}$

$\dfrac{(8)}{(-2)}$
$\boxed{-4}$

c. $3m - 5t$

$3(7) - 5(-2)$
$21 + 10$
$\boxed{31}$

d. $t^2 - 4r$

$(-2)^2 - 4(8)$
$4 - 32$
$\boxed{-28}$

Application: Answer the following questions:

1. You earn 15n dollars for mowing n lawns.

$n = 1$

    a. How much do you earn for mowing 1 lawn?

$15n$
$15(1) = \$15$

$n = 9$

    b. How much do you earn for mowing 9 lawns?

$15n$
$15(9) = \$135$

2. After m months, the length of a fingernail is 10 + 3m <u>millimeters</u>.

    a. How long is the fingernail, in centimeters, after 8 months?

$$10 + 3(8)$$
$$10 + 24$$

$34 \text{ mm} = 34 \div 10 = 3.4 \text{ cm}$

    b. How long is the fingernail after three years? $(3 \text{ yrs} = 3 \times 12 = 36 \text{ months})$

$$10 + 3(36)$$
$$10 + 108$$

$118 \text{ mm} = 118 \div 10 = 11.8 \text{ cm}$

Creating Algebraic Expressions

Review: The Commutative and Associative Properties

Commutative Property of Addition (order doesn't matter)	*Associative Property of Addition* (grouping order doesn't matter)
5 + 6 can be written as 6 + 5	2 + (5 + 6) can be written as (2 + 6) + 5 $2 + 11$ $8 + 5$
Commutative Property of Multiplication (order doesn't matter)	*Associative Property of Multiplication* (grouping order doesn't matter)
5 x 6 can be written as 6 x 5	(2 x 5) x 6 can be written as 2 x (6 x 5)

Addition	Subtraction	Multiplication	Division	Exponents
Sum	Difference	Of	Quotient	Power
Increased by	Decreased by	Product	Ratio of	Squared t^2
More than	Minus	Times	Each	Cubed t^3
Combined	Less	Multiplied by	Fraction of	
Together	Less than	Double, Triple	Out of	
Total of	Fewer than	Twice	Per	
Added to	How many more	As much	Divided by	
Gained	Left	Each	Split	
Raised		**Use Parenthesis:** The quantity of		
Plus				

Practice: Write the expression for each verbal description:

1. The difference of a number and 5

2. The quotient of 14 and 7

3. y decreased by 17

$$X - 5$$

$$14 \div 7 \text{ or } \frac{14}{7}$$

$$y - 17$$

4. x increased by 6   +

$x + 6$

5. The sum of a number and 8   +

$n + 8$

6. 6 squared

6^2 $6 \cdot 6 = 36$

7. Twice a number

$x \cdot 2$
$2x$

8. 8 more than a third of a number

$8 + \frac{1}{3}x$
$\frac{1}{3}x + 8$

9. 6 less than twice k

$\cancel{6 - 2k}$
$2k - 6$

Creating Expressions from a Context

Scenario A: A local restaurant is busiest on Saturday evenings. The restaurant has three cooks who work during this time. The cooks divide the incoming orders among themselves. So far, they have prepared 27 total.

a. If 15 additional orders come in, how many meals will each cook prepare?

$$\frac{27 + 15}{3} = \frac{42}{3} = 14 \text{ meals}$$

b. If 42 additional orders come in, how many meals will each cook prepare?

$$\frac{27 + 42}{3} = \frac{69}{3} = 23 \text{ meals}$$

c. Write an expression to represent the unknown number of meal each cooks prepare. Let m represent the number of additional orders.

$$\frac{27 + m}{3}$$

Scenario B: Trey is selling candy bars to raise money for his basketball team. The team receives $1.25 for each candy bar sold. He has already sold 25 candy bars.

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AS

a. If Trey sells 10 more candy bars, how much money will he raise for the basketball team?

$1.25(25 + 10)$ $\boxed{\$43.75}$
$1.25(35)$

b. If Trey sells 45 more candy bars, how much money will he raise for the basketball team?

$1.25(25 + 45)$ $\boxed{\$87.50}$
$1.25(70)$

c. Write an expression to represent the unknown amount of money Trey will raise for the basketball team. Let c represent the additional candy bars sold.

$1.25(25 + c)$

4

Scenario C: Four friends decide to start a summer business of yardwork for their neighborhood. They will split all their earnings evenly. They have lawnmowers, but need to invest some money into rakes, trash bags, rakes, and hedge trimmers. They have to spend $75 on these supplies.

a. How much profit will each friend receive if they earn $350 the first week?

b. How much profit will each friend receive if they earn $475 the first week?

c. Write an expression that represents the unknown profit for each friend. Let d represent the amount of money earned.

Scenario D: Five friends (Jack, Jace, Kristian, Isreal, and Zach) have their own iPhones with songs downloaded to their phones from iTunes.

- ✓ Jack : X
- ✓ Jace has five more songs than Jack. : $X+5$
- ✓ Kristian has half as many songs as Jace. : $\frac{1}{2}(X+5)$
- ✓ Isreal has 3 more than twice the number of songs as Jack. : $2X+3$ *(2x annotation above)*
- Zach has three times as many songs as Kristian. : $3 \cdot \frac{1}{2}(X+5) = \frac{3}{2}(X+5)$

# of songs for Jack	# of songs for Jace	# of songs for Kristian	# of songs for Isreal	# of songs for Zach	Total # of Songs
11					
15					
25					
x					

$$X + X+5 + \frac{1}{2}(X+5) + 2X+3 + \frac{3}{2}(X+5)$$

$$X + X+5 + 2X+3 + 2(X+5)$$

$$1X + 1X + 5 + 2X + 3 + 2X + 10$$

$$\boxed{6X+18}$$

Understanding Parts of an Expression

a. Hot dogs sell for $1.80 apiece and hamburgers sell for $3.90 apiece. This scenario can be represented by the expression 1.80x + 3.90y. Identify what the following parts of the expression represent.

1.80	Cost of a hotdog
3.90	Cost of a hamburger
x	# of hotdogs you buy
y	# of hamburgers you buy
1.80x	total cost of hotdogs
3.90y	total cost of hamburgers
1.80x + 3.90y	total cost of hotdogs & hamburgers

b. Noah and his friends rent a sailboat for $15 per hour plus a basic fee of $50. This scenario can be represented by the expression 15h + 50.

15	price per hour
h	number of hours
15h	cost for h hours
50	basic fee
15h + 50	total cost to rent a sailboat

c. A teacher has $600 to spend on supplies. They plan to spend $40 per week on supplies. This scenario can be represented by the expression 600 – 40w.

600	amount available to spend on supplies
-40	amount spent per week
w	# of weeks
-40w	total spent for w weeks
600 – 40w	amount remaining

560