

Jakarta International School
7th Grade

Practice Test - Blue
Simplifying Expressions and
Solving Basic Equations

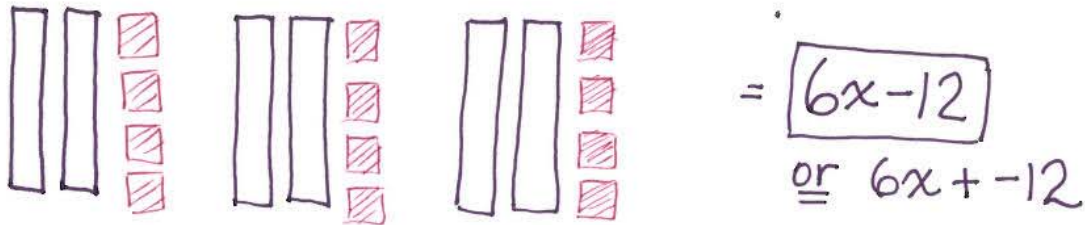
Name: SOLUTIONS

Date: _____

Score: $\frac{50}{50}$

1. For the expression $3(2x-4)$


a) Use an Algebra Tile model to multiply. (1pt)



b) Use the Distributive Property to simplify the expression (1pt)

$$3(2x - 4) = 6x - 12$$

c) How would you explain to a 6th grader why the distributive property works (in problem like number 3) using the Algebra Tile model (in problem a like number 2)? (1pt)

Using the distributive property, I multiply 3 by each term inside the parentheses separately. $3 \cdot 2x = 6x$ and $3 \cdot -4 = -12$. With algebra tiles, you can see that I end up with 3 groups of $2x - 4$ {  }. When I make 3 groups, I end up with $6x$ and -12 in total, the same result I got using the distributive property.

2. Simplify using the Distributive Property (hint: if it helps, draw an rectangle area picture to help yourself) (2 points)

a. $4 \cdot 19 - 4 \cdot 11$

$$4(19 - 11) \\ 4(8) = 32$$

b. $4 \cdot 1150$

$$4(1000 + 100 + 50) \\ 4000 + 400 + 200$$



$$4600$$

3. Use the Distributive Property to solve the following problem. Show your work.

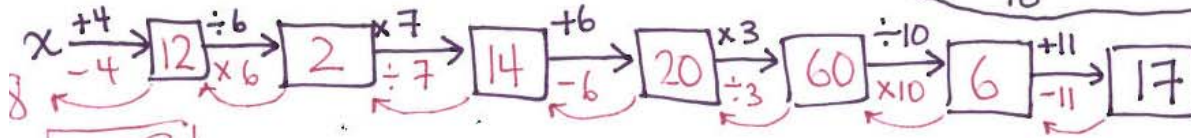
At the grocery store Ryan was finding the mass of peaches. He discovered that the average mass of a peach was 297 g. Find the mass of 8 peaches. (2pts)

$$\begin{array}{r} 8(300-3) \\ 2400-24 \\ \hline 2376 \end{array}$$

The mass of 8 peaches is 2376 g.

4. Create a "machine" to help you solve this equation using backtracking. Check your solution. (2pts)

$$\frac{3 \left[7 \left(\frac{x+4}{6} \right) + 6 \right]}{10} + 11 = 17$$



$$x = 8$$

Check

$$\frac{3 \left[7 \left(\frac{8+4}{6} \right) + 6 \right]}{10} + 11 \stackrel{?}{=} 17$$

$$\frac{3 [14+6]}{10} + 11 \stackrel{?}{=} 17$$

$$3(2) + 11 \stackrel{?}{=} 6 + 11 \stackrel{?}{=} 17$$

$$17 = 17 \checkmark$$

5. Vocabulary Check. Fill in the blank. (6pts)

- a) A Constant is a term that has no variable.
- b) A mathematical sentence with an equal sign is called a(n) Equation.
- c) Like terms are terms with the same variables.
- d) In the expression: $3x - y + 16$, 3 is the Coefficient of x.
- e) Operations that undo each other are called Inverse Operations.
- f) Any value or values that make an equation true is called the Solution of the equation.

6. Remove the brackets, being careful to observe the correct order of operations, and write the answer in its simplest form: (6pts)

a) $7(2x-3y)-5(x+y)$
 $14x-21y-5x-5y$
 $9x-26y$

c) $x(y+8y+3)$
 $xy+8xy+3x$
 $9xy+3x$

b) $3b+6\{4-2[b-(7+b)]\}$
 $3b+6\{4-2[b-7-b]\}$
 $3b+6\{4-2b+4+2b\}$
 $3b+6\{18\}$
 $3b+108$

7. At your birthday you are going to give your friends cupcakes. Let c be the number of chocolate cupcakes you buy. You plan on giving triple the number of vanilla cupcakes as chocolate cupcakes and 8 more strawberry cupcakes than chocolate cupcakes. Write an expression that represents the total number of cupcakes that you will buy. (2pts)

$$c + 3c + c + 8$$
$$5c + 8$$

8. Circle the ordered pairs that are solutions of the linear equation $y = -6x + 4$? (2pts)

(2,16)

(-6, 40)

(4, -20)

Give another ordered pair that would be a solution.

(0, 4)

Various Answers.

9. Solve the following equations using Inverse Operations. Check your solution. (3 points each: 1 point for correct work, 1 point for correct answer, 1 point for correct check step) (9pts)

a. $\frac{18+b}{-3} = 25$

$$\frac{18+b}{-3} \cdot -3 = 25 \cdot -3$$

$$18+b = -75$$

$$18+b-18 = -75-18$$

$$b = -93$$

Check $\frac{18+(-93)}{-3} = 25$ $\frac{-75}{-3} = 25$ $25 = 25 \checkmark$

b. Solve for a: $\frac{a}{b} - c = d$

$$\frac{a}{b} - c + c = d + c$$

$$\frac{a}{b} \times b = b(d+c)$$

$$a = b(d+c)$$

$$a = b(d+c)$$

Check $\frac{b(d+c)}{b} - c = d$ $d+c-c = d$ $d = d \checkmark$

c. $2|x| = 17$

$$\frac{2|x|}{2} = \frac{17}{2}$$

$$|x| = 8.5$$

$$x = 8.5$$

or

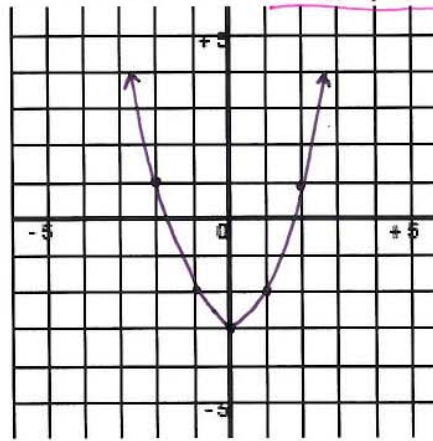
$$x = -8.5$$

Check $2 \cdot |8.5| = 17 \checkmark$
or $2 \cdot |-8.5| = 17$

10. Complete the table of values and graph the function: (2pt)

$$y = x^2 - 3$$

x	y
-2	1
-1	-2
0	-3
1	-2
2	1



11. For each word problem, define a variable, write an equation, solve the equation using inverse operations, and check your answer to make sure it makes sense. (8pts)

(4 points each: 1 point for correct variable, 1 point for correct equation, 1 point for correct work/answer, 1 point for correct check step)

a) Olivia wants to buy a car which costs \$32,000. She pays a deposit of \$14,000 and then arranges to pay an amount each month for the next three years. How much should each monthly repayment be if she wishes to pay off the car in three years?

* Let x = monthly repayment

12 months/year \therefore 36 months in 3 years.

$$32,000 - 14,000 = 36m$$

$$* 36m = 18,000$$

$$\frac{36m}{36} = \frac{18,000}{36}$$

$$* m = 500$$

Each monthly payment should be \$500.

* Check $36(500) = 18,000$
 $18,000 = 18,000 \checkmark$

b) Ji Won bought 5 cartons of milk and received Rp. 20,000 in change. If he gave Rp. 100,000 to the shop keeper, work out the cost of each carton of milk.

* Let x be the cost of a milk carton.

$$\begin{cases} * 100,000 - 5x = 20,000 \\ \text{OR} \\ 20,000 + 5x = 100,000 \end{cases}$$

$$20,000 + 5x - 20,000 = 100,000 - 20,000$$

$$\frac{5x}{5} = \frac{80,000}{5}$$

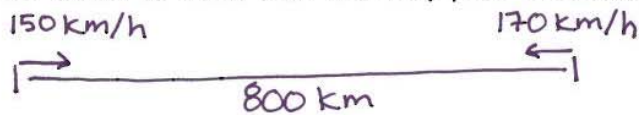
$$* x = 16,000$$

Each milk carton costs Rp. 16,000.

$$* \text{Check: } 100,000 - 5(16,000) \stackrel{?}{=} 20,000$$

$$20,000 = 20,000$$

12. Two trains, traveling towards each other, left from two stations that are 800 km apart at 6 pm. If the rate of the first train is 150 km/h and the rate of the second train is 170 km/h, at what time will they pass each other? (2pts)



relative rate

$$\begin{array}{r} 150 \\ + 170 \\ \hline 320 \text{ km/h} \end{array}$$

$$d = rt$$

$$\frac{800}{320} = \frac{320 \cdot t}{320}$$

$$2.5 = t$$

$$6 \text{ pm} + 2.5 \text{ h} = 8:30 \text{ pm}$$

They will pass each other at 8:30 pm.

13. C leaves home going 40 kilometers per hour. When C is 9 km from home, D starts after C from the same place, going 58 km/h. How long does it take D to catch up with C? (2 pts)

relative rate

$$\begin{array}{r} 58 \\ - 40 \\ \hline 18 \text{ km/h} \end{array}$$

$$d = rt$$

$$\frac{9}{18} = \frac{18 \cdot t}{18}$$

$$0.5 = t \rightarrow \text{time} = 0.5 \text{ h}$$

It takes D 30 minutes to catch up with C.

Milo's Mile (2pts)

Milo was thinking when he was out running,
"How fast I am running just might be stunning!"

Five miles an hour is his usual pace,
So it takes him 12 minutes for a one mile race.



"But if I run 6 miles an hour instead,
That's a 10-minute mile!" he did in his head.

Compute Milo's times for running a mile
at speeds 3 to 10 miles an hour, then smile .

And look at the data to help us to see
How the number of minutes changes with speed.

Five miles per hour to six loses two.
Now look at the others - is that what they do?

Or is the change different for other changes in time?
You'll get extra credit if you write in a rhyme. (+1)

Five miles per hour to six loses two.
When looking at the others, this is not true.
When computing Milo's times.
You will realize that they rhyme.
When he runs 3 miles per hour,
He will run 1 mile in 20 min, not a lot of power
When Milo runs 4,
A 15 min mile, what a bore.
When he reaches the mph of 5,
Milo is, at 12 min, just starting to become alive.
He can get a mile in 10 min at 6,
This is when Milo starts to get his kicks.
When Milo reaches the mph of 7,
He is at 8.57 min, almost running to heaven.
Running a mile in 7.5 min, at 8 mph
It is time to turn on the power.
When doing the mph of 9,
At 6.66 min, is that fast enough? NEIN!
And finally, when going to 10,
At 6 min, Milo is as fast as a Benz.
So as you can see,
The times are inconsistent to me.