

# Algebra 8 SIWS Unit Test

Name: ANSWER KEY Period: \_\_\_\_\_ Date: \_\_\_\_\_

Show all work! Label units where needed. Each question is worth 5 points unless otherwise noted. Read carefully and think critically!

Superior Ball Company manufactures soccer balls. They have the following income and expenses for manufacturing  $n$  soccer balls.

$$I = 9n$$

$$E = 2(2n + 3500)$$

+4 units  
+3 meth

- 1.) Write an equation for the profit  $P$  for manufacturing  $n$  soccer balls. Simplify your equation.

$$P = 9n - 2(2n + 3500)$$

$$P = 9n - 4n - 7000$$

$$P = 5n - 7000$$

+3 for +7000

+2  $5n^2$

+1 Distribute  $9n$

- 2.) How much profit will the company make if it sells 4,200 soccer balls?

$$P = 5(4,200) - 7000$$

$$P = \$14,000$$

$$+1 \quad P = 4200$$

- 3.) The company wants to make at least \$50,000. How many soccer balls must they sell?

$$50000 = 5n - 7000$$

$$57000 = 5n$$

$$n = 11,400 \text{ soccer balls}$$

- 4.) How many soccer balls must be sold for the company to break even?

$$0 = 5n - 7000$$

$$7000 = 5n$$

$$n = 1,400 \text{ soccer balls}$$

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State whether each equation below represents a linear, quadratic, or exponential equation and **explain how you know**.

5.)  $y = 3(x - 5) + 9(4 - x)$

Linear. When expanded,  
 $mx + b$ .

7.)  $y = \frac{(.4)^x}{10}$

Exponential. Variable  
is exponent.

6.)  $y = x^2 - 12$

Quadratic. Expanded  
form,  $x^2$  is highest  
power on  $x$

+3 correct, bc  
explanation  
+2 incorrect, ok  
explanation  
+1 mess  
+4 "has  $x^2$ ". Need to  
say highest power

8.)  $y = (x + 4)(-2x + 5)$

Quadratic. Factored  
form, two linear factors.

Using the two equations, write a new equation relating the given variables. Think about what variable you **don't** want and how you can use the second equation to help you eliminate that variable.

Don't need to simplify.

9.)  $y$  in terms of  $z$ .

$y = 3x + 8z$

$x = 4z - 5$

$y = 3(4z - 5) + 8z$

$y = 12z - 15 + 8z$

$y = 20z - 15$

10.)  $A$  in terms of  $B$ .

$A = 3B + 2C$

$2B - 4C = 10B + 24$

$-4C = 8B + 24$

$C = -2B - 6$

$A = 3B + 2(-2B - 6)$

$A = 3B - 4B - 12$

$A = -B - 12$

+2 wrong vars but  
done correctly

+3 meth

Solve for the given variable.

11.)  $x^2 + 2x = 24$

$$x^2 + 2x - 24 = 0$$

$$(x+6)(x-4) = 0$$

$$\begin{array}{ll} \swarrow & \searrow \\ x+6=0 & x-4=0 \\ x=-6 & x=4 \end{array}$$

12.)  $3(x+5) + 5(x+2) = 0$

$$3x+15+5x+10=0$$

$$8x+25=0$$

$$8x = -25$$

$$x = \frac{-25}{8} = -3\frac{1}{8} = -3.125$$

tl solving linear  
like quad or  
vice versa  
to 3 math

13.)  $2x^2 + 7x - 9 = 0$

$$(2x+9)(x-1) = 0$$

$$\begin{array}{ll} \swarrow & \searrow \\ 2x+9=0 & x-1=0 \\ x = -\frac{9}{2} = -4.5 & x=1 \end{array}$$

14.)  $-2(7x+15) = 18 + 2x$

$$-14x - 30 = 18 + 2x$$

$$-16x = 48$$

$$x = -3$$

You are trying to launch a stomp rocket over your house from ground level. The path of the rocket as it travels through the air can be modeled by the equation below.

$$h = -16t^2 + 96t$$

15.) How high off the ground is the rocket at .5 seconds?

$$h = -16(.5)^2 + 96(.5)$$

$$h = 44 \text{ feet}$$

16.) Write the equation in factored form.

Does it need to be GCF

$$h = -16t(t - 6)$$

$$h = 16t(-t + 6)$$

17.) Using your factored form, calculate how long the stomp rocket is in the air. **Making a table or guessing and checking will not be acceptable strategies.**

$$0 = -16t(t - 6)$$

$$t = 0 \quad t = 6 \text{ seconds}$$

18.) The house you are trying to clear is about 145 feet tall at its highest point. Will your stomp rocket be able to clear it?

$$105 = 3$$

tl plugging in 145 for h

$$h = -16(3)^2 + 96(3)$$

$$h = 144 \text{ ft.}$$

No, max is 144.