Name: _____ Date: _____

Rearranging Formulas
Algebra 1

It is often necessary, in mathematics and science, to rearrange formulas. Most often we do this to solve for a particular variable that occurs in the formula. We have already done this skill numerous times, as in the following exercise.

***Exercise* #1:** Which of the following equations is equivalent to $2y+5x=16$?

(1) $y=2x+6$ (3) $y=\frac{5}{2}x+8$

(2) $y=-\frac{5}{2}x+8$ (4) $y=\frac{2}{5}x+8$ _____

***Exercise* #2:** The distance that an object can travel is a function of how fast it is traveling, its rate, and how long it has traveled, time. This is summarized by the formula:

Distance = Rate • Time or $D=R\cdot T$

(a) How far does a car travel if it moves at 52 miles per hour for 3.5 hours?

(b) Calida is stuck in rush hour traffic and is trying to determine how long it will take her to get home. Solve the rate formula above for time, *T*, and then use it to determine how long it will take Calida to travel her final 18 miles home.

Calida's Rate (mph)	Time (hrs)
5	
10	
20	

***Exercise* #3:** If $ax+b=c$ then x = ?

(1) $b+c-a$ (3) $\frac{c}{b}-a$

(2) $\frac{a+b}{c}$ (4) $\frac{c-b}{a}$ _____

***Exercise* #4:** Daiki is enclosing a garden with 45 feet of fencing. He wants to know what he needs to make the length of his garden given the garden's width. Recall that the perimeter of any rectangle is given by the formula $P = 2w + 2l$.

(a) Solve the perimeter formula for the length, l, given that $P = 45$.

(b) Fill in the table using your graphing calculator.

Width, w (feet)	Length, l (feet)
5	
10	
15	
20	

***Exercise* #5:** The formula $A = prt + p$ gives the amount of money in a savings account due to simple interest. Which of the following formulas, gives the time, *t*, the money has been in the account?

(1) $\frac{A - p}{pr}$ (3) $\frac{A - 2p}{r}$

(2) $\frac{A - pr}{p}$ (4) $\frac{A + p - r}{p}$

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***Exercise* #6:** The volume of a right circular cylinder is given by $V = \pi r^2 h$, where *r* is the radius of the cylinder's circular base and *h* is its height.

(a) Solve for the height, *h*, in terms of *V* and *r*.

(b) Solve for the radius, *r*, in terms of *V* and *h*.

(c) A soda can is to be made that holds a volume of 350 cubic centimeters and has a height of 11.5 centimeters. Use your formula from (b) along with the **STORE** command on your calculator to determine the *diameter* of the soda can to the nearest tenth of a centimeter.

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Rearranging Formulas
Algebra 1 Homework

Skills

1. Solve for x in the following equations.

(a) $a+12x=m$ (b) $3x+3b=12$ (c) $\frac{8x-4f}{3}=a$

Applications

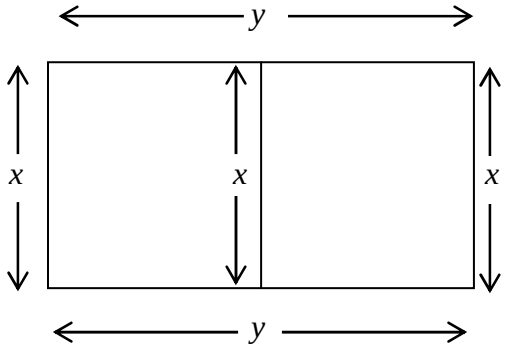
2. Solve for the stated variable in the following equations.

(a) $C=\pi d$; d (b) $A=\frac{1}{2}bh$; h (c) $A=\pi r^2$; r where $r>0$

(d) $W=VIt$; t (e) $m=\frac{2E}{v^2}$; E (f) $S=2A+Ph$; P

3. A farmer has 30 feet of fencing that he is using for the rectangular pen shown below that also requires fencing for a dividing pen. The variables x and y are related by the equation

$$3x+2y=30$$



(a) Solve this equation for y in terms of x.

(b) Using your calculator, fill out the table below for both x and the area of the rectangular pen.

Width, x	0	1	2	3	4	5	6	7	8	9
Length, y										
Area = xy										

(c) For what value of x and y will the area of the pen be the largest?

4. Solve for g in the equation: $S = \frac{1}{2}gt^2$

(1) $\frac{S - \frac{1}{2}}{t^2}$ (2) $\frac{1}{2}St^2$ (3) $\frac{\frac{1}{2}S}{t^2}$ (4) $\frac{2S}{t^2}$

_____

5. Solve for a, if $F = \frac{W}{g}a$.

(1) $\frac{gF}{W}$ (2) $\frac{WF}{g}$ (3) $\frac{W}{gF}$ (4) $\frac{g}{WF}$

_____

6. If $S = \frac{1}{2}gt^2$, where $t > 0$, then $t = ?$

(1) $\frac{\sqrt{\frac{1}{2}S}}{g}$ (2) $\frac{2S}{g}$ (3) $\sqrt{\frac{2S}{g}}$ (4) $\frac{S}{2g}$

_____

7. Solve for b, if $A = \frac{ab}{2}$.

(1) $2A - a$ (2) $A - \frac{a}{2}$ (3) $\frac{2A}{b}$ (4) $\frac{2A}{a}$

_____

8. Given the formula $V = \frac{1}{3}\pi r^2 h$, solve for r where $r > 0$.

(1) $\sqrt{3V - \pi h}$ (2) $\sqrt{\frac{3V}{\pi h}}$ (3) $\frac{V}{3\pi h}$ (4) $V - 3\pi h$

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Reasoning

9. Eden claims that the following two equations are different ways of writing the same equation. Is she correct? Justify.

$$8a + c = -7c + 16$$
$$c = -a + 2$$