Review Exercise Set 16

Exercise 1:   How many gallons of a 10% acid solution must be mixed with 5 gallons of a 20% acid solution to make a 18% acid solution? (Note: Start by creating a table similar to the one below and then fill in the given information.)

	Amount of Solution (A)	*	Concentration (R)	=	Quantity of Substance (Q)
10% Solution		*		=	
20% Solution		*		=	
18% Solution		*		=	

Exercise 2:   Find the cost per pound of a mixture of 120 lbs of a grass seed that costs $1.20 per pound and 100 lbs of a grass seed that costs $2.10 per pound. (Note: Start by creating a table similar to the one below and then fill in the given information.).

	Amount (A)	*	Cost per Pound (C)	=	Value (V)
$1.20 grass seed		*		=	
$2.10 grass seed		*		=	
Grass seed mixture		*		=	

Exercise 3:   Movie tickets for adults were selling for $6.00 each and tickets for children were selling for $3.50 each. On a weekday 450 tickets were sold with total receipts of $2262.50. Find the number of adult tickets sold. (Note: Start by creating a table similar to the one below and then fill in the given information).

	Tickets Sold (T)	*	Cost per Ticket (C)	=	Receipts (R)
Adult tickets		*		=	
Children tickets		*		=	
Total tickets		*		=	

Exercise 4:   How many ounces of a 25% gold alloy must be mixed with 80 ounces of a 40% gold alloy to make a 30% gold alloy. (Note: Start by creating a table similar to the one below and then fill in the given information.)

	Amount (A)	*	Percent (P)	=	Quantity (Q)
25% alloy		*		=	
40% alloy		*		=	
30% alloy		*		=	

Exercise 5: A gardener wants to make 30 pounds of a fertilizer that is 15% nitrogen by mixing a 10% nitrogen fertilizer with a 25% nitrogen fertilizer. How many pounds of each fertilizer (10% and 25%) must the gardener use? (Note: Start by creating a table similar to the one below and then fill in the given information.)

	Amount (A)	*	Percent (P)	=	Quantity (Q)
10% fertilizer		*		=	
25% fertilizer		*		=	
15% fertilizer		*		=	

Review Exercise Set 16 Answer Key

Exercise 1:   How many gallons of a 10% acid solution must be mixed with 5 gallons of a 20% acid solution to make a 18% acid solution? (Note: Start by creating a table similar to the one below and then fill in the given information.)

Let x equal the amount of the 10% solution since this is what we are trying to find. The amount of the 18% solution would be the total of the 10% and 20% solutions.

	Amount of Solution (A)	*	Concentration (R)	=	Quantity of Substance (Q)
10% Solution	x	*	10	=	10(x)
20% Solution	5	*	20	=	20(5)
18% Solution	x + 5	*	18	=	18(x + 5)

Now, we can setup our equation using the quantity column. The quantity of the 10% solution plus the quantity of the 20% solution must be equal to the quantity of the 18% solution.

$$10(x) + 20(5) = 18(x + 5)$$
$$10x + 100 = 18x + 90$$
$$10x - 10x + 100 = 18x - 10x + 90$$
$$100 = 8x + 90$$
$$100 - 90 = 8x + 90 - 90$$
$$10 = 8x$$
$$10 \div 8 = 8x \div 8$$
$$1.25 = x$$

We would need 1.25 gallons of the 10% solution.

Exercise 2:   Find the cost per pound of a mixture of 120 lbs of a grass seed that costs $1.20 per pound and 100 lbs of a grass seed that costs $2.10 per pound. (Note: Start by creating a table similar to the one below and then fill in the given information.).

Let x equal the cost per pound of the mixture and fill in the other given information.

	Amount (A)	*	Cost per Pound (C)	=	Value (V)
$1.20 grass seed	120	*	1.20	=	1.20(120)
$2.10 grass seed	100	*	2.10	=	2.10(100)
Grass seed mixture	220	*	x	=	x(220)

We will now setup the equation using the value column, similar to what we did in exercise 1.

1.20(120) + 2.10(100) = x(220)
144 + 210 = 220x
354 = 220x
354 ÷ 220 = 220x ÷ 220
1.60909 = x

Since we are dealing with money we will round the answer to the nearest cent. So the cost per pound of the grass seed mixture is $1.61.

Exercise 3:   Movie tickets for adults were selling for $6.00 each and tickets for children were selling for $3.50 each. On a weekday 450 tickets were sold with total receipts of $2262.50. Find the number of adult tickets sold. (Note: Start by creating a table similar to the one below and then fill in the given information.).

We do not know how many adult or children tickets were sold so you would let x equal the number of adult tickets sold. This would mean that the difference between the total tickets and the adult tickets would equal the children tickets.

We are not asked to find the cost per ticket for the total tickets so we can ignore it for this problem.

Exercise 3 (Continued):

	Tickets Sold (T)	*	Cost per Ticket (C)	=	Receipts (R)
Adult tickets	x	*	6.00	=	6(x)
Children tickets	450 - x	*	3.50	=	3.5(450 - x)
Total tickets	450	*	------------	=	2262.50

Now we can setup our equation using the receipts column.

$$6(x) + 3.5(450 - x) = 2262.50$$
$$6x + 1575 - 3.5x = 2262.50$$
$$2.5x + 1575 = 2262.50$$
$$2.5x + 1575 - 1575 = 2262.50 - 1575$$
$$2.5x = 687.5$$
$$2.5x \div 2.5 = 687.5 \div 2.5$$
$$x = 275$$

The number of adult tickets sold were 275.

Exercise 4: How many ounces of a 25% gold alloy must be mixed with 80 ounces of a 40% gold alloy to make a 30% gold alloy. (Note: Start by creating a table similar to the one below and then fill in the given information.)

Let x equal the amount of the 25% gold alloy. The amount of the 30% gold alloy would then be the sum of the 25% and 40% gold alloys.

	Amount (A)	*	Percent (P)	=	Quantity (Q)
25% alloy	x	*	25	=	25(x)
40% alloy	80	*	40	=	40(80)
30% alloy	x + 80	*	30	=	30(x + 80)

Example 4 (Continued):

Setup the equation using the quantity column.

$25(x) + 40(80) = 30(x + 80)$
$25x + 3200 = 30x + 2400$
$25x - 25x + 3200 = 30x - 25x + 2400$
$3200 = 5x + 2400$
$3200 - 2400 = 5x + 2400 - 2400$
$800 = 5x$
$800 \div 5 = 5x \div 5$
$160 = x$

We would need 160 ounces of the 25% gold alloy.

Exercise 5: A gardener wants to make 30 pounds of a fertilizer that is 15% nitrogen by mixing a 10% nitrogen fertilizer with a 25% nitrogen fertilizer. How many pounds of each fertilizer (10% and 25%) must the gardener use? (Note: Start by creating a table similar to the one below and then fill in the given information.)

In this problem we need to find the amount of both the 10% and 25% fertilizers so we would let one of them be x and the other would be the difference between the total pounds of the 15% fertilizer and x.

	Amount (A)	*	Percent (P)	=	Quantity (Q)
10% fertilizer	x	*	10	=	10(x)
25% fertilizer	30 - x	*	25	=	25(30 - x)
15% fertilizer	30	*	15	=	15(30)

Now, setup the equation using the quantity column.

$10(x) + 25(30 - x) = 15(30)$
$10x + 750 - 25x = 450$
$750 - 15x = 450$
$750 - 750 - 15x = 450 - 750$
$-15x = -300$
$-15x \div -15 = -300 \div -15$
$x = 20$

$30 - x = 30 - 20 = 10$

We would need 20 pounds of the 10% nitrogen fertilizer and 10 pounds of the 25% nitrogen fertilizer.