Instructions. *Think* wherever you wish, but please do not *write* outside the box.

Plato's Trail Mix. Plato's Trail Mix has 10 raisins for every 3 nuts. In a large bag of Plato's Trail Mix, the number of raisins is R and the number of nuts is N. Which is correct? Explain.

a) $10R \approx 3N$ b) $3R \approx 10N$

(The symbol $\approx$ means "is approximately equal to." We would not expect the numbers to be exactly equal, since there is some random variation.)

$\frac{\text{Raisins (R)}}{\text{Nuts (N)}} = \frac{10}{3}$

b) $3R = 10N$

The ratio of raisins to nuts in a Plato's Trail Mix bag is 10 to 3. The correct answer to the question is choice b) $3R \approx 10N$ based on the information given. Three times the number of raisins is approximately equal to ten times the number of nuts. This can easily be obtained from the proportion $\frac{R}{N} = \frac{10}{3}$ with cross multiplication.

An example: There are 30 raisins in a given bag. Based on the proportion $\frac{30}{N} = \frac{10}{3}$, $N = 9$

If $R = 30$. $3R = 10N$, then $3(30) = 10(9)$.

$[90 = 90.]$

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(b) is correct. $3R \approx 10N$

A Raisins / nuts $\quad \frac{R}{N} \approx \frac{10}{3}$

* Cross-multiply

$3R \approx 10N$

B Direct Variation

$y = kx$

$R = kN$

$\frac{10}{3} = \frac{k \cdot 3}{3}$

$3 \cdot R \to \frac{10}{3} N$

$3R = 10N$

C Table

x = N	y = R
3	10
6	20
9	30

$m = \frac{20-10}{6-3} = \frac{10}{3}$

$R = \frac{10}{3}N + b$

$30 = \frac{10}{3}(9) + b$

$30 = 30 + b$

$-30 \quad -30$

$0 = b$

$3 \cdot R = \frac{10}{3} N \to 3$

$3R = 10N$

D $\frac{3 \cdot R}{N} \approx \frac{10}{3} \cdot \frac{3 \cdot N}{N}$

$3R \approx 10N$ (find LCM)

Answer (b) is correct. If there are 10 raisins for every 3 nuts then by using a proportional reasoning model and setting up a proportion and solving, I was able to show that when the 2 ratios are equal is when there are 3 times the number of raisins and 10 times as many nuts. (Which leads to the LCM of 30.) I also showed using linear equations and tables.

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I think letter b is correct. If you multiply the number of raisins times three you will have a total of 30. If you multiply the number of nuts times ten you will have a total of thirty. As mentioned in the information the total would not be exact therefore, I am missing some key part of the problem.

(b)

R	N
10	3
20	6
30	9

(A)

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(a) $10R \approx 3N$

(A) $3R \approx 10N$

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(A)

The number of raisins in the trail mix is roughly three times the number of nuts. Hence, $r = 3n$.

The number of nuts in the trail mix is roughly much less and a multiple of 3 since there are three nuts for every 10 raisins. Therefore the number of nuts is equal to 10 times the number of raisins, $n = 10r$.

The original ratio $r:n$ can be substituted, as a general rule, $3n:10r$.

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Let N be the number of nuts

Let R be the number of raisins

In this problem, it says that for every 3 nuts, there are 10 raisins. So we can set up the proportion as: the number of nuts over the number of raisins

$$\frac{N}{R} = \frac{3}{10}$$

$$10N = 3R$$

$$3R = 10N$$

$$\boxed{3R \approx 10N}$$

∴ letter b is correct

We are measuring the number of nuts in terms of the number of raisins.

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Plato's Trail Mix has 10 Raisins for every 3 nuts. For example, if there were 20 Raisins, then 6 nuts would be in the mix, 30 Raisins, 9 nuts, and so on. Those numbers are not exactly accurate since there is some random variation. However, one can describe these quantities as approximately equal to each other with respect to multiples. Meaning the mathematical statement $3R \approx 3N$ could be considered a true statement if R represents the number of Raisins and N represents the number of Nuts. When the amount of Raisins is multiplied by 3 and the amount of Nuts is multiplied by 10, the two quantities would be approximately equal.

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100 raisins
30 nuts

B) "$3R \approx 10N$" is correct to approximate the ratio of raisins to nuts in a standard bag of Plato's trail mix. This can be seen through application: say for example we have a small bag that only contains 10 raisins and 3 nuts. Substituting these numbers into A) would yield an utterly false statement.

$R=10$, $N=3$ $\quad 10(10) \approx 3(3)$ ✗
$100 \approx 9$

However substituting again in the second statement yields a true statement.

$R=10$, $N=3$ $\quad 3(10) \approx 10(3)$ ✓
$30 \approx 30$.

This statement continues to hold true for any set of numbers provided the ratio of raisins to nuts is 10:3.

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(The symbol $\approx$ means "is approximately equal to." We would not expect the numbers to be exactly equal, since there is some random variation.)

The trail mix has 10 raisins for every 3 nuts, which means for every 10 raisins there is an equivalent number of nuts of 3.

Thus to put it into symbol: $10R = 3N$

Just like saying in this room there are six males for every 20 females, which means for every six males there is an equivalent number of females which is 20.

In symbol: $6M = 20F$; let M = males and F = females

Not the other way around of $20M = 6F$.

On the problem above, the number 10 is specifically for raisins not nuts. And the number 3 stood for the specific number of raisins nuts not raisins.

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The trail mix has 10 raisins for every 3 nuts. Although it is tempting to reflect this with the equation $10R = 3N$, this would be incorrect. There should be a ratio of nuts to raisins of $\frac{3}{10}$ and this first equation simplifies to a ratio of $\frac{10}{3}$. The correct equation would be $3R = 10N$, which gives an appropriate ratio of $\frac{3}{10}$ for nuts to raisins.

This is similar to the difficulty many students have with providing an equation converting yards to feet. They are generally tempted to write $y = 3f$ as the conversion equation when they should write $f = 3y$. The error in thinking becomes apparent when students are asked to convert 5 yards to feet by using the equation they propose.

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(The symbol $\approx$ means "is approximately equal to." We would not expect the numbers to be exactly equal, since there is some random variation.)

Since there are 10 raisins for every 3 nuts, we can express this as $3R \approx 10N$ (b). For every 10 raisins that is in the bag, you will find approximately 3 nuts. The total number of items in a bag of Plato's Trail Mix is $R+N = T$. For every 10 raisins we have 3 nuts so $N = \left(\frac{3}{10}\right)R$. This implies that $10N = 3R$. Thus, choice (b) is correct.

Alternatively, $R \approx \left(\frac{10}{3}\right)N$. This implies that $3R \approx 10N$. Again, this is choice (b).

Or, we can test choices (a) and (b). If $R=10$ and $N=3$, choice (a) is false since $10(10) \neq 3(3)$ $\Rightarrow 100 \neq 9$. Choice (b) is correct since $3(10) = 10(3)$ $\Rightarrow 30 = 30$. Again choice (b) is correct.

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The ratio of raisins:nuts is 10:3. Therefore, you could set this up as:

$$\frac{R}{N} = \frac{10}{3}$$

If you simplify this to be in the format as given for a) and b), it would be written $3R \approx 10N$ after multiplying to get the cross-products. This means that b) is the correct option.

option a) looks like it would be the correct answer since the information given is "10 raisins for every 3 nuts."

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a) $10R \approx 3N$ b) $3R \approx 10N$

(The symbol $\approx$ means "is approximately equal to." We would not expect the numbers to be exactly equal, since there is some random variation.)

Answer a) $10R \approx 3N$ is correct.

Since R represents the number of raisins, and N represents the number of nuts, and since there are 10 raisins for every 3 nuts in the large bag of Plato's Trail Mix, the correct expression to represent this scenario is $10R \approx 3N$.

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The sentence tells the reader that there are 10 raisins for every 3 nuts. This tells me that for every 3 nuts, there is approximately 10 raisins.

Option a is the correct answer. 10 Raisins is approximately equal to 3 Nuts

Option b is incorrect because the letters are swapped. 3 Raisins will NOT be approximately equal to 10 Nuts.

This can also be displayed visually:

a) R R R R R
R R R R R $\approx$ N N N

b) R R R $\approx$ N N
N N
N N
N N
N N

Only option A shows 3 Nuts and 10 Raisins, so it must be the correct answer.

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Neither solution is correct. If there was a Ratio (:) sign they would be more accurate. There are 10R:3N. The two numbers are not approximately equal to one another but increased and decrease in relationship with one another.

For example, if you have 50 Raisins you would have 15 nuts. As long as the ratio numbers in front of the variable "R" and "N" stay constant, the variable "R" and "N" will be $\approx$ to each other.

In conclusion:

$R \approx N$ when 10R:3N

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(The symbol $\approx$ means "is approximately equal to." We would not expect the numbers to be exactly equal, since there is some random variation.)

The correct answer is a.) $10R \approx 3N$. Based on the given, Plato's Trail Mix has 10 raisins for every 3 nuts. The probability of having the same ratio is somewhat similar in a large bag of Plato's Trail Mix. So, using the given R is the number of raisins and N is the number of nuts. Then more or less 10 raisins is approximately equal to 3 nuts.

The choice of b is incorrect since the expression $3R \approx 10N$ is read as 3 raisins for every 10 nuts. There is not enough information supporting this expression, based on the given.

In solving a problem (mathematical), first thing to do is identify the given and what is being ask.

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R = Raisins N = Nuts

R	N
10	3
20	6
30	9
40	12

R N
$10(10) \not\approx 3(3)$
$10(20) \not\approx 3(6)$
$10(30) \not\approx 3(9)$

R N
$3(10) \approx 10(3)$
$3(20) \approx 10(6)$
$3(30) \approx 10(9)$

The correct approximation is $3R \approx 10N$. I used a table to show the relationship between nuts and raisins and then used the numbers in the table to see which relationship was true by substituting in the values.

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(The symbol $\approx$ means "is approximately equal to." We would not expect the numbers to be exactly equal, since there is some random variation.)

Given: raisins = R ; nuts = N ; 10 raisins to every 3 nuts

$10R : 3N$ $\frac{10r}{13}$ or $\frac{3n}{13}$

① $\frac{10R}{3} : \frac{3N}{3} = \frac{10R}{3} : N$ or ② $\frac{10R}{10} : \frac{3N}{10}$ $R : \frac{3N}{10}$

using a) $10R \approx 3N$ use ①

$10R \approx 3\left(\frac{10R}{3}\right)$

$10R \approx 10R$ ✓

$10R \approx 3N$ use ②

$10\left(\frac{3N}{10}\right) \approx 3N$

$3N \approx 3N$ ✓

using b) $3R \approx 10N$ use ①

$3R \approx \frac{10R}{3}\,10$

$3R \approx \frac{100R}{3} \approx 33R$

$3R \approx 33R$

$R \approx 11R$ ✗

$3R \approx 10N$ use ② does not work

$3\left(\frac{3N}{10}\right) \approx 10N$

$\frac{9N}{10} \approx 10N$

$\frac{9N}{9} \approx \frac{100N}{9} \approx 11N$

$N \approx 11N$ ✗

b $3R \approx 10N$

$\frac{30r}{13} \approx \frac{30N}{13}$

a) $30R \approx 3N$

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Scratch:

R - # of raisins

N - # of nuts

$\frac{\text{raisins}}{\text{nuts}} = \frac{R}{N}$ one set: $\frac{10}{3}$

Proportion in Plato's Trail Mix (PTM):

if ~~equates~~ comprises a whole

$$\frac{10R}{3N} \downarrow = 1 \Rightarrow 10R \approx 3N$$

= Explanation

a.) $10R \approx 3N$ would be the correct statement. Let ~~R~~ R be # of raisins in the bag & N represent the # of nuts in the same bag. Since PTM contains 10 R for every 3 ~~nuts~~, we have the ratio $\frac{10R}{3N}$. Assuming this makes up the entire contents of the bag, we can set up the relation $\frac{10R}{3N} = 1 \Rightarrow 10R = 3N$.

As stated above, if we account for some random variation, we can see $10R \approx 3N$.

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a) $10R \approx 3N$ b) $3R \approx 10N$

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R = # raisins
N = # nuts

10 raisins for every 3 nuts
10:3 raisins : nuts

If there are 10 raisins there are 3 nuts
So, $10 \cdot 10 \not\approx 3 \cdot 3$.

Now, $3 \cdot 10 \approx 10 \cdot 3$ by substitution when $10 = R$ and $N = 3$.
Thus, B is the correct answer.

Given: 10:3 raisins : nuts
Prove: $3R \approx 10N$
Let R = # raisins and N = # nuts

Since the Ratio of Raisins to nuts is 10:3 for any value of raisins or nuts
$\frac{10r}{3n}$ - (Let r = any multiple of raisins and n = any multiple of nuts)
Consider $3R \approx 10N$
$3(10r) \approx 10(3n)$
$30r \approx 30n$
and $r \approx n$
So the number of raisins and nuts would be equal for any multiple.

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(The symbol $\approx$ means "is approximately equal to." We would not expect the numbers to be exactly equal, since there is some random variation.)

if the are 10 raisins for every 3 nuts, then the ratio of nuts to raisins is 3:10 (3 to 10). Since there is some random variation, this ratio is approximately proportionate. However, the random variation does not impact the direct variation of the ratio. As the N increases R increases and vice versa. a) $10R \approx 3N$ is incorrect because the only way $10R \approx 3N$ can be approximately equal is if R and N are not same, but R and N would have to be the same to meet the demands of the ratio. b) $3R \approx 10N$ is correct because proportionately it can be within the constraints of the demand of the ratio.