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## How much would it have cost Kelis to provide all the boys, she brought to the yard, milkshakes?

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### Abstract

With the release of Kelis' R&B classic *Milkshake* in 2003 many have wondered what was so special about her milkshake that brought all the boys to the yard. Therefore, to much delight, in 2017 Kelis finally released a recipe video for her infamous milkshake. This allows the question of 'how expensive would it be for Kelis to provide a serving of milkshake to all the boys who came to her yard?' to be asked. To answer this question, the number of eligible boys was determined as 2,725,115,365 meaning that Kelis would need to spend approximately £11.1 billion on ingredients; comparable to Shell's 2017/18 profits.

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### Introduction

In 2003 the iconic R&B song *Milkshake* was released [1, 2]. In the song, performed by Kelis, she states that her milkshake, which is "better than yours", "brings all the boys to the yard" [1]. This begs the question how many milkshakes would Kelis need to provide one to each of these boys and how much would it cost her to do so?

Luckily, in a collaboration with Baileys in 2017, Kelis released a recipe video for her infamous milkshake. The recipe includes chocolate ice cream, ginger beer, Baileys Original Irish Cream Liqueur, candied ginger and cayenne pepper [2]. Whilst some attempt has been made previously to quantify this song, as of yet, no figure has been put on the cost of supplying all the boys with one serving of Kelis' milkshake [3]. Therefore, by determining the population of boys who could come to the yard for milkshakes, the number of servings of this milkshake can be calculated. Then, by calculating the quantity of ingredients required to fulfil this order, a total cost can be determined based on each ingredient's cost per unit.

### How many boys would be brought to the yard?

The presence of alcoholic ingredients in the recipe of this milkshake does present some problems with the number of boys who would be legally allowed to consume it. Currently there are nine countries which have a nationwide prohibition on the consumption of

alcohol and many countries enforce a sale restriction on alcohol to those under the age of 18, and in some cases older [4]. However, in the UK it is legal for individuals over the age of five to consume alcohol so long as it is on private premises [5]. Since Kelis states that her milkshake "brings all the boys to the yard" it can be assumed that the consumption of alcohol is taking place on private property and is therefore legal for all over the age of 5 [1]. Hence due to these alcohol laws, the yard in question will be assumed to be located in the UK.

With this issue out of the way, the total population of boys in the world can be determined. Assuming when Kelis refers to boys, she is referring to all male humans then the total number of boys can be found by looking at the world population statistics. By taking 15 years old as the youngest age a boy may come to the yard, then the CIA World Factbook's population break down by age can be used as shown

Age (Years)	Population of men
15-24	611,311,930
25-54	1,522,999,578
55-64	307,262,939
>65	283,540,918
<b>Total:</b>	<b>2,725,115,365</b>

Table 1 – The world population breakdown by age. Adapted from the CIA World Factbook [6].

Ingredient	Reported quantity per serving	Converted quantity	Quantity required for total population	Price per unit	Total price of ingredients
Chocolate ice cream	4 scoops	0.4732 L	1,289,524,590.72 L	0.825 £/L	£ 1,063,857,787.34
Ginger beer	8 oz	0.2366 L	644,762,295.36 L	0.250 £/L	£ 161,190,573.84
Baileys	3 oz	0.0887 L	241,717,732.88 L	21.429 £/L	£ 5,179,769,297.79
Crystallised ginger	5 pieces (5 x 30g)	0.150 kg	408,767,304.75 kg	11.429 £/kg	£ 4,671,801,525.99
Cayenne pepper	0.5 tsp	0.0009 kg	2,452,603.83 kg	17.708 £/kg	£ 43,430,708.60
<b>Total cost:</b>					<b>£11,120,049,893.55</b>

Table 2 – A breakdown of the full recipe for Kelis' famous milkshake [2]. Each quantity has been converted into SI units and multiplied out to fulfil the 2,725,115,365 servings required. The price per unit was taken from Tesco online grocery shopping and manually calculated for each item.

in table 1. This gives a total population of eligible boys as 2,725,115,365 [6]. Unfortunately, there is likely more eligible boys than this number however, reliable population data for ages 5-14 is not readily available.

### How much would it cost?

Table 2 shows the full break down of Kelis' recipe for one serving of her famous milkshake. For each item in the recipe, as reported in her Vimeo film, the amount has been converted into SI units and paired with a cost per unit before finally being multiplied out so that the recipe accounts for the 2,725,115,365 servings required. The cost per unit for each item has been taken from Tesco's online grocery shop, using own brand products where possible, as it has been reported to be the supermarket with the largest market share in the UK [7].

The first item in the recipe is four scoops of chocolate ice cream [2]. Assuming Kelis is using a standard number 16 scoop, where each scoop is equivalent to 1/32 of a US gallon, four scoops is equivalent to 473.2 mL of ice cream [8]. With a two litre tub costing £1.65, Kelis will need to buy £1,063,857,787.34 worth of ice cream [9]. The next ingredient is 8 US oz (236.6 mL) of ginger beer [2]. Costing only £0.50 for a two litre bottle means that a meagre £161,190,573.84 would need to be spent [10]. The next item in the recipe, and according to Kelis the most important, is 3 US oz (88.7 mL) of Baileys Original Irish Cream Liqueur [2]. Costing £15.00 for a 700 mL bottle, Kelis would have to spend £5,179,769,297.79; making it the most expensive item in the recipe [11].

For the final two ingredients some extra assumptions must be made. Firstly, Kelis states that 5 slices of candied, or crystallised, ginger needs to be added [2]. Since a slice is a vague quantity, the portion size of 30 g, as shown on the Tesco website, will be used in its place. This means Kelis needs 150 g of crystallised ginger per person resulting in a total cost, at £2.00 for a 175 g bag, of £4,671,801,525.99 [10]. Lastly, 0.5 teaspoons of cayenne pepper are added [2]. To convert this into a useable mass, the United States Department of Agriculture's National Nutrient Database value of 1.8 g per teaspoon can be used [13]. With Kelis using 0.9 g of pepper for each serving, and 48 g costing £0.85, £43,430,708.60 will be spent on pepper [14].

After adding the cost of all five ingredients the total Kelis would have to spend is £11,120,049,893.55. For comparison this figure is roughly equal to Shell's 2017/18 profits (\$15.2 billion) and over 3,500 times Kelis' net worth (reported at \$4 million) [15, 16].

### Conclusion

In summary, it can be concluded that from Kelis' 2017 milkshake recipe, she would need to buy approximately £11.1 billion worth of ingredients to supply milkshakes to all the boys. This figure is also likely an underestimate as it does not account for any boys aged 5-14 due to lack of data for this range. Furthermore, since the amount of money required is 3,500 times Kelis' net worth, it would not have been possible for Kelis to supply all the boys in the yard with milkshakes. One possible way she could have achieved this was by charging to teach everyone her recipe.

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