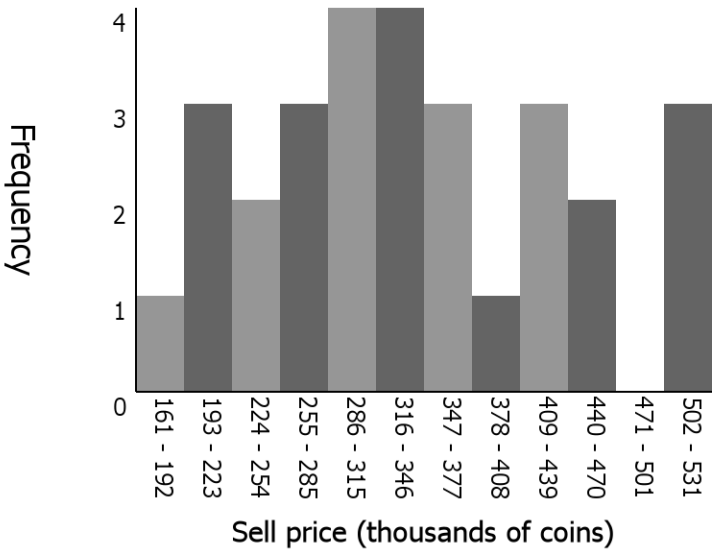
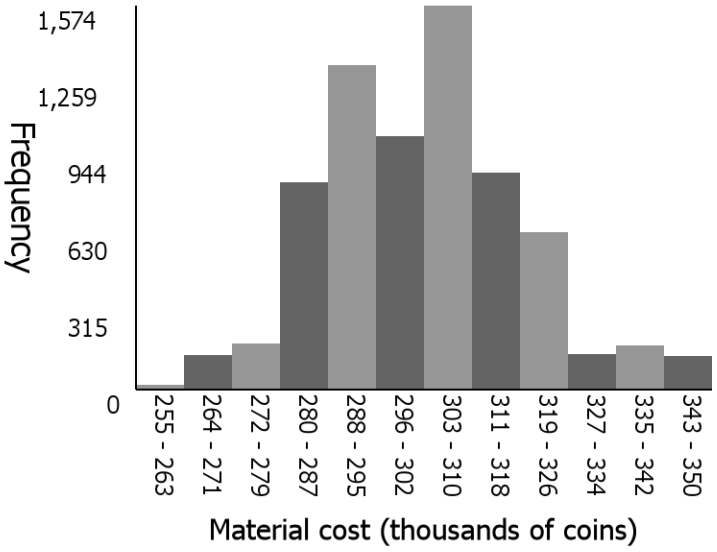
Selling prices and material costs of a young dragon helmet

Sell price distribution (outliers omitted)



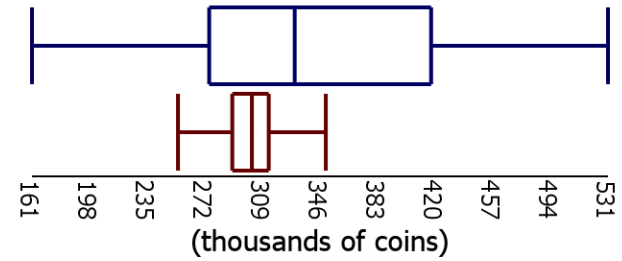
The distribution is centered around 330,000 coins (median). It has a low variability (IQR of 142,726 coins) and is mostly symmetrical. There is a large gap between 469,732 - 500,600 coins. There are 0 outliers on the low end and 0 outliers on the high end.

Material cost distribution (outliers omitted)

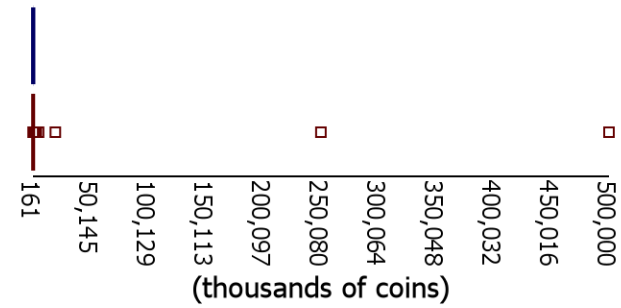


The distribution is centered around 302,470 coins (median). It has a low variability (IQR of 23,425 coins) and is mostly symmetrical. There are no large gaps in the distribution. There are 3 outliers on the low end, the lowest being 254,209 coins and 345 outliers on the high end, the highest being 499,999,935 coins.

Price and cost distributions (outliers omitted)



Price and cost distributions (outliers included)



Key:

Sell Price

Material Cost

5 number summeries (thousands of coins):

min: 161, q1: 275, median: 330, q3: 418, max: 531

min: 255, q1: 290, median: 302, q3: 313, max: 350

Statistical test comparing the selling prices and material costs of a young dragon helmet

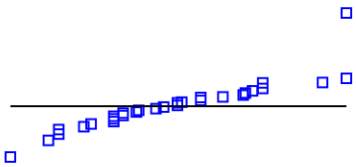
Let group1 = Sell prices of a young dragon helmet, group2 = Material cost of a young dragon helmet
X_1 = Sell price of a young dragon helmet (coins), X_2 = Material cost of a young dragon helmet (coins)
μ_1 = Mean sell price of a young dragon helmet (coins), μ_2 = Mean material cost of a young dragon helmet (coins)

$H_o: \mu_1 = \mu_2$ $H_a: \mu_1 > \mu_2$

Requirements for a difference of means test (σ_1 and σ_2 unknown):

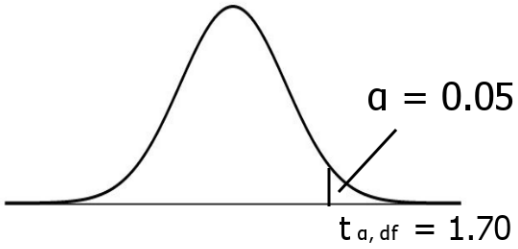
1. 2 independent SRS's: ✓ $n_1 = 29$ $n_2 = 7140$
   One price/cost from either group will not affect any price/cost from either group
2. σ is not known, but S_X is: ✓ $S_1 = 97{,}787.8274$ coins $S_2 = 16{,}176.6243$ coins
3. Group1 is normally distributed and $n_2 > 30$: ✓

Quantile plot of sell prices $n_2 = 7140 > 30$



Rejection Critieria:

α = 0.05 df = 28



Reject H_o if $t > 1.70$

Test Statistic:

$$t = \frac{(\bar{x}_1 - \bar{x}_2) - (\mu_1 - \mu_2)}{\sqrt{\frac{S_1^2}{N_1} + \frac{S_2^2}{N_2}}}$$

$t = 2.00$
p-value = 0.0277

Reject H_o since $2.00 > 1.70$

Inputs:

$\bar{x}_1 = 338{,}770.5172$ (coins)
$\bar{x}_2 = 302{,}468.7337$ (coins)
$S_1 = 97{,}787.8274$ (coins)
$S_2 = 16{,}176.6243$ (coins)
$n_1 = 29$
$n_2 = 7{,}140$

There is significant evidence at the α=0.05 level of significance to support the claim that the mean selling price of a young dragon helmet is greater than the mean cost of the materials required to make it.

Since we rejected H_o, it suggests that on average people earned more coins from selling this item than it would have cost them to buy the materials.

Implication: the test suggests that on average we could make a profit from flipping this item.