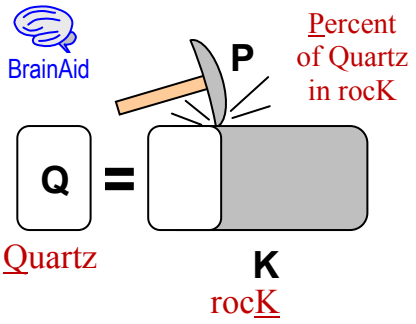
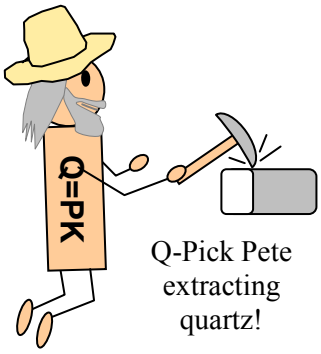
Percent-Of Problems: Q=PK [kyu-pik]

This is what percent of that?

Quantity = Percent • Kwantity

- Kwantity is purposely misspelled to differentiate it from Quantity.
- P can be expressed in equivalent percent, decimal, or fraction form, e.g., 25% = .25 = ¼





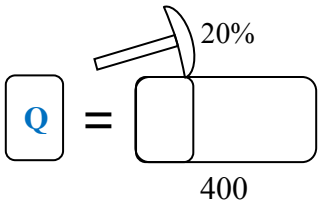
Q=PK Variations

Given two values, find the missing one.

See *Fraction Fun* techniques

Find Q

What is 20% of 400?



$Q = P\,K$

$Q = 20\%\,(400)$

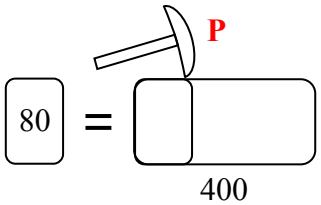
$Q = \frac{20}{100}(400)$ (4)

$Q = 80$

Pound the Percent

Find P

80 is what percent of 400?



$Q = P\,K$

$80 = P\,(400)$

$\frac{80}{400} = \frac{P\,(400)}{400}$ (4) (20) (100)

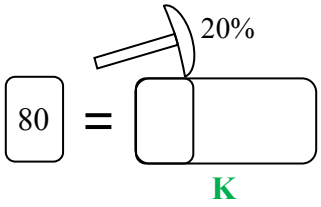
$20\% = P$

Division Diet

Heave the Hundredth

Find K

80 is 20% of what?



$Q = P\,K$

$80 = 20\%\,K$

$\frac{80}{.2} = \frac{.2}{.2}K$ (2)

$400 = K$

Double DiP left

Drag the Dumb-bell

Your Turn!

Tips

- Start with Q=PK.
- Plug in the given values.
- "is" means "equal."
- rocK follows "of."
- Solve for the "what."

What is 10% of 300?

Q = PK

30 is what percent of 300?

30 is 10% of what?

Answers

Q=10%(300),Q=30 30=P(300),P=10% 30=10%K,K=300

TRAP

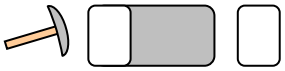
The wording of *Percent-Of* problems will *not* always be in Q=PK order.
Because the English language is so flexible, there are a dizzying number of ways to word Q=PK problems.
Six possible orders of Q-P-K each asking for Q, P, or K produce 18 different wordings!

Quartz Pick Rock (QPK)

Q: What is 10% of 100?
P: 10 is what percent of 100?
K: 10 is 10% of what amount?

Quartz Rock Pick (QKP)

Q: What amount of 100 is 10%?
P: 10 of 100 is what percent?
K: 10 of what amount is 10%?



Pick Rock Quartz (PKQ)

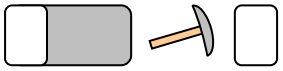
Q: 10% of 100 is what amount?
P: What percent of 100 is 10?
K: 10% of what amount is 10?

Pick Quartz Rock (PQK)

Q: 10% is what amount of 100?
P: What percent is 10 of 100?
K: 10% is 10 of what amount?

Rock Quartz Pick (KQP)

Q: Of 100, what amount is 10%?
P: Of 100, 10 is what percent?
K: Of what does 10 make 10%?



Rock Pick Quartz (KPQ)

Q: Of 100, 10% is what amount?
P: Of 100, what percent is 10?
K: Of what does 10% make 10?

Tip

No matter the word order, start with Q=PK and transfer the numbers in the problem to the appropriate variable.

Of 100, 10 is what percent?

Q = P K
10 = P(100)

Your Turn!

15% is what amount of 300?

What percent of 300 is 45?

Of what does 15% make 45?

25 is 20% of what?

What amount of 125 is 20%?

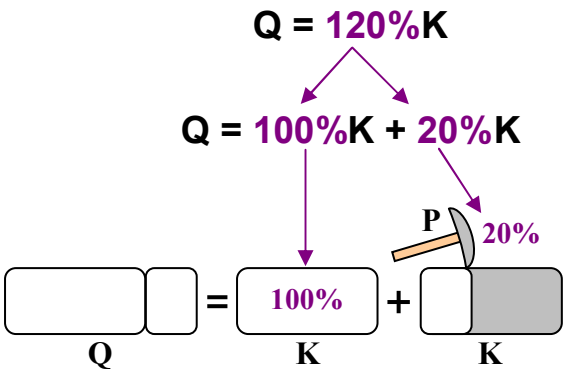
Of 125, 25 is what percent?

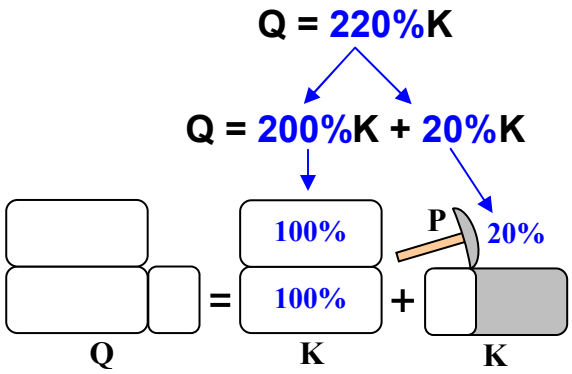
Answers: Q=15%(300),Q=45 45=P(300),P=15% 45=15%K,K=300 25=20%K,K=125 Q=20%(125),Q=25 25=P(125),P=20%

If Percent > 100%

Q = K + PK

Since 100% = 1, every multiple of 100% is equivalent to having one 100% solid-quartz rock. Any remaining percent of quartz must be extracted from an additional rock.





Even though you end up with *more* than the original rock, the solution procedures are the same. Use the *Fraction Fun* technique (Pound the Percent, Heave the Hundredth, Double DiP etc.) you prefer.

What is 120% of 400?

$Q = 120\%\,(400)$

$Q = \frac{120}{100}(400)$ (4)

$Q = 480$

480 is what percent of 400?

$480 = P\,(400)$

$\frac{480}{400} = \frac{P}{100}\,(400)$ (4)

$120\% = P$

480 is 120% of what?

$480 = 120\%\,K$

$\frac{480}{1.2} = \frac{1.2}{1.2}\,K$

$400 = K$

Your Turn!

What is 115% of 300?

345 is what percent of 300?

345 is 115% of what?

Answers: Q=115%(300),Q=345 345=P(300),P=115% 345=115%K,K=300

Q = K ± PK is the basis for Markup, Discount, and Percent-Change Problems.

Practical Percent-Of Problems

For each problem, start with Q=PK, substitute the two given values, and solve for the third.

1. If 3 of 4 birds in a flock of 160 birds are female, how many are female?

* [whole *of* whole = whole / whole] so 3 of 4 = 3/4
* [part *of* whole = part • whole] so ¾ of 160 = ¾ • 160

2. Jack has 200 DVDs separated into classical, rock, and pop categories. If 50 of the DVDs are pop, what percent does this represent?

3. Cindy bought a TV and the 10% sales tax came to $30. What was the original price of the TV?

4. Last year, Sue earned $500 selling T-shirts. This year she earned 200% of last year's total. What did she earn this year?

5. Make up three Q=PK problems, each one requesting a different variable. Then solve each problem.

Q Problem P Problem K Problem

Answers: [1] Q=3/4(160),Q=120 [2] 50=P(200),P=25% [3] 30=10%K,K=300 [4] Q=200%(500),Q=1000 [5] Your choice