

# Optimization — Greatest & Least

CKSTEM Math Problem Solving · Grades 5–8

Try each problem on your own first — then watch the solution videos.

## ★ Objective vs Constraint

A relief team has 17 blankets and 14 water bottles. Every complete comfort kit needs 3 blankets and 2 water bottles. They also pack meals into crates that hold 5, 10, or 20 meals each, and they must deliver exactly 95 meals using the fewest crates. For each scenario, decide whether the question is asking for the GREATEST or the LEAST, name the objective (the thing being pushed), and name the constraint (the limit that stops it).

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## L0 Bottleneck Rule

A relief packing line builds identical comfort kits. Each kit needs exactly 2 blankets and 3 water bottles. The warehouse has 17 blankets and 14 water bottles. What is the greatest number of complete kits the team can pack?

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**L1 Take the Biggest First**

Relief meals are shipped in crates that hold 5, 10, or 20 meals. To deliver exactly 95 meals, what is the least number of crates the team can use?

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**L2 Squeeze the Rest**

Seven relief grants are given out. Each is a different positive whole number of dollars, and together they total \$350. One grant is exactly \$100. What is the greatest amount a single grant could be?

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### L3 Round Up to Guarantee

A field report says about 30 people will arrive (rounded to the nearest 10). Each person needs 2 meals. What is the smallest number of meals to prepare to guarantee no one falls short?

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### L4 Shape the Extreme

A rectangular garden has whole-number side lengths in metres and a perimeter of exactly 24 metres. The length must be greater than the width. What is the greatest possible area of the garden?

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**L5 Test the Boundary**

A relief truck carries at most 100 kilograms. A crate of food weighs 6 kg and helps 15 families; a crate of water weighs 8 kg and helps 16 families. The team must pack at least 4 crates of food and strictly more water crates than food crates. What is the greatest total number of families helped?

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**L6 Corner of the Region**

Two kinds of relief kits are built. Each Type A kit uses 4 packs of supply X and 3 packs of supply Y and helps 4 people; each Type B kit uses 3 packs of X and 5 packs of Y and helps 5 people. The team has 27 packs of X and 34 packs of Y, and must build at least 2 of each kit. What is the greatest number of people that can be helped?

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## L7 Optimization Detective

A relief station has 25 identical care packs to hand out. Every family that receives anything must receive a different odd number of packs. What is the greatest number of families that can each receive packs?

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