SEARCH RESCUE
Exploring the maths behind HM Coastguard

LONDON GRID FOR LEARNING | HM Coastguard

Algebra Worksheet (ANSWERS) for KS2-4

These resources are based on real-life challenges faced daily by HM Coastguard. Each problem has been assigned a coastguard rank according to its challenge level to enable easy differentiation.

Maritime Operations Officer
(substituting into formulae)

Senior Maritime Operations Officer
(solving one-step equations)

Commander
(solving multi-step equations)

Chief Coastguard
(solving simultaneous equations)

The four levels vary in terms of scaffolding and challenge, but are all based on the same scenario.

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Use the table values to solve the problems below.

Deck liferaft (D)	25 persons
Standard liferaft (S)	47 persons
Large liferaft (L)	150 persons
Marine Evacuation System (M)	370 persons

a. Design 5 different lifeboat solutions for a cruise ship that will hold 1200 passengers. For each solution, state how many extra passengers it could hold. (e.g. 3M + 4D = 3x370 + 4x25 = 1210 so 10 extra passengers)
b. Work out the max. passenger capacities of the following cruise ships:
   i. 5L + 5S = 985
   ii. 10D + 2M = 990
   iii. M + 8D + 4S = 1378
   iv. 12D + 4S + 4L + 2M = 1828

Work out how many people to put in each lifeboat to evenly distribute the weight:

BOAT A: 900 people, 15 lifeboats =60

BOAT B: 720 people, 8 lifeboats = 90

BOAT C: 600 people, 4 lifeboats = 150

BOAT D: 820 people on board. 690 have already got on to lifeboats. How many need to get on the last one? = 130

Work out how many people to put in each lifeboat to evenly distribute the weight:

BOAT A: 1300 people, 10 lifeboats. 7 lifeboats are already full with 145 people in each. How many should you distribute in the remaining 3. = 95

BOAT B: 2200 people, 16 lifeboats. 9 lifeboats are already full with 120 people in each. How many should you distribute in the remaining lifeboats. = 160

BOAT C: 1800 people. Each lifeboat can hold 92 people. 5 lifeboats are already filled. How many more lifeboats will you need for the remaining passengers. = 15

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Work out how many people can fit in each type of boat.

1) The 'Concordia' can hold 1200 people and can fit all passengers into its two different lifeboat types in the following ways:

10 type A lifeboats and 10 type B lifeboats
14 type A lifeboats and 2 type B lifeboats
Type A = 80, Type B = 40

2) The 'Blue Lagoon' can hold 2400 people and can fit all passengers into its two different lifeboat types in the following ways:

10 type A lifeboats and 20 type B lifeboats
8 type A lifeboats and 40 type B lifeboats
Type A = 200, Type B = 20

3) Two ships, 'Britannia' and 'Regus' use the same lifeboat types. Work out the capacity of each lifeboat.

Britannia: Total capacity 1200, 4 Type C and 4 Type D
Regus: Total capacity 600, 1 Type C and 4 Type D
Type C = 200, Type D = 100

4) Two ships, 'Spirit of the Ocean' and 'Titus' use the same lifeboat types. Work out the capacity of each lifeboat.

Britannia: Total capacity 1200, 2 Type F and 3 Type G
Regus: Total capacity 1100, 1 Type F and 4 Type G
Type F = 300, Type G = 200