WINTER WONDERLAND

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On square paper, draw a set of axes. The x-axis needs to run from -20 to 20 and the y-axis needs to run from -10 to 20.

Shape 1
Draw the following circles on your grid with very faint lines:
Circle 1 has equation $x^2 - 18x + y^2 - 28y + 252 = 0$
Circle 2 has equation $x^2 - 14x + y^2 - 28y + 220 = 0$
There are two points where these circles intersect. Draw over the parts of the circles that are to the right of these points with bold lines, and colour in the resulting shape yellow.

Shape 2
Draw a square with side lengths 2 so that its bottom left hand vertex is at (7,-9). Colour the square in brown.
Draw the following line segments:

Line segment 1 has equation	$y = -7$	for x values from 3 to 13
Line segment 2 has equation	$3y = 5 - 2x$	for x values from 10 to 13
Line segment 3 has equation	$3y = 2x - 27$	for x values from 3 to 6
Line segment 4 has equation	$y = -5$	for x values from 4 to 6 and from 10 to 12
Line segment 5 has equation	$3y = 9 - 2x$	for x values from 9 to 12
Line segment 6 has equation	$3y = 2x - 23$	for x values from 4 to 7
Line segment 7 has equation	$y = -3$	for x values from 5 to 7 and from 9 to 11
Line segment 8 has equation	$3y = 13 - 2x$	for x values from 8 to 11
Line segment 9 has equation	$3y = 2x - 19$	for x values from 5 to 8

Colour the interior of the region you have just drawn in green.

Shapes 3&4
Copy shape 2 to a position translated by a vector of 7<u>x</u> + 5<u>y</u>
Copy shape 3 to a position translated by a vector of 2<u>y</u> - 11<u>x</u>

Shape 5
Draw six rectangles with width 2 and height 3. The co-ordinates of the bottom left vertices of these rectangles are: (-15,0) (-13,0) (-15,-3) (-13,-3) (-15,-6) (-13,-6)
Colour each rectangle in yellow.

Draw lines to connect the following co-ordinates in order: (-20,-10) (-9,-10) (-9,5) (-20,5) (-20,-10)
Colour the resulting shape in brown (apart from the parts already coloured in).

Draw the following line segments:

Line segment 1 has equation	$y = 5$	for x values from -20 to -4
Line segment 2 has equation	$x = -20$	for y values from 5 to 11
Line segment 3 has equation	$8y = 28 - 3x$	for x values from -20 to -4

Colour the interior of the region you have just drawn in grey.

Shape 6
Draw a circle with equation $x^2 - 20x + y^2 - 6y + 108 = 0$

Shapes 7-12
Draw circles the same size as shape 6, but with the following centre points:
(16,10) (18,18) (6,13) (-3,6) (-5,13) (-13,17)

Shape 13
Without drawing over any other shapes, draw a rectangle with the following vertices:
(-20,-2) (20,-2) (20,20) (-20,20)
Colour the rectangle in dark blue, but do not colour over any area which is also inside another shape.