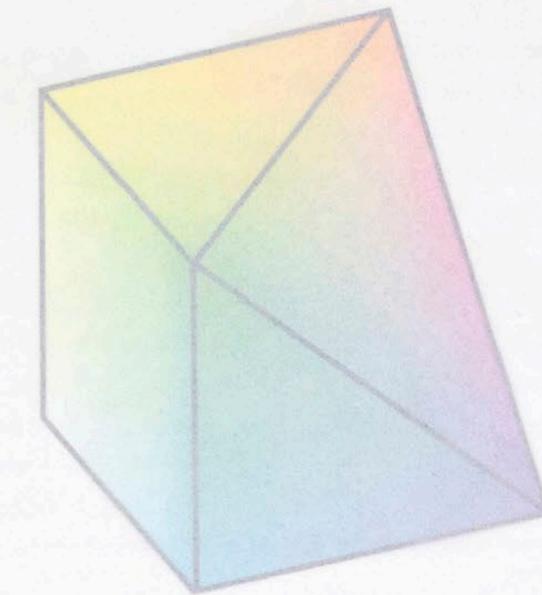


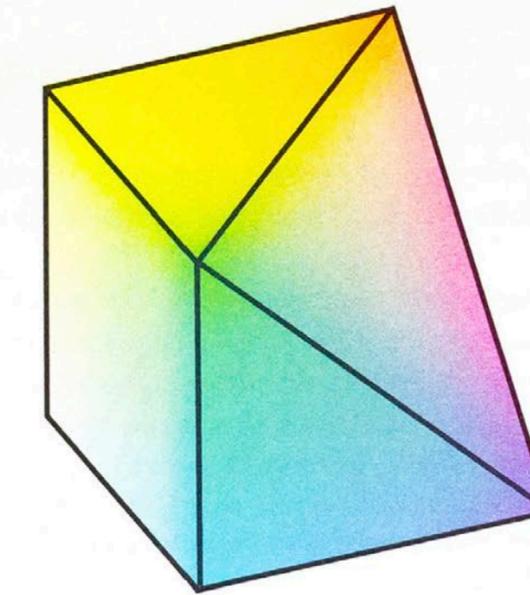
Riso
Barycentric
Color
Atlas

Riso
Barycentric
Color
Atlas



Daniel
Mellis
Chicago
2025

Riso
Barycentric
Color
Atlas

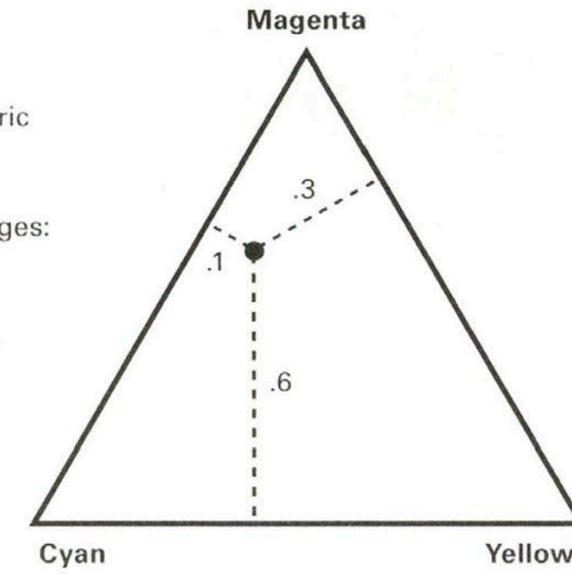


Daniel
Mellis
Chicago
2025

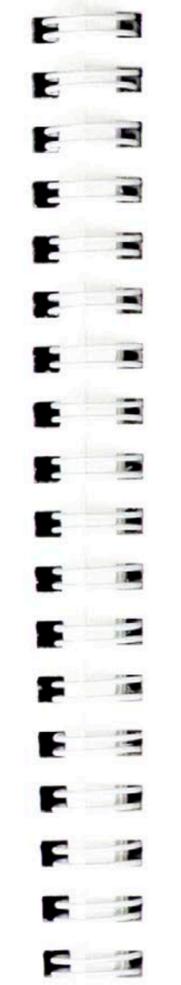
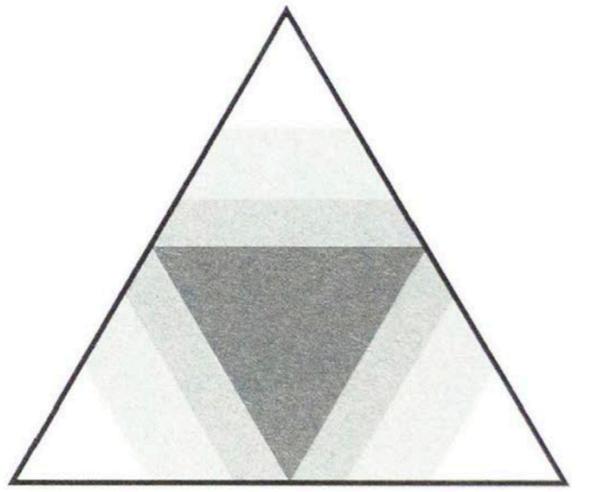
Number of Ink Colors	Number of Combinations of 1, 2, or 3 Inks
3	7
4	14
5	25
6	41
7	63
8	92
9	129
n	$\frac{n^3+5n}{6}$

The point shown here has barycentric coordinates: $(c, m, y) = (.3, .6, .1)$

- This corresponds to these percentages:
- 50% Triangle → (15%, 30%, 5%)
 - 75% Triangle → (22.5%, 45%, 7.5%)
 - 100% Triangle → (30%, 60%, 10%)
 - 133% Triangle → (40%, 80%, 13%)
 - 166% Triangle → (50%, 100%, 16%)
 - 200% Triangle → (60%, 120%, 20%)



-  Possible coordinates for the 133% figure
-  Possible coordinates for the 166% figure
-  Possible coordinates for the 200% figure



PREFACE

The basic color palette of Riso duplicators is limited. There are only a finite number of available inks and due to cost and space limitations, each shop or studio will have a much smaller subset.

However, when two or three inks are overprinted, a far more expansive palette is possible. Choosing one, two, or three inks from a set of five allows for twenty-five combinations and there are forty-one combinations from a set of six. If ten levels of ink coverage per color are introduced, these numbers expand by a factor of roughly 500.

The current publication is an attempt to systematically explore some of this complexity. Twenty-four sets of three colors have been chosen. For each set, six figures have been printed, each containing swatches with the same total ink coverage, ranging from 50% to 200%.

The percentages for each swatch were chosen using barycentric coordinates. Instead of the standard x and y axes of the Cartesian coordinate system, barycentric coordinates locate points within the interior of a triangle of height one. The position of a point is given by three coordinates—say c, m, and y—with the constraint that $c+m+y=1$. Each coordinate is the distance from the point to the edge opposite its respective vertex.

Colors corresponding to an interior point are a mixture of all three inks. The closer a point is to a vertex, the higher the percentage is of that color. At the magenta vertex, $m=1$ and $c=y=0$. When $m=0$, the point is on the edge connecting the cyan and yellow vertices.

The percentages for a swatch were determined by multiplying its coordinates by its figure's total ink coverage. The figures with total coverage over 100% were truncated so that no one ink has values greater than 100%. Each swatch is represented by the coordinates at its geometric center, except for those at the figure boundaries. There, coordinates were chosen in order to have one- or two-color swatches.

TABLE OF COLORS

Aqua — Fluorescent Pink — Yellow
Aqua — Fluorescent Pink — Sunflower

Aqua — Crimson — Yellow
Aqua — Crimson — Sunflower

Blue — Fluorescent Pink — Yellow
Blue — Fluorescent Pink — Sunflower

Federal Blue — Fluorescent Pink — Yellow
Federal Blue — Fluorescent Pink — Sunflower

Orchid — Fluorescent Pink — Sunflower
Orchid — Fluorescent Pink — Fluorescent Orange

Fluorescent Orange — Fluorescent Pink — Aqua
Fluorescent Orange — Fluorescent Pink — Light Lime

Blue — Fluorescent Pink — Orchid
Blue — Fluorescent Pink — Crimson

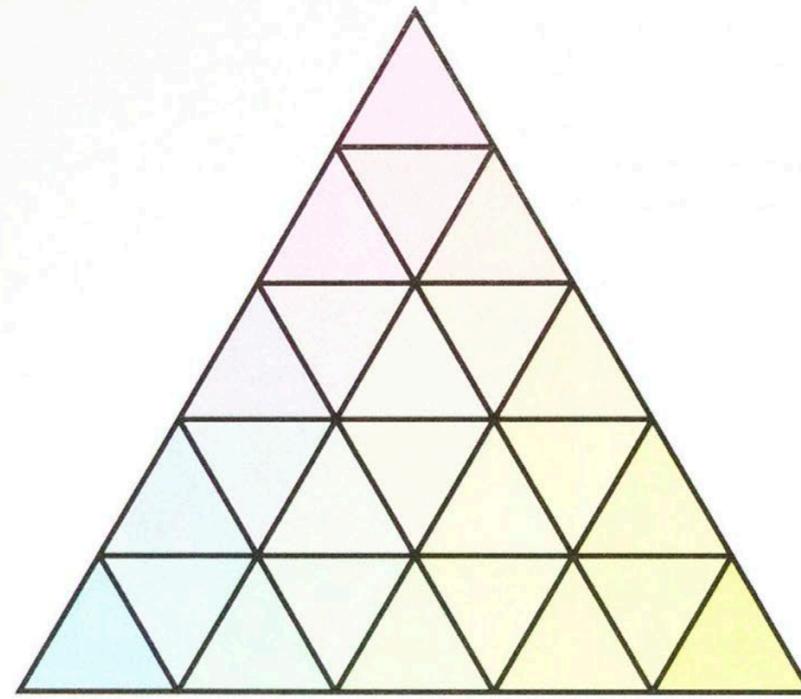
Crimson — Fluorescent Pink — Orchid
Crimson — Fluorescent Orange — Aqua

Copper — Sunflower — Crimson
Copper — Sunflower — Metallic Gold

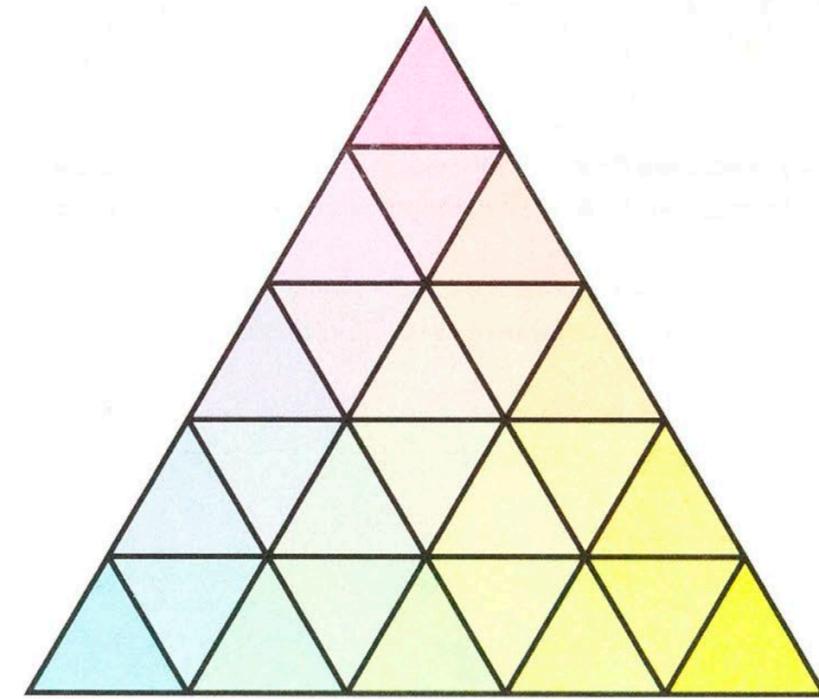
Orchid — Crimson — Aqua
Orchid — Crimson — Yellow

Blue — Orchid — Green
Aqua — Orchid — Yellow

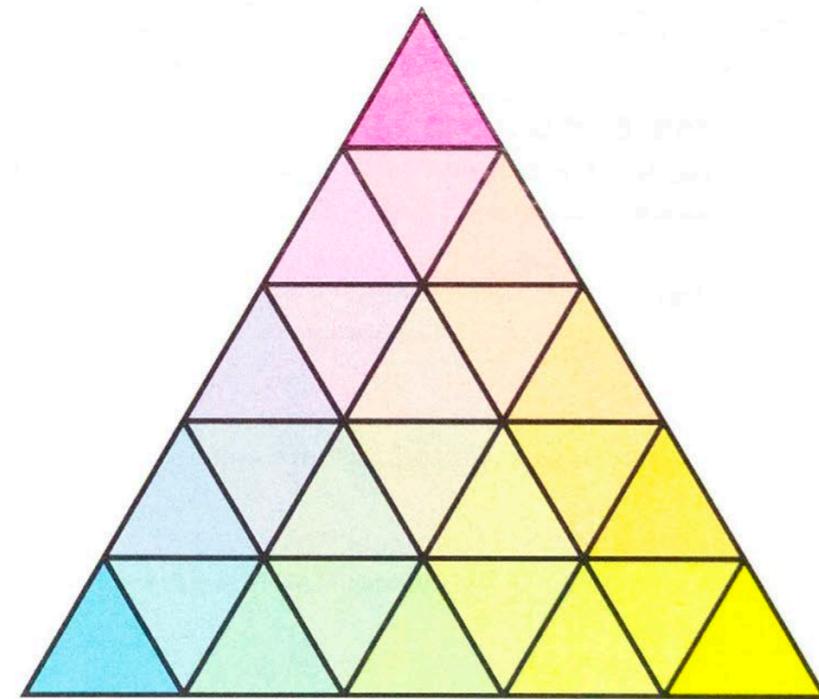
Blue — Yellow — Copper
Blue — Yellow — Green



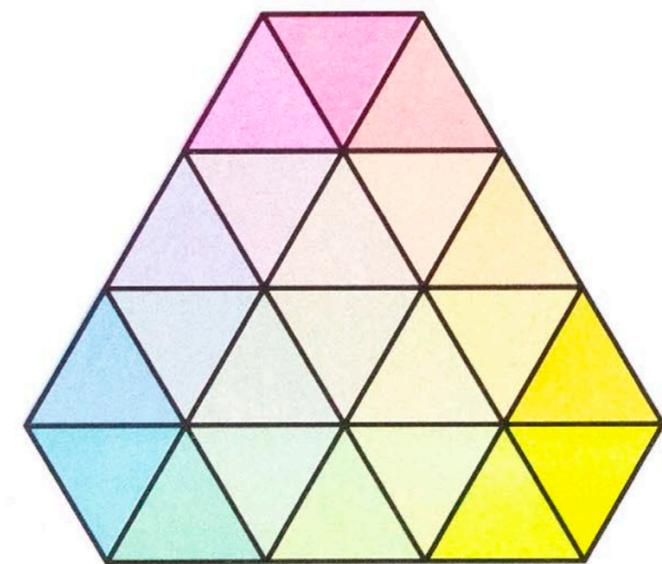
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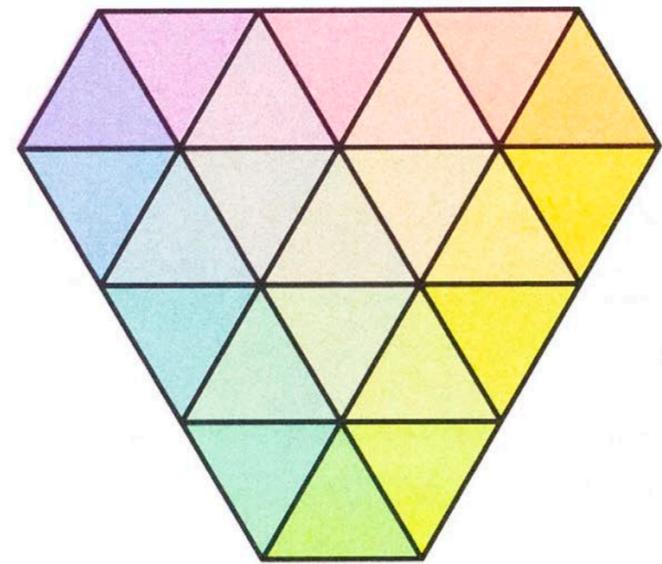
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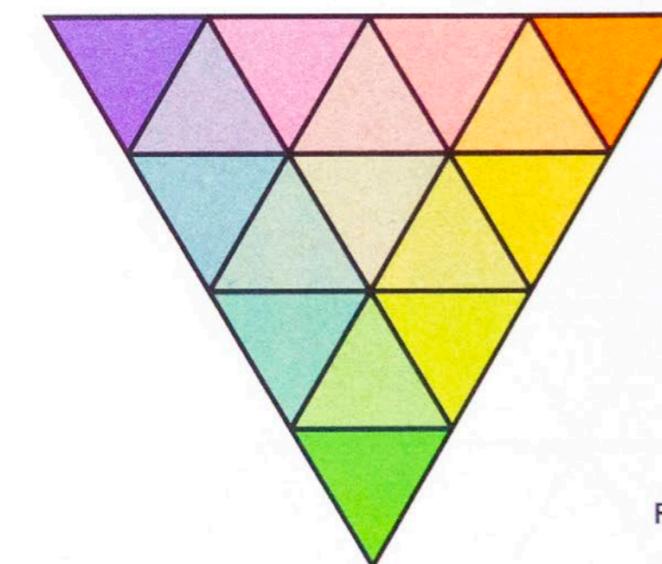
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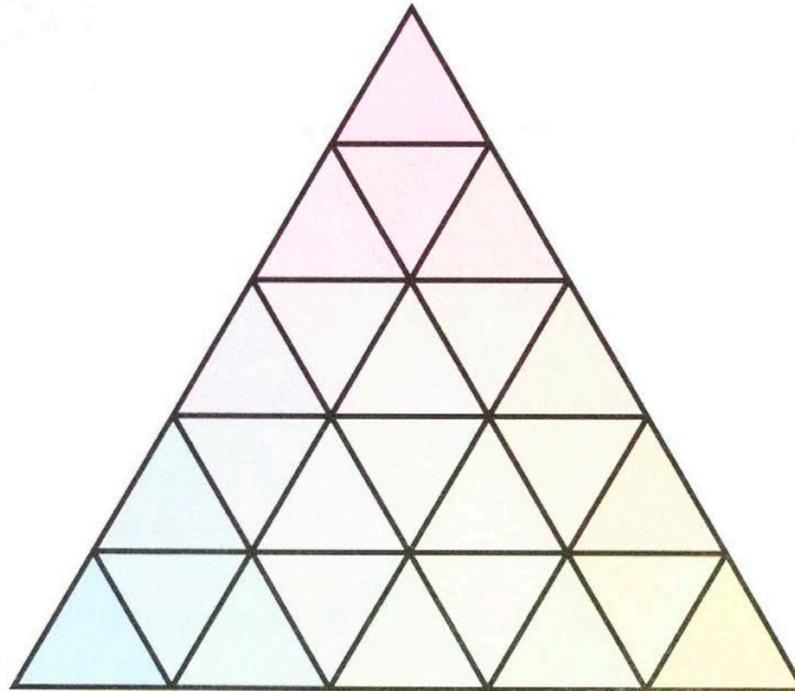


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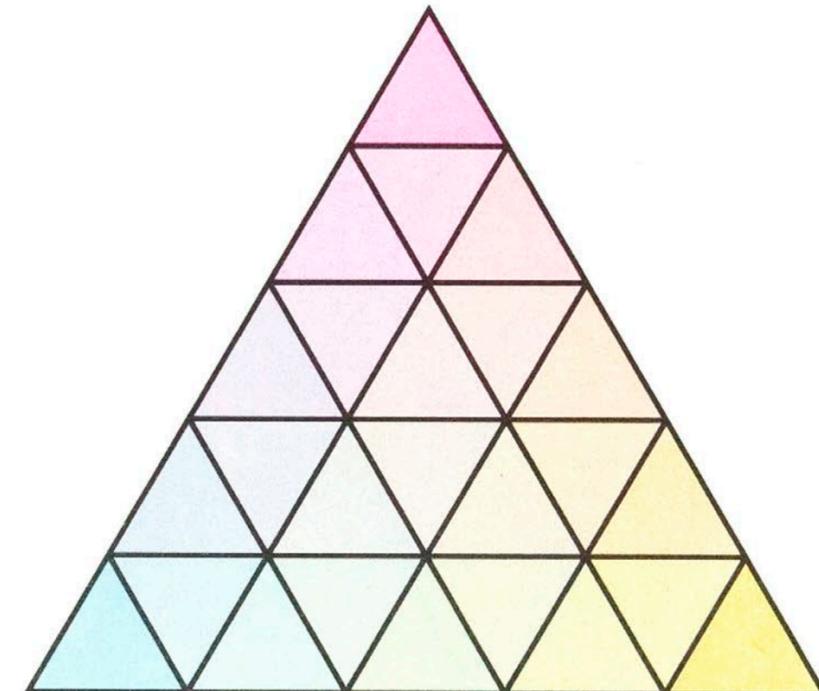


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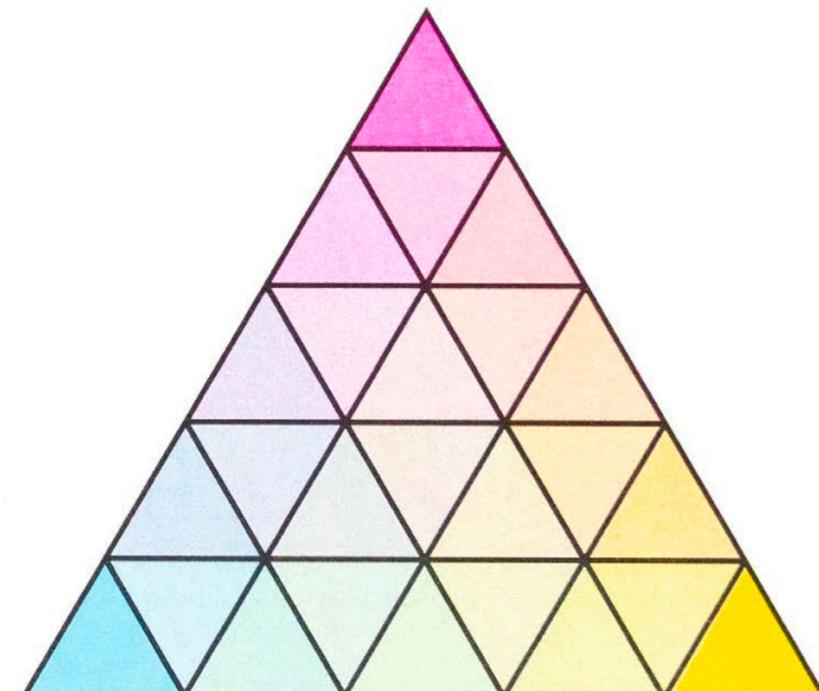
- Aqua 
- Fluorescent Pink 
- Yellow 



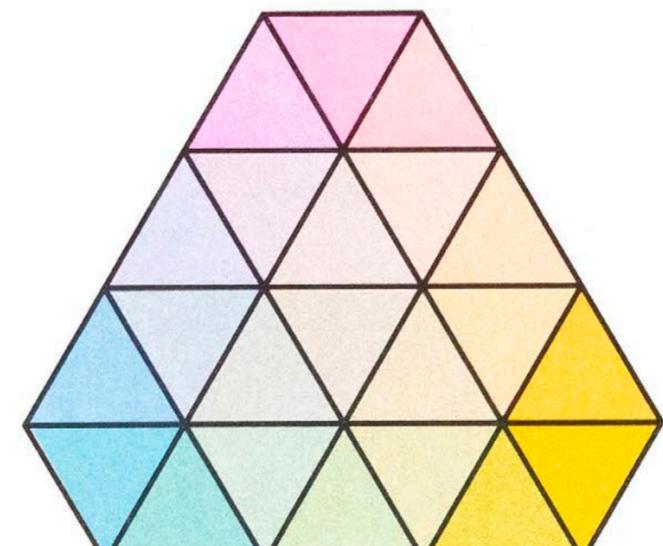
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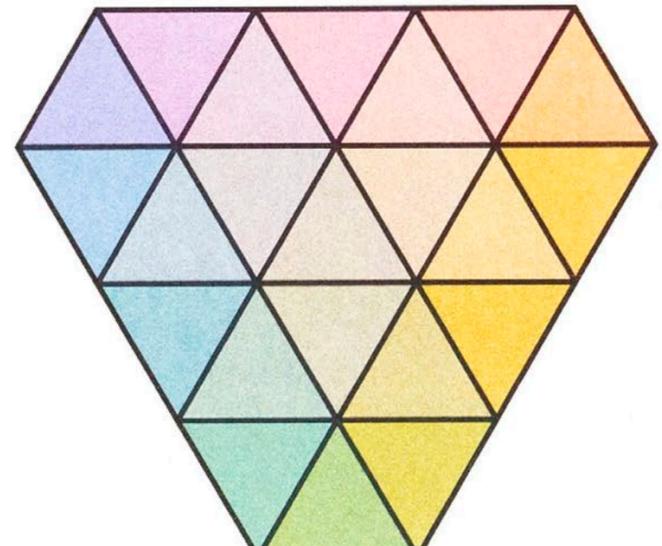
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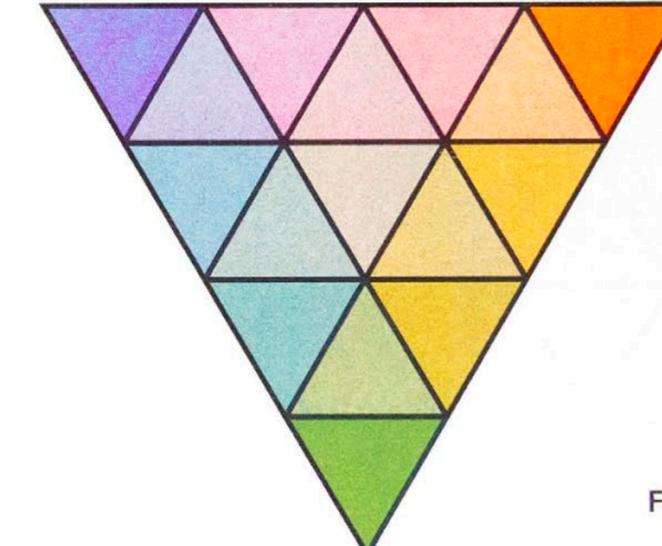
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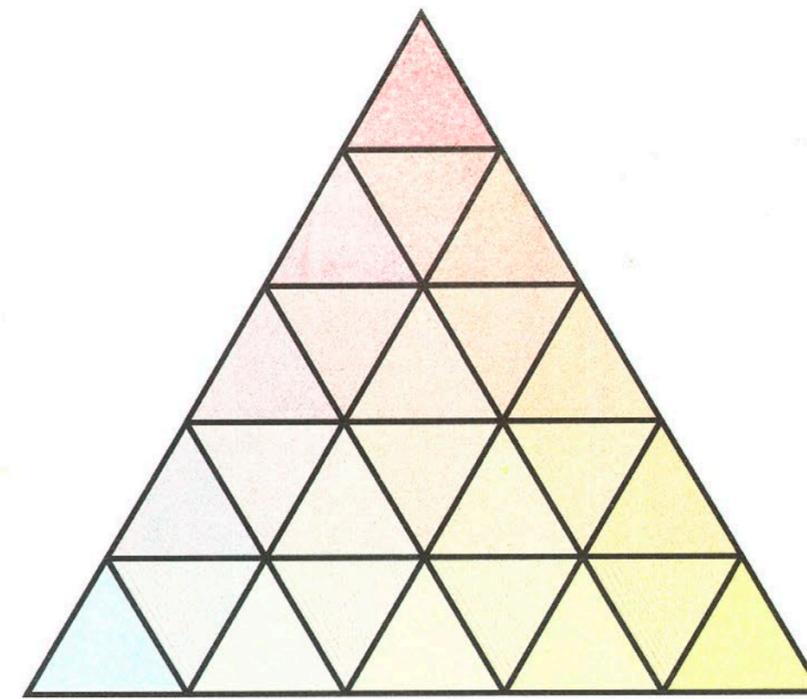


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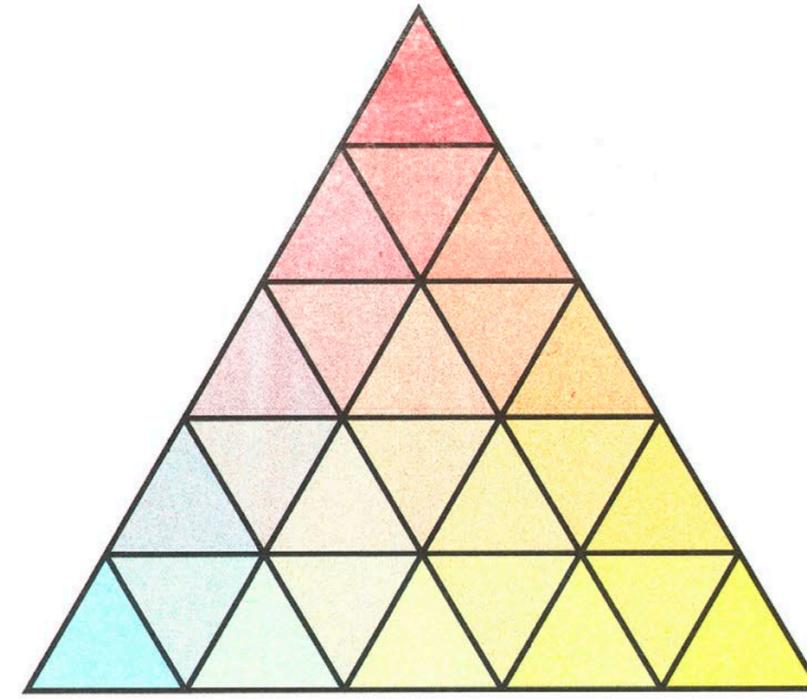


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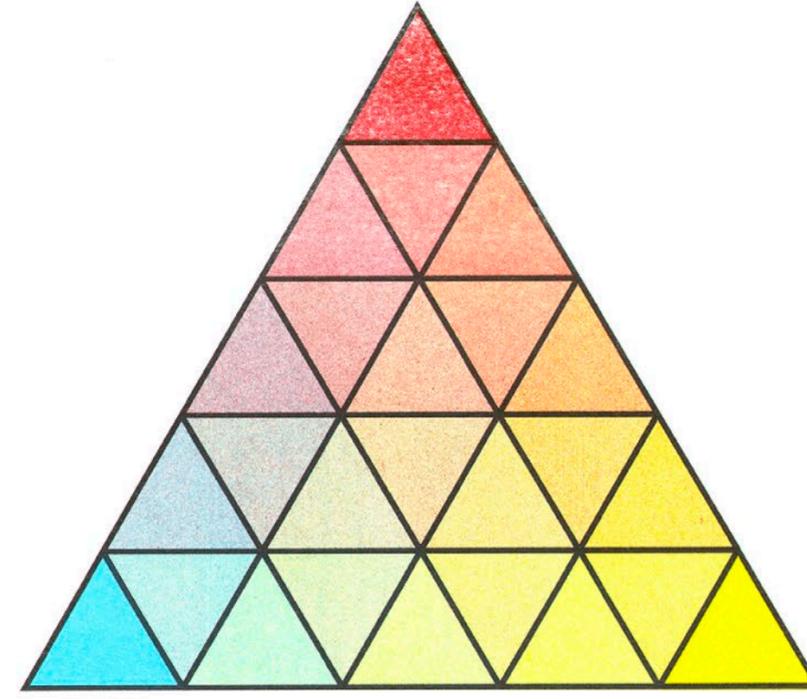
- Aqua 
- Fluorescent Pink 
- Sunflower 



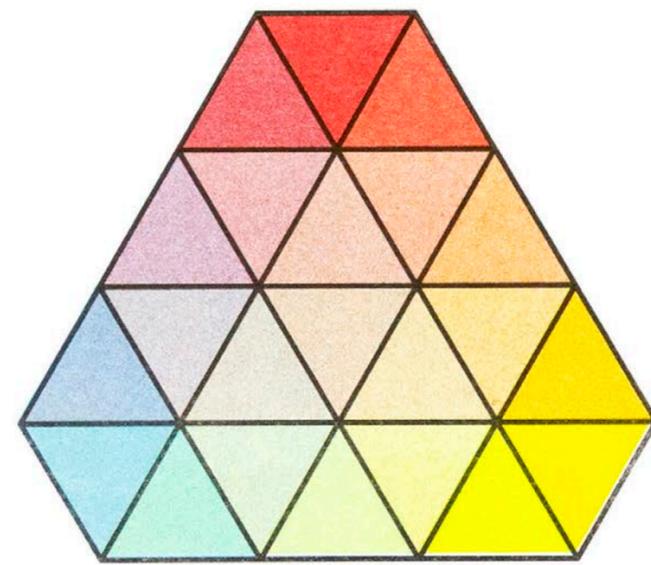
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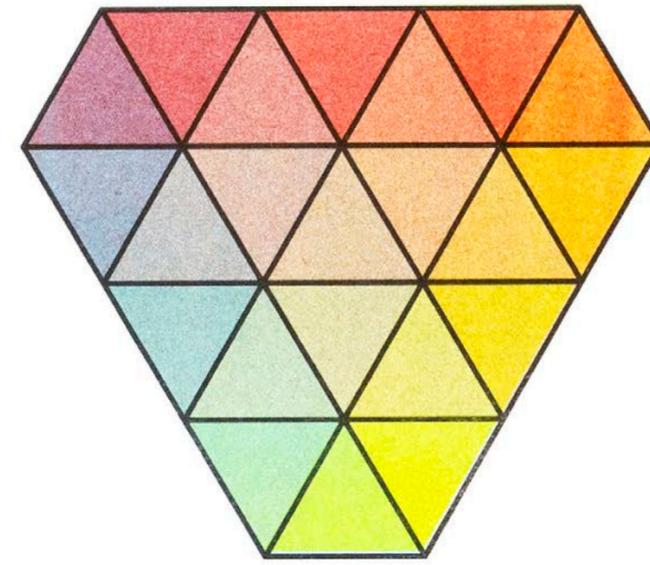
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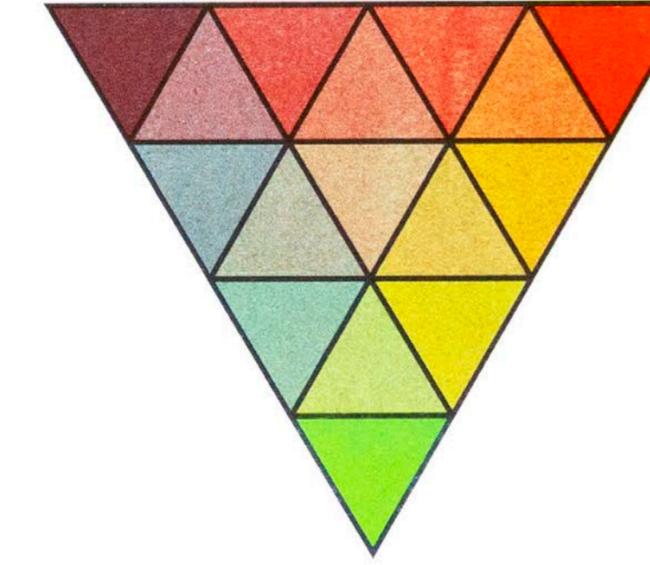
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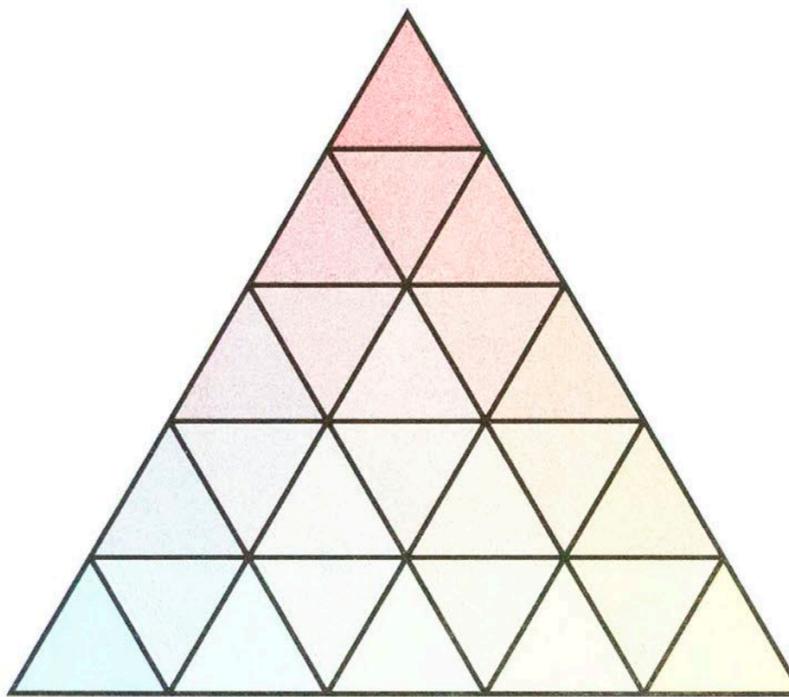


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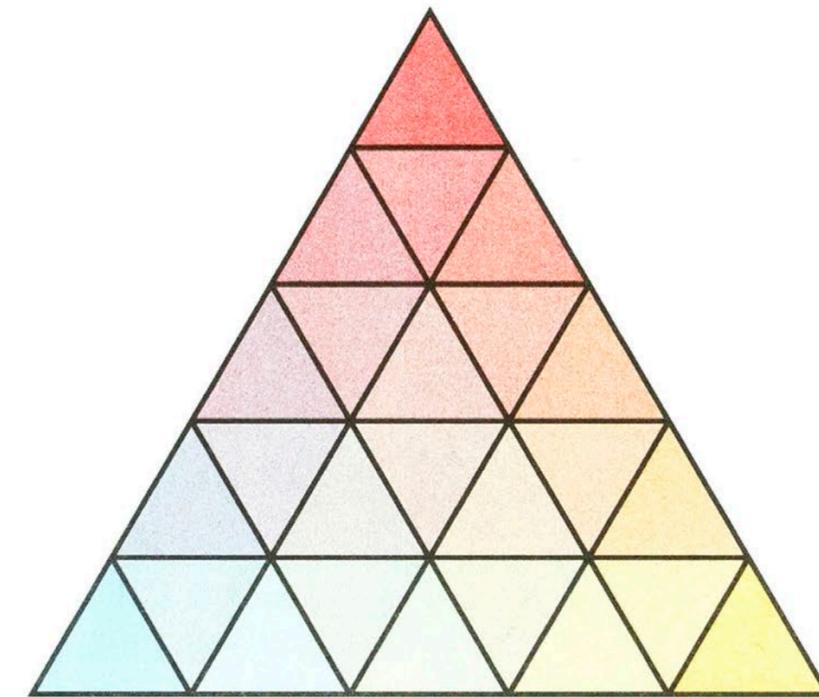


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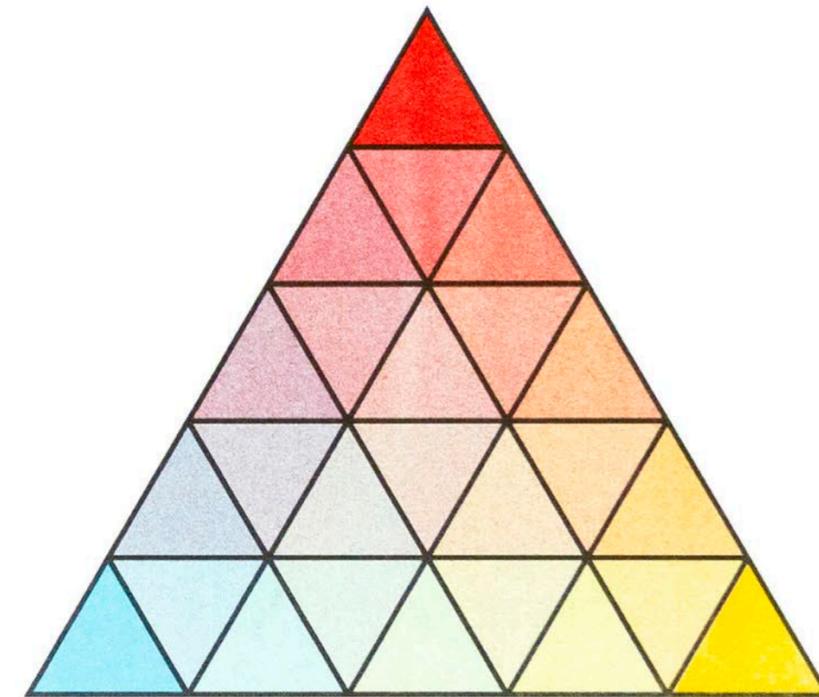
- Aqua 
- Crimson 
- Yellow 



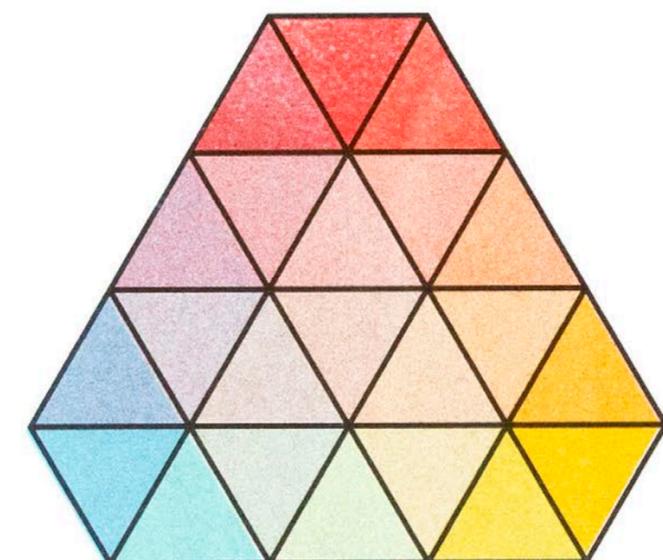
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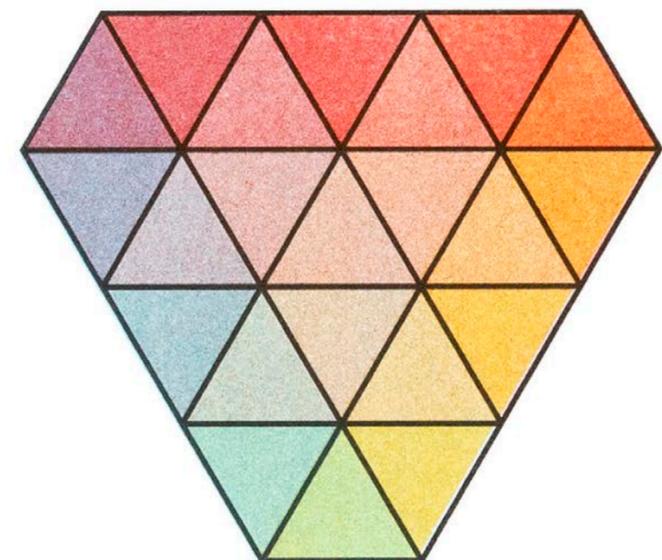
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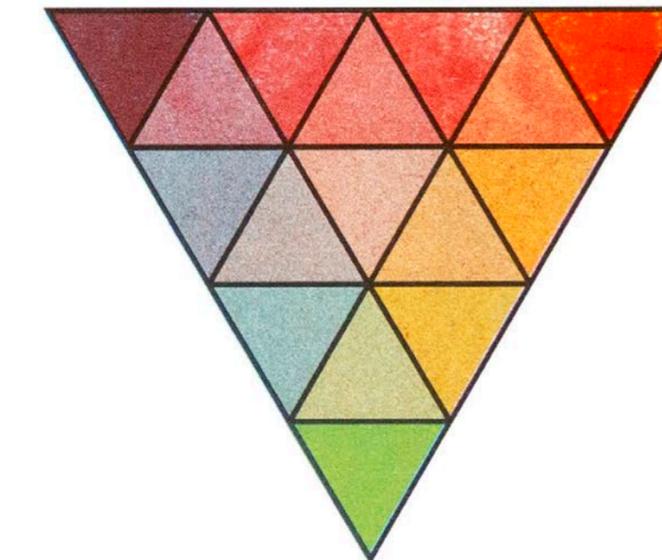
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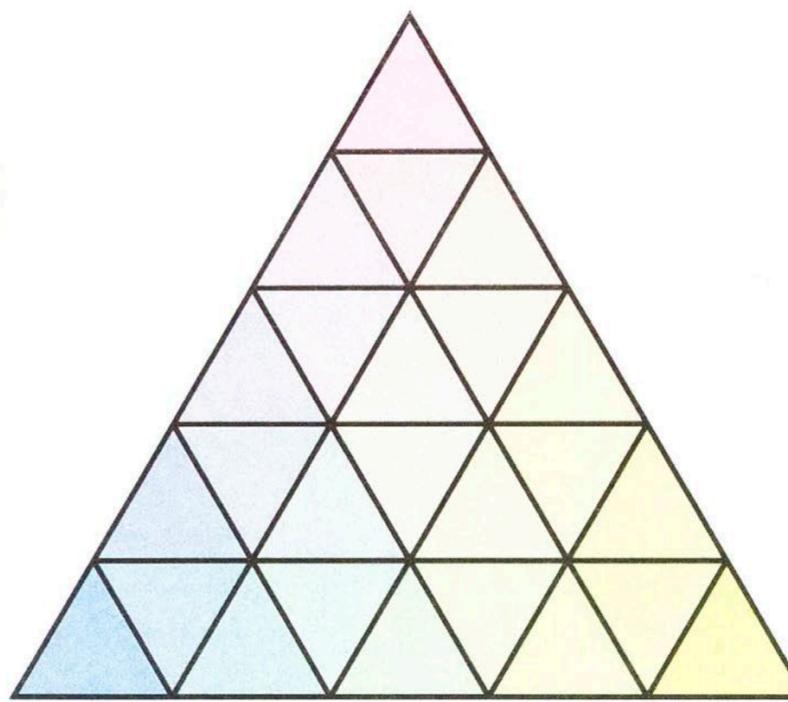


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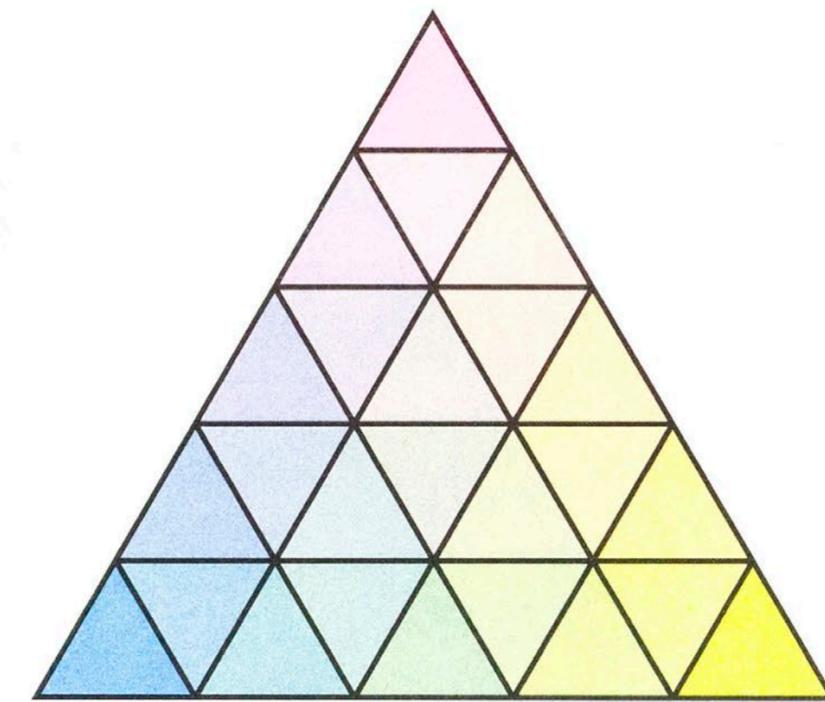


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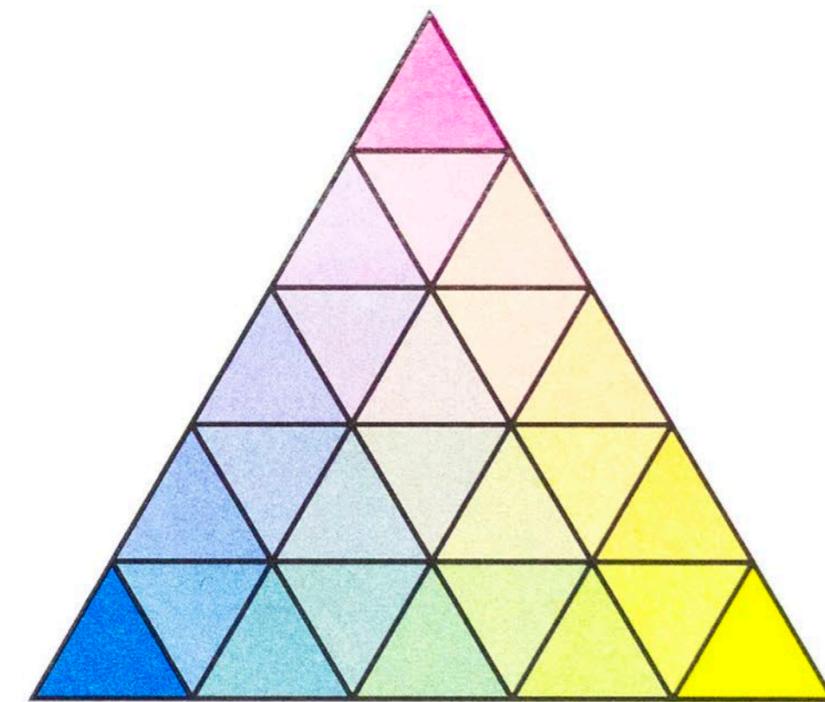
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- Crimson 
- Sunflower 



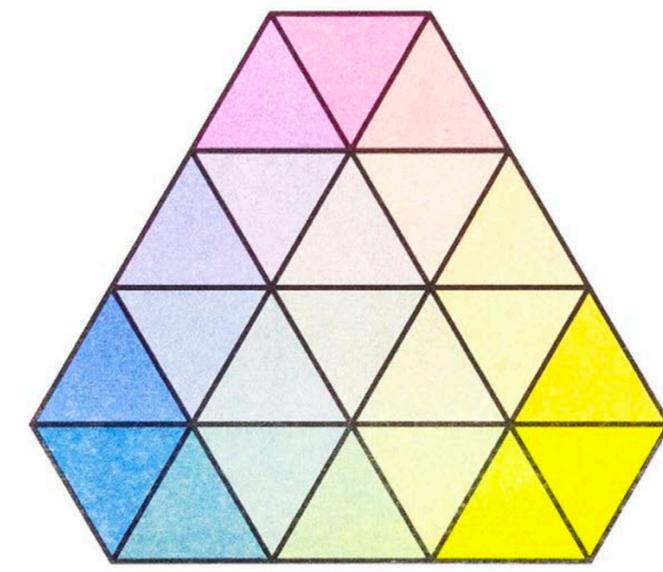
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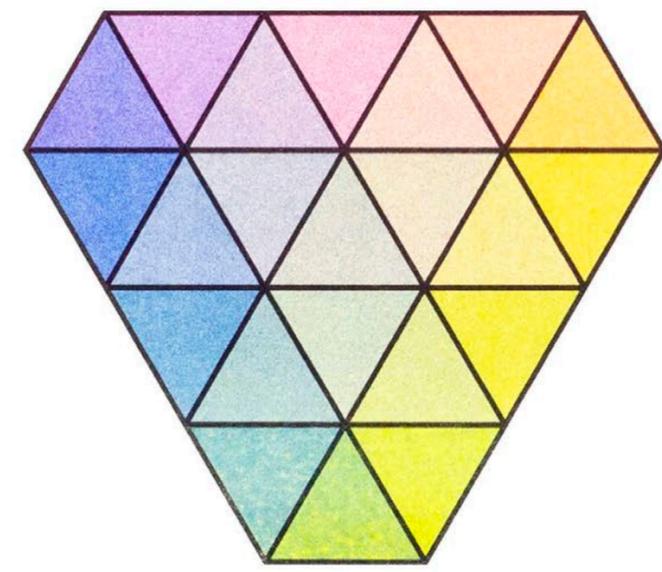
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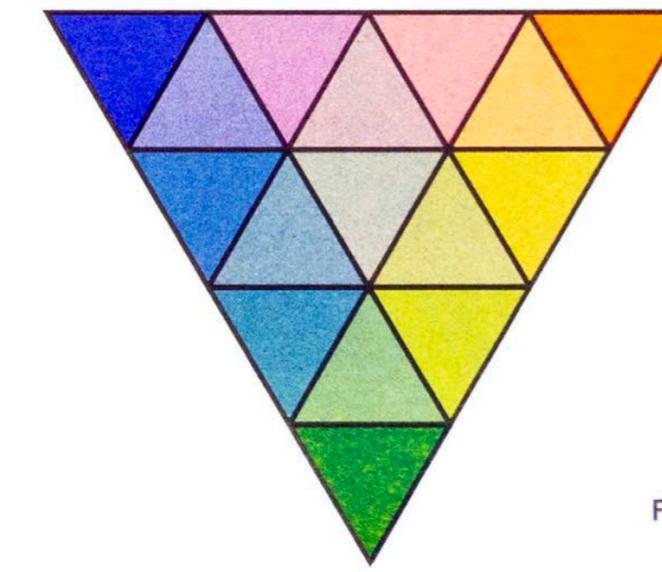
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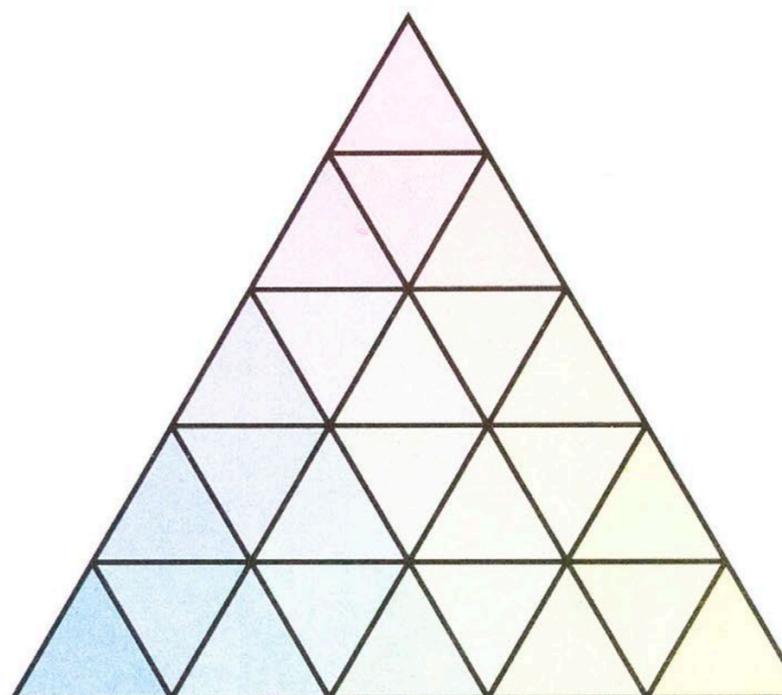


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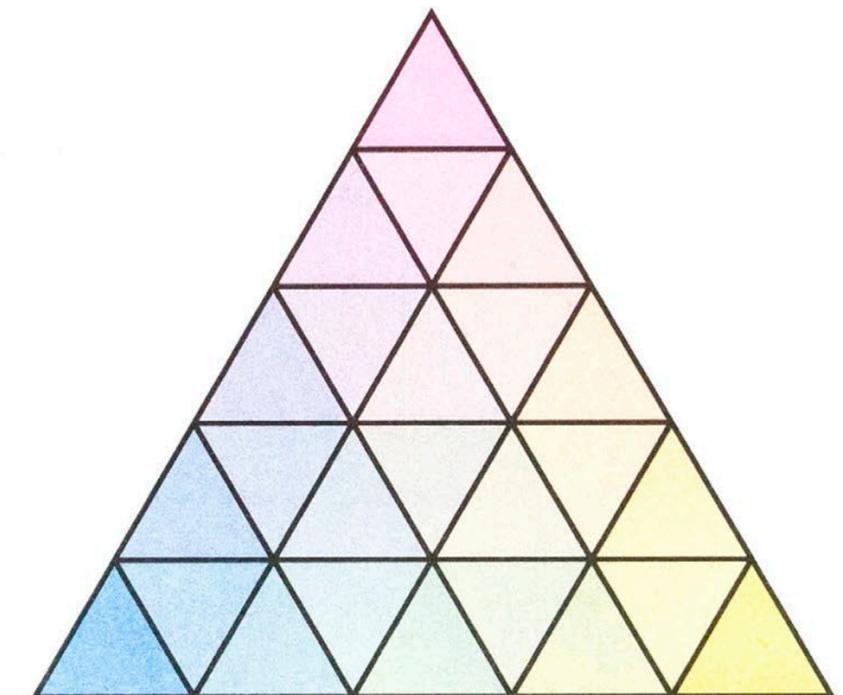


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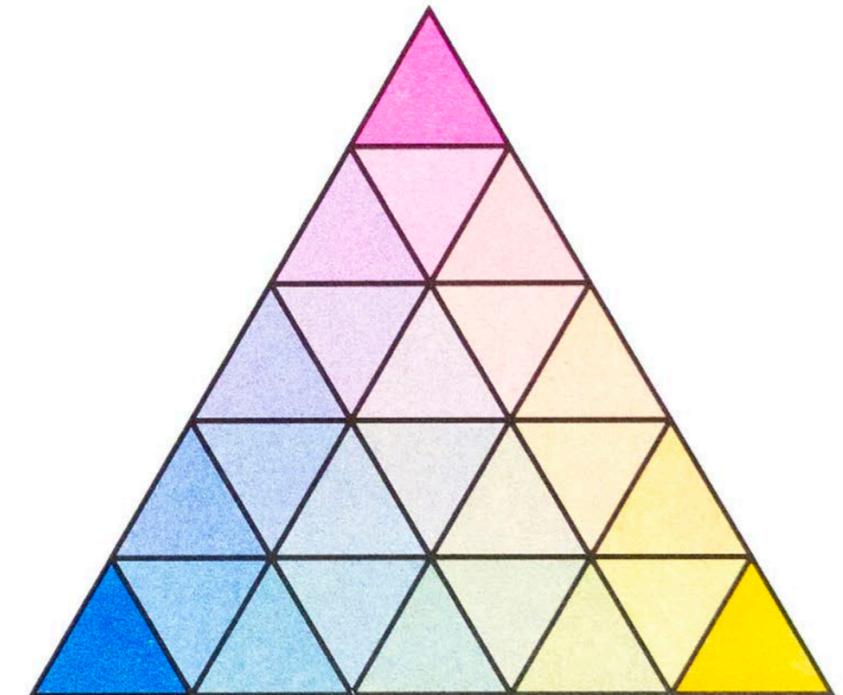
Blue 
Fluorescent Pink 
Yellow 



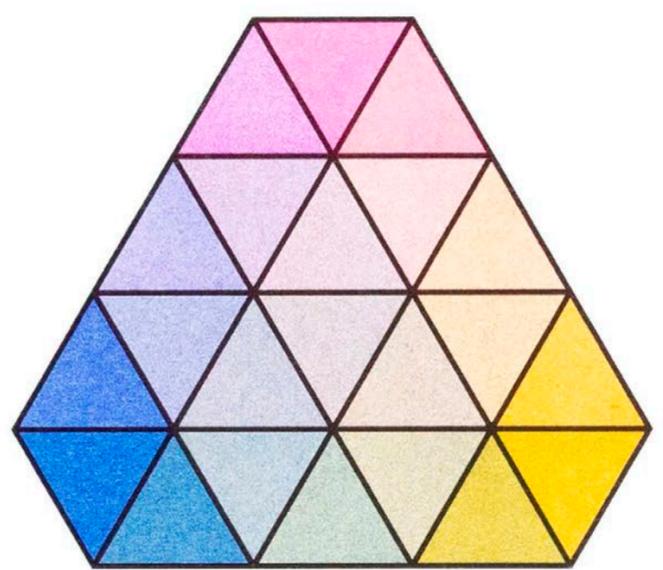
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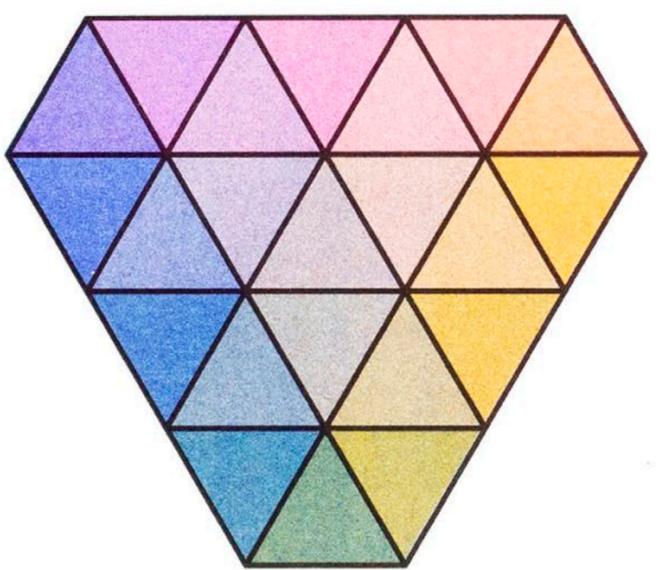
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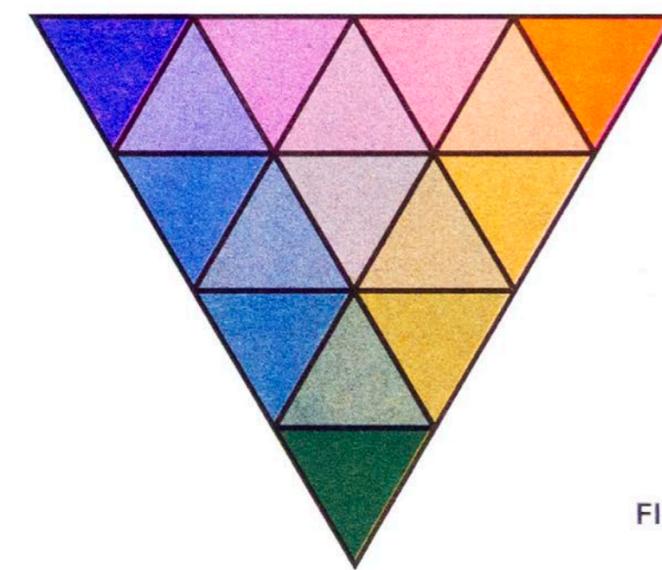
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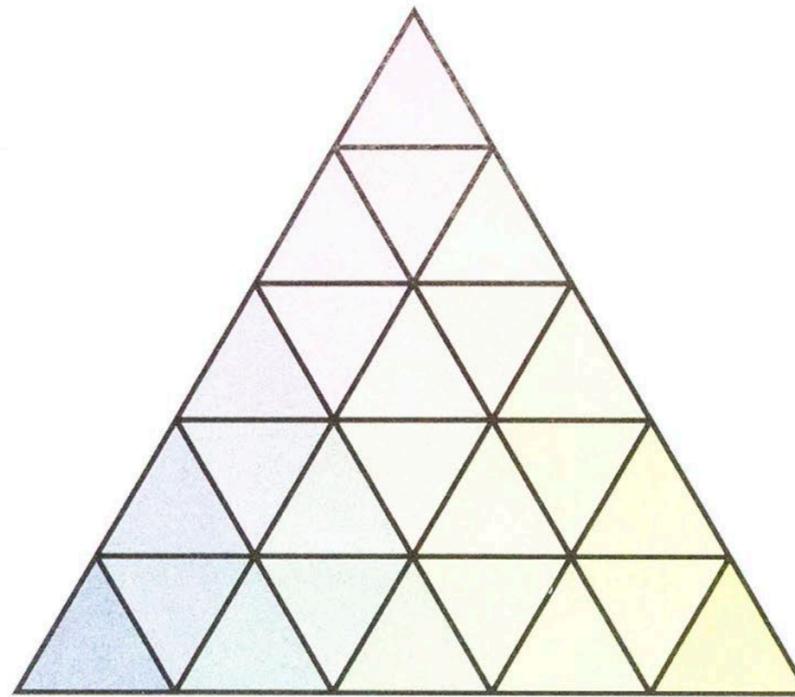


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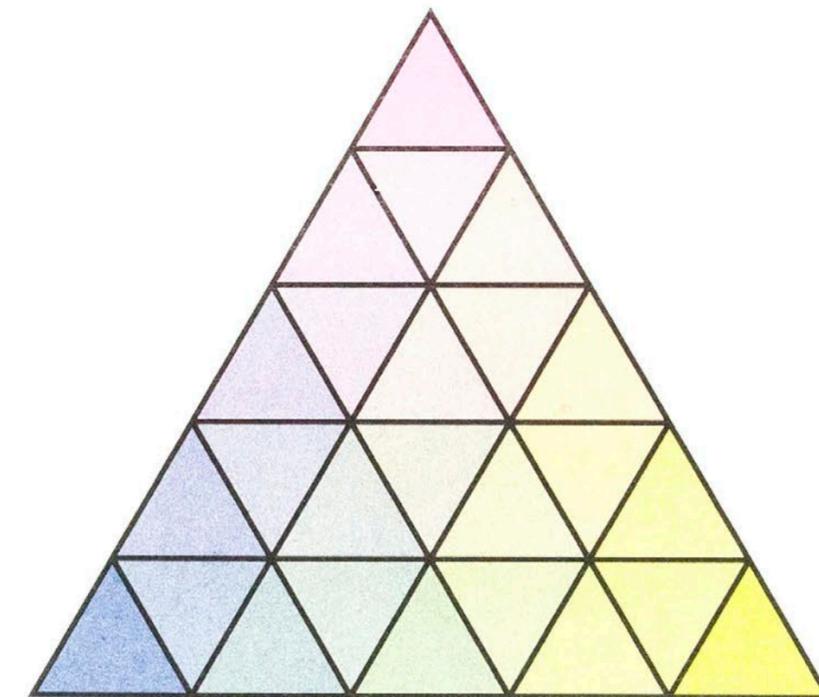


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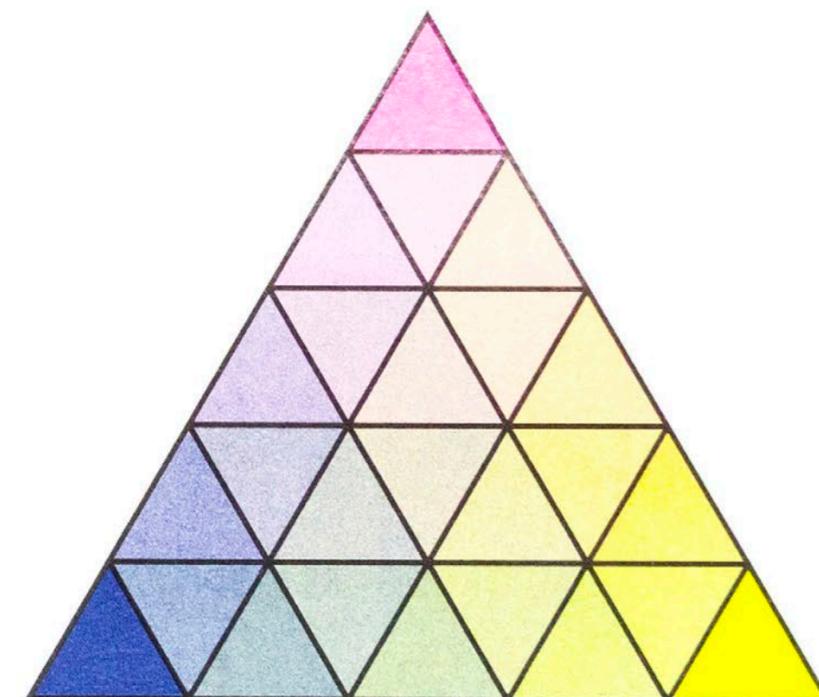
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- Fluorescent Pink 
- Sunflower 



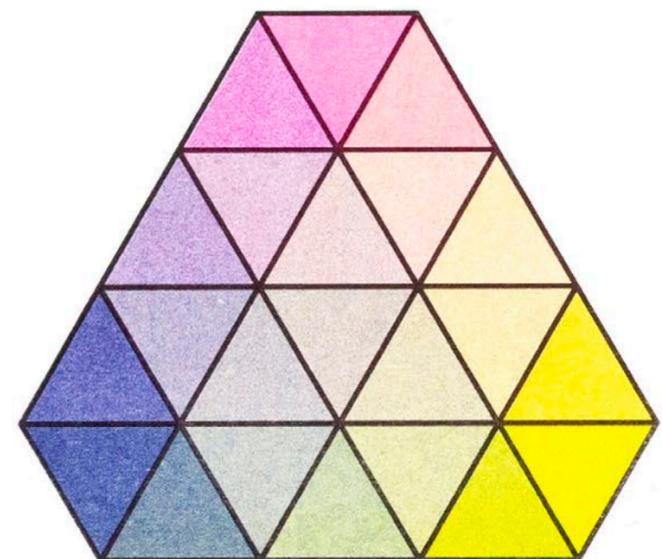
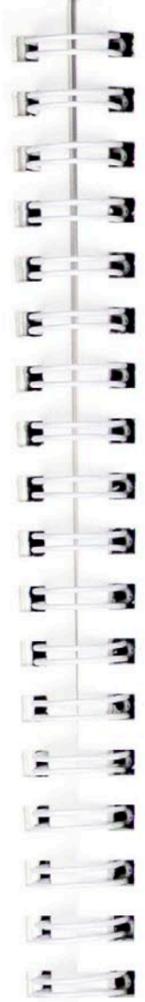
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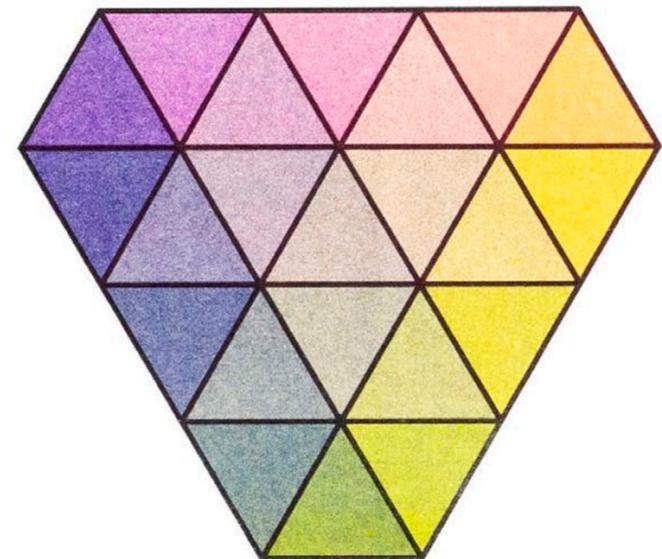
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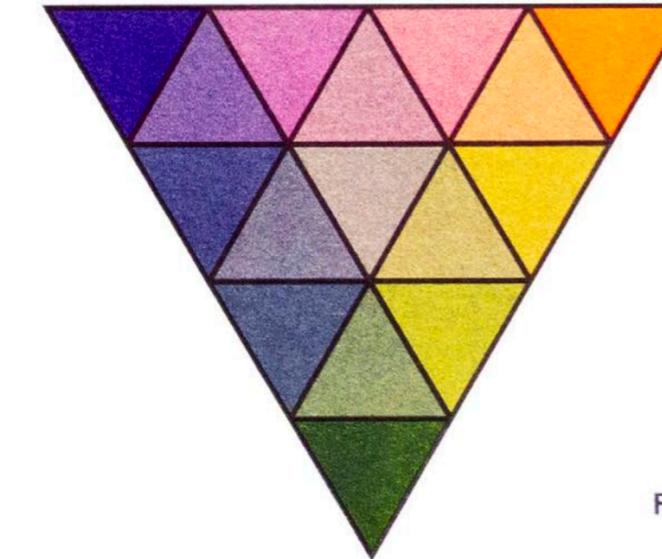
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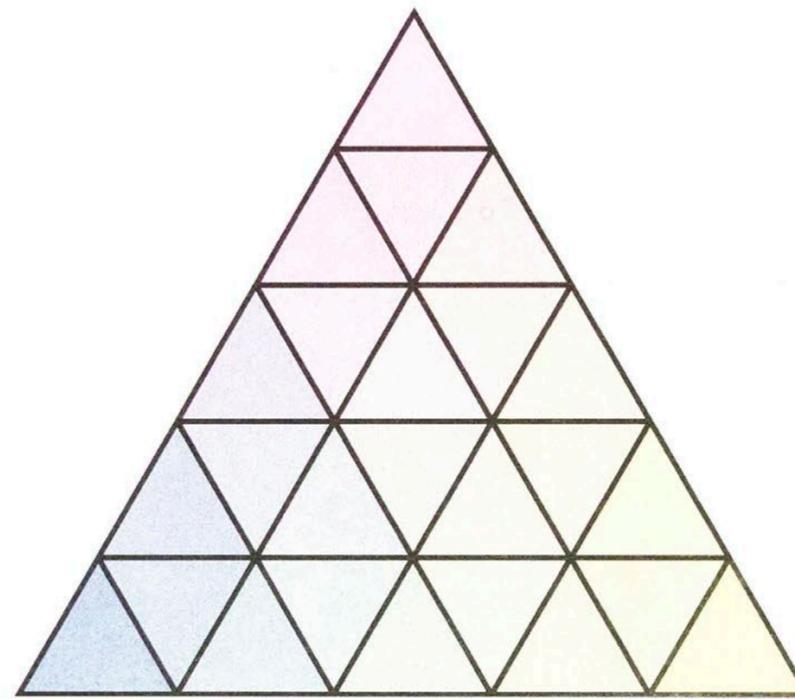


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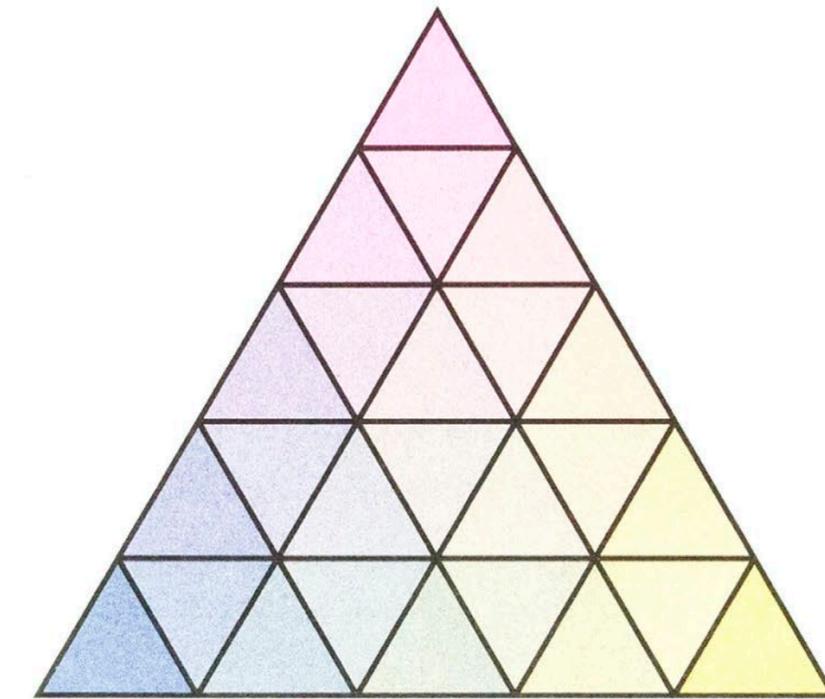


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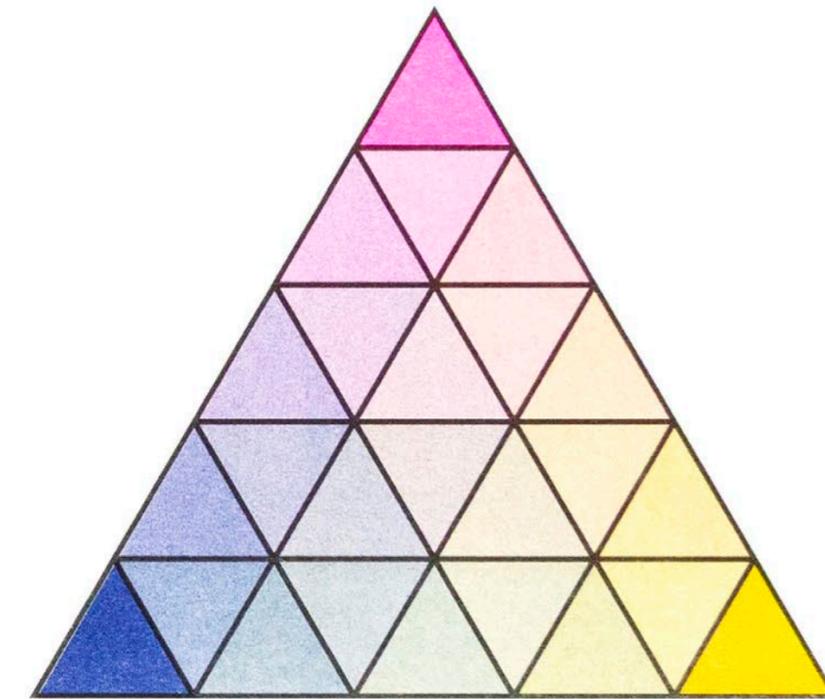
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- Fluorescent Pink 
- Yellow 



50%



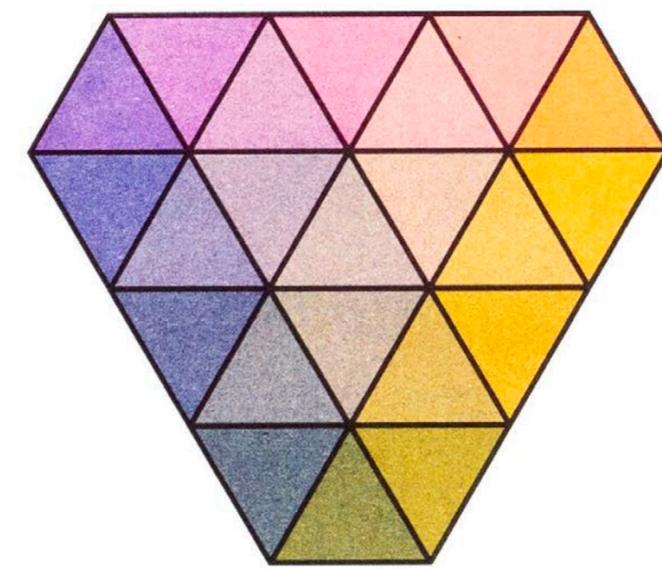
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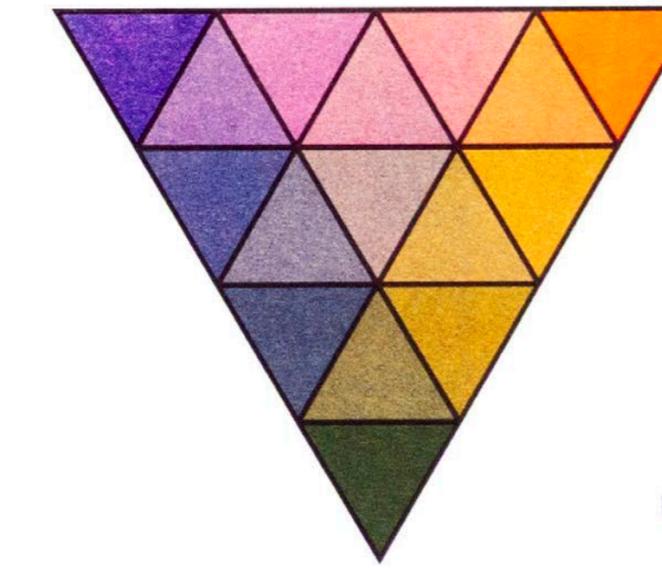
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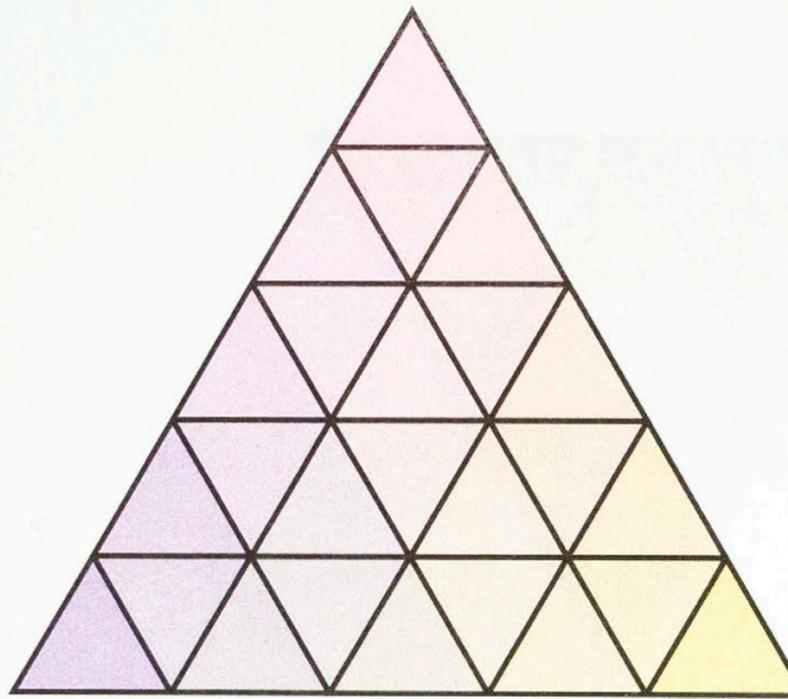


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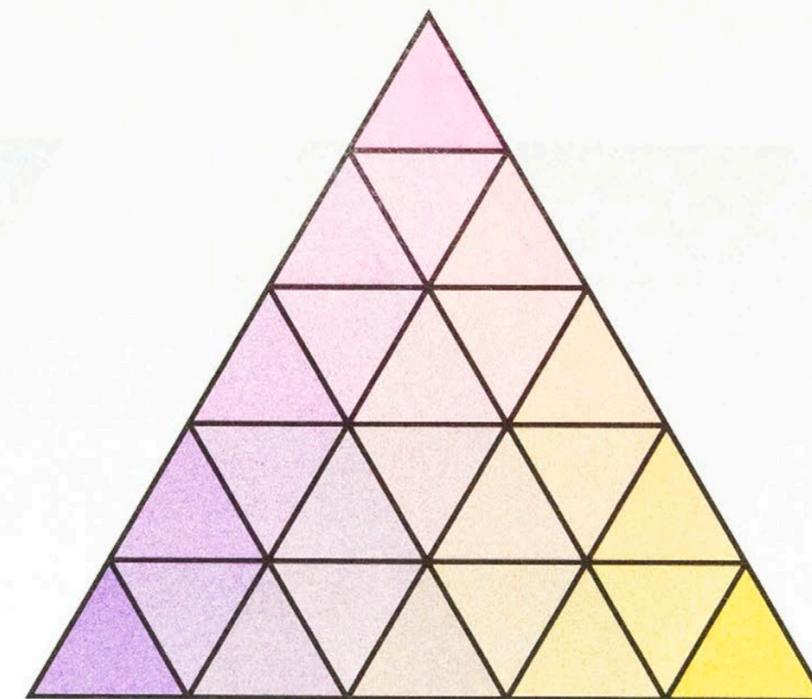


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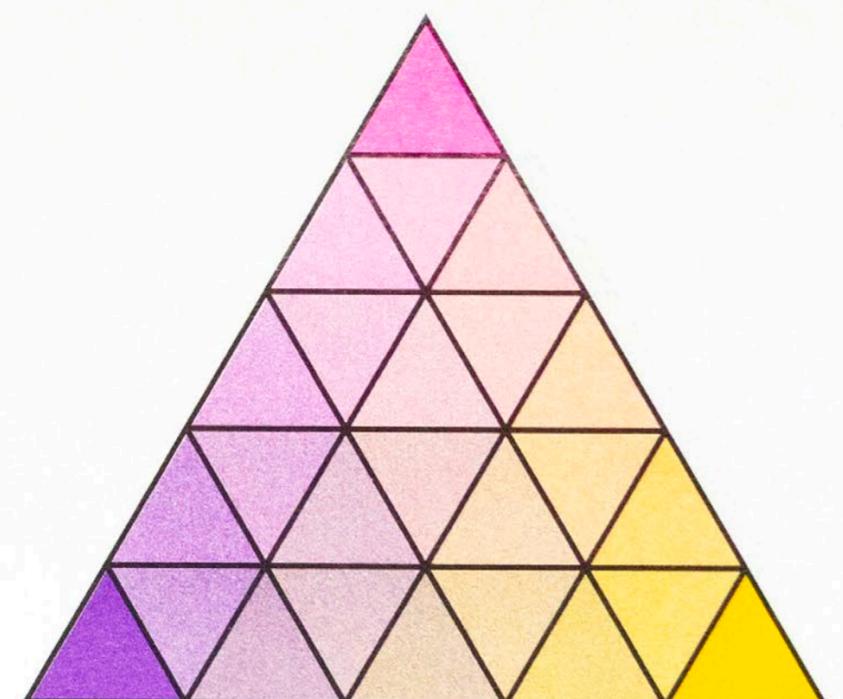
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- Sunflower 



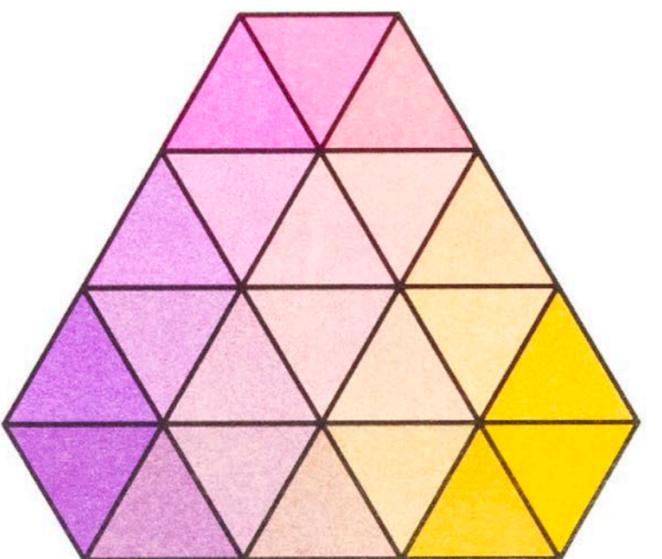
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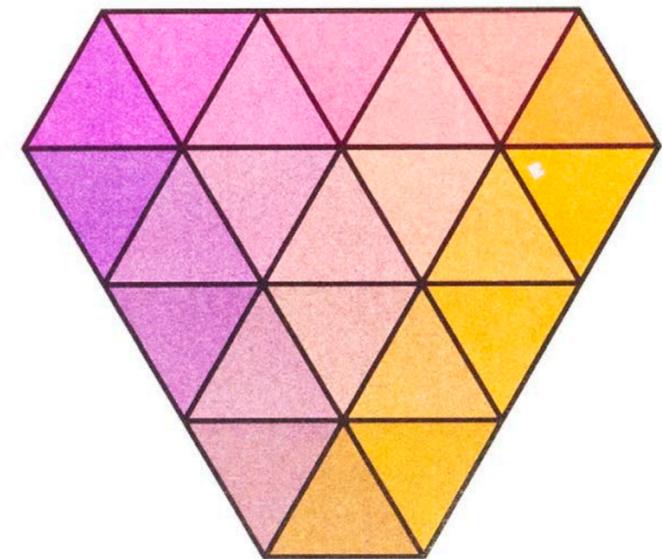
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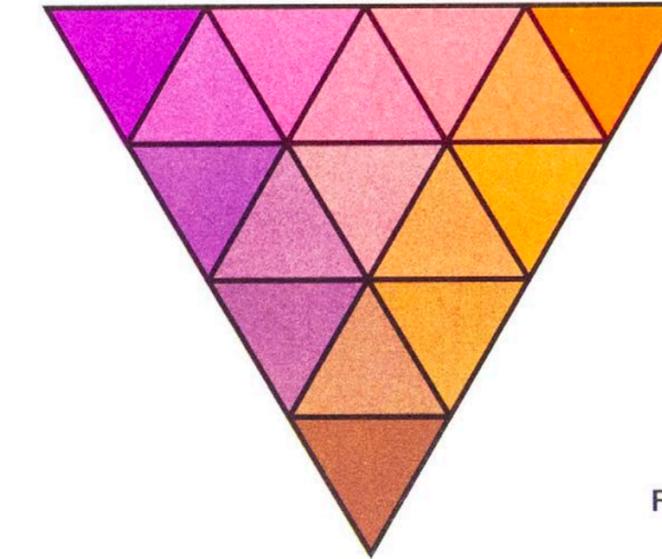
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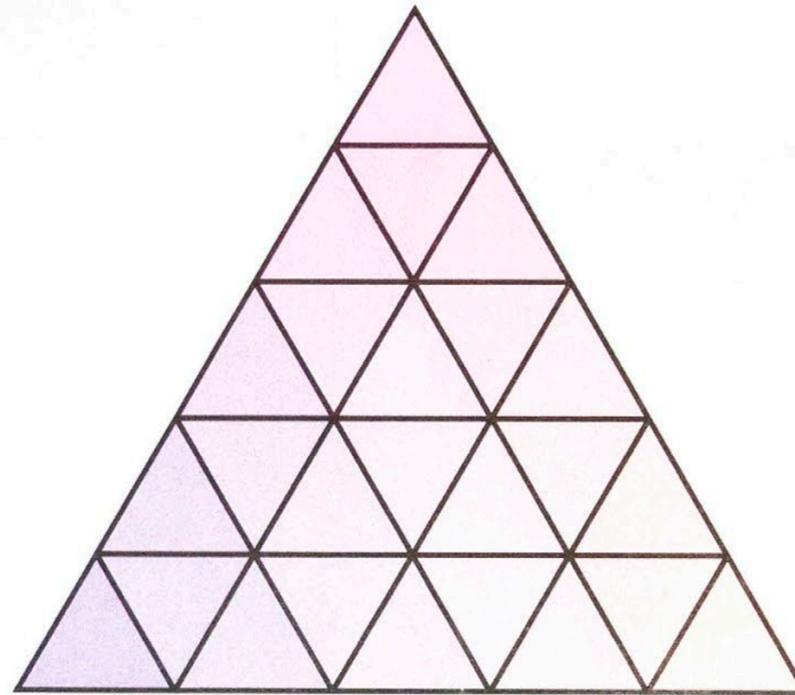


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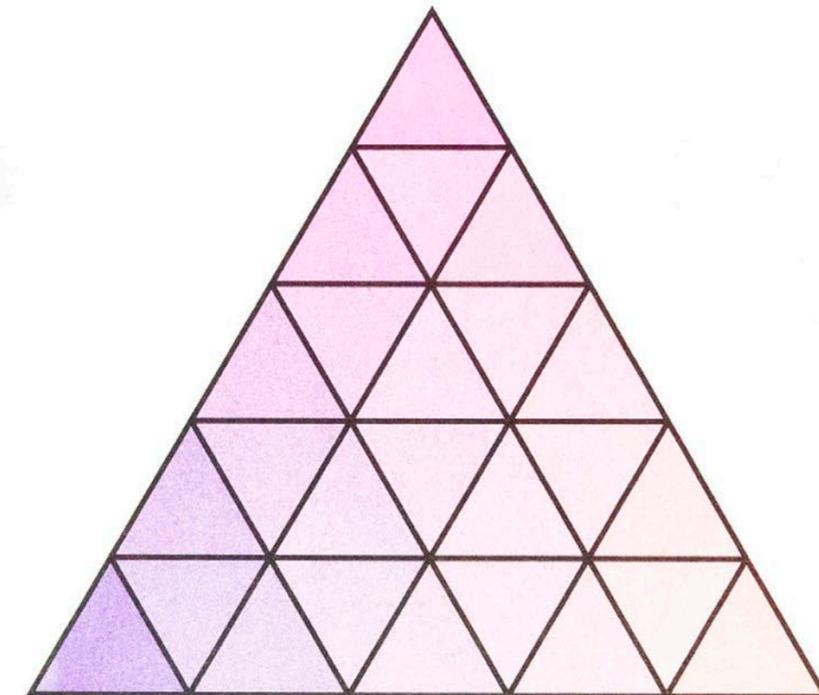


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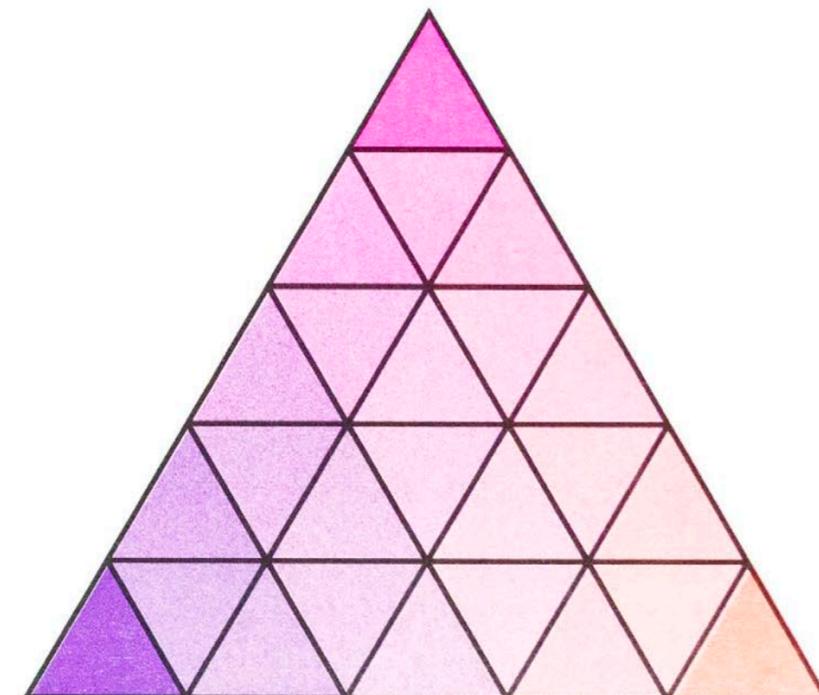
- Orchid 
- Fluorescent Pink 
- Sunflower 



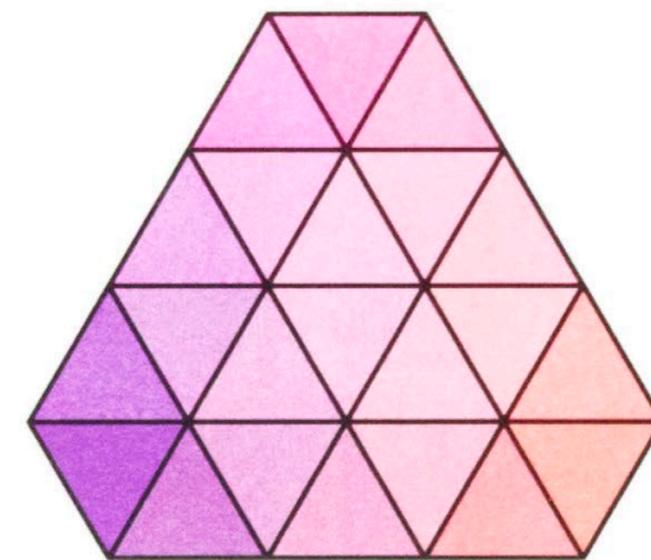
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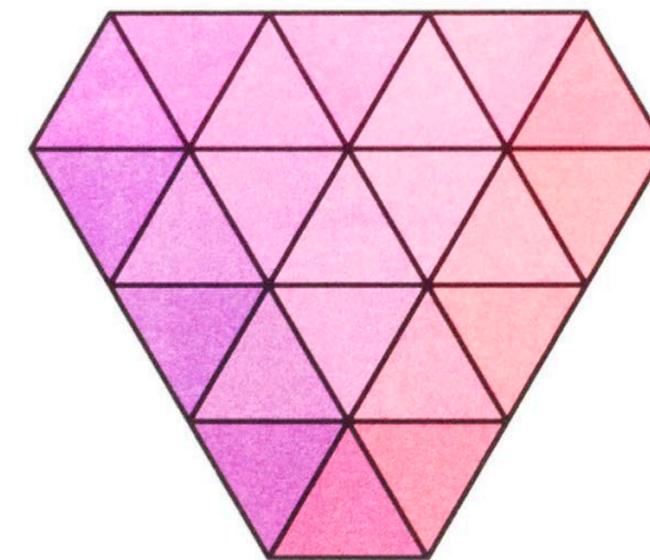
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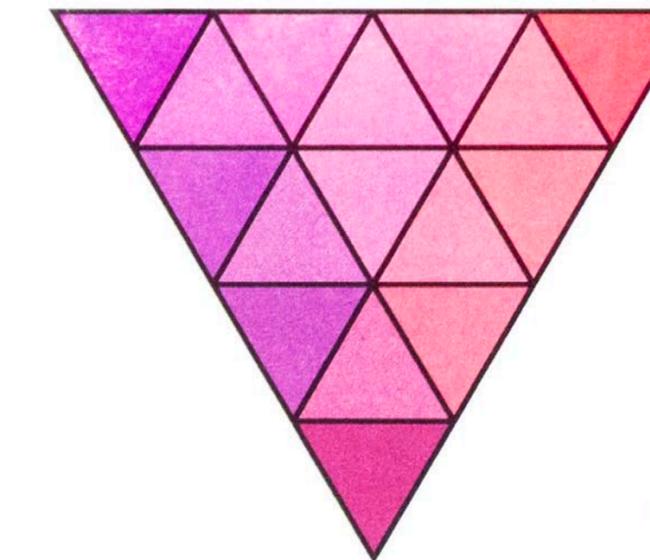
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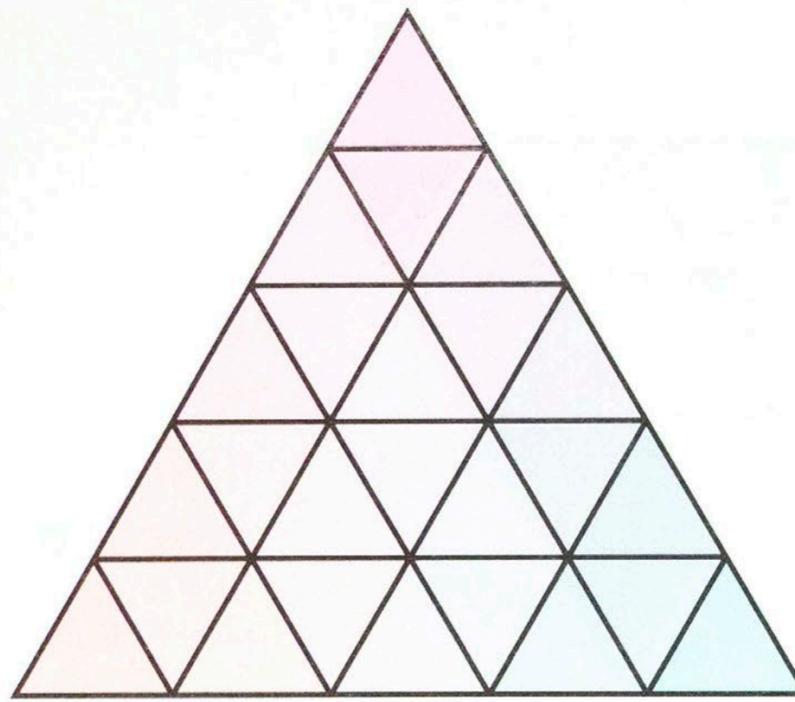


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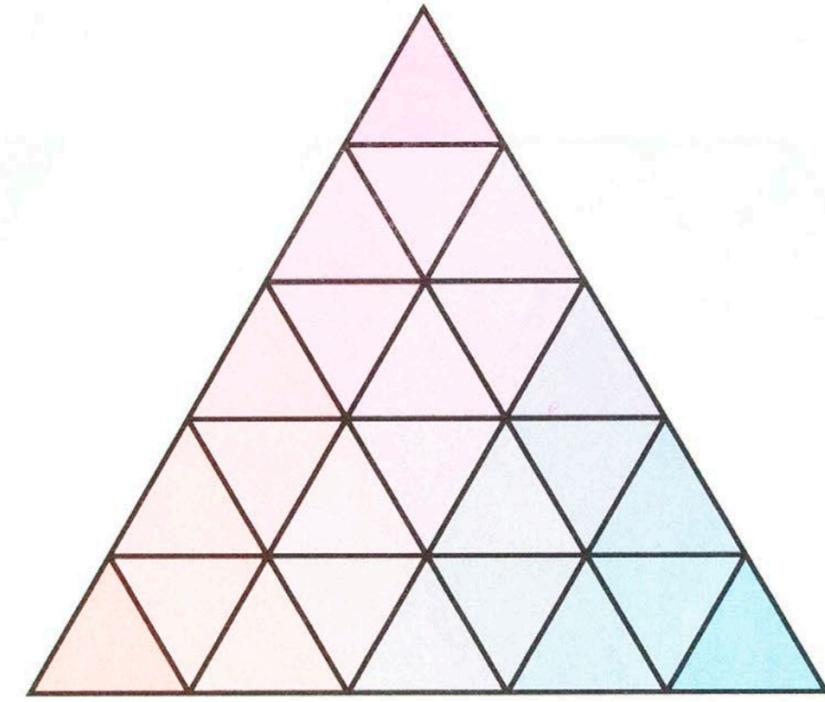


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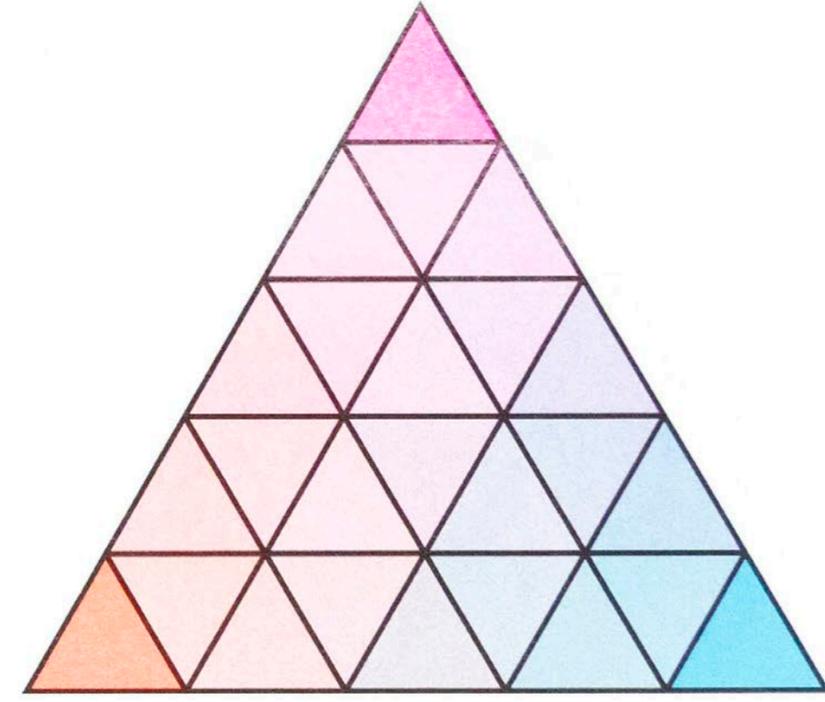
- Orchid 
- Fluorescent Pink 
- Fluorescent Orange 



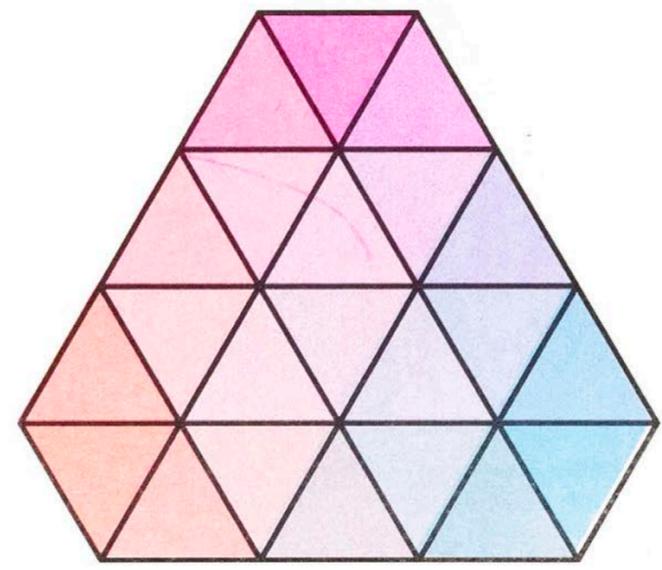
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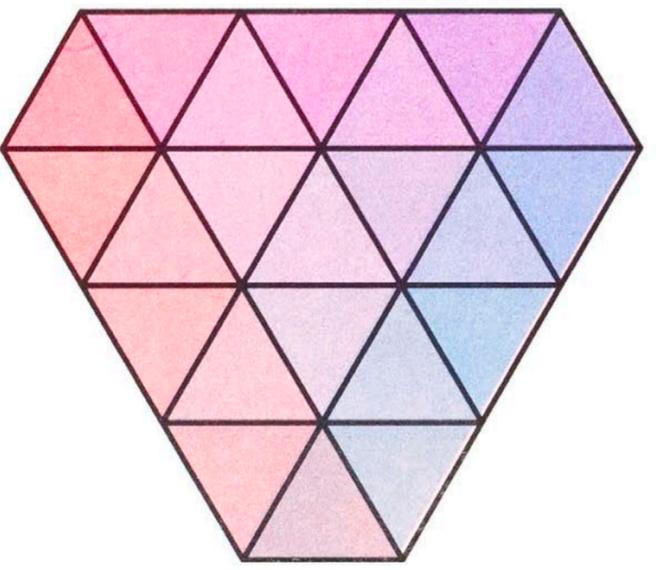
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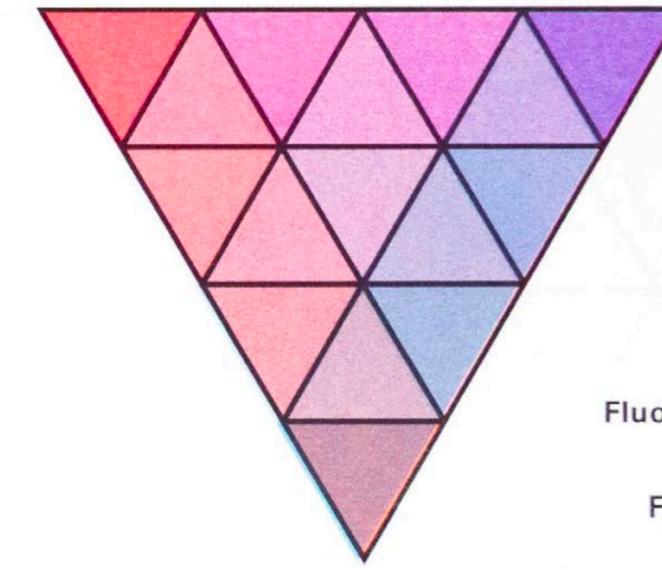
100%



133%



166%



200%

Fluorescent Orange

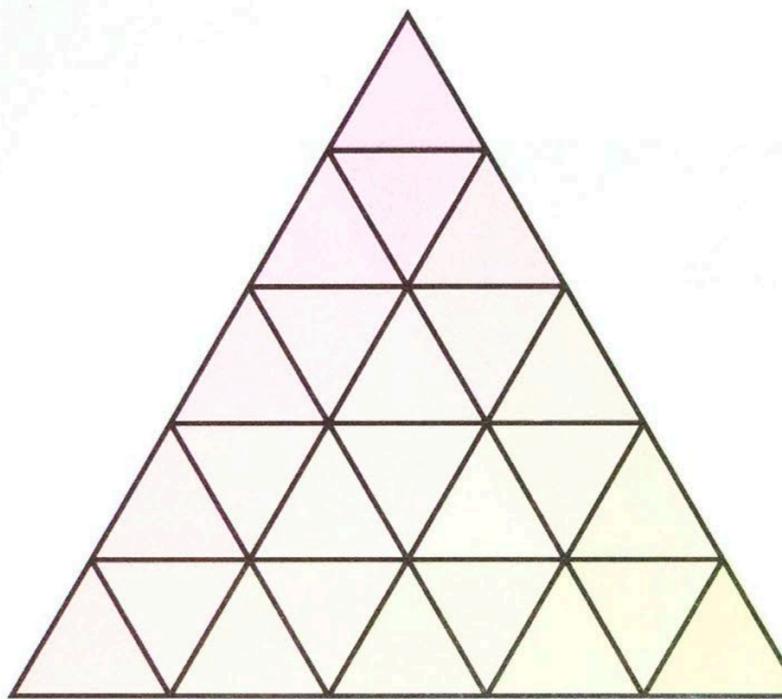


Fluorescent Pink

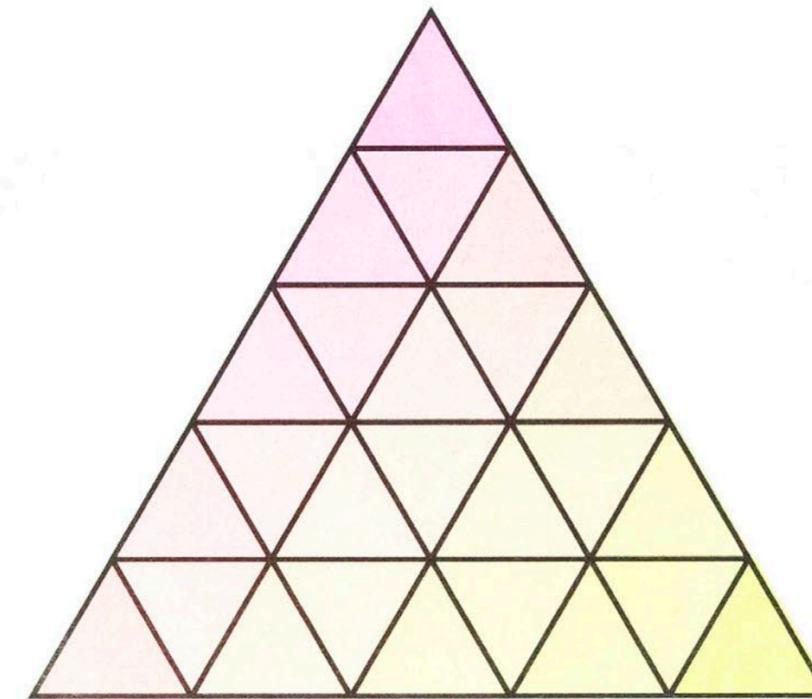


Aqua

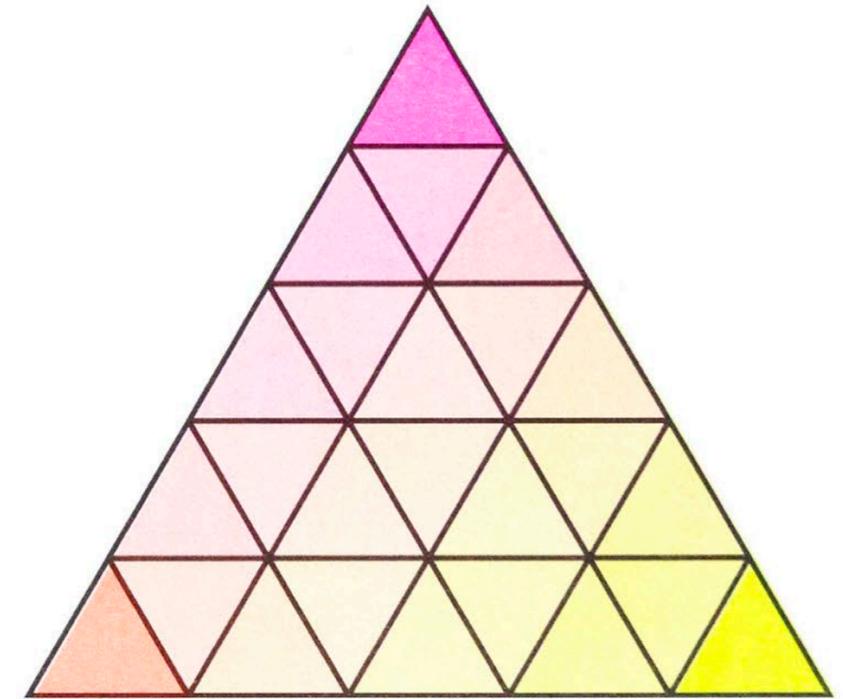




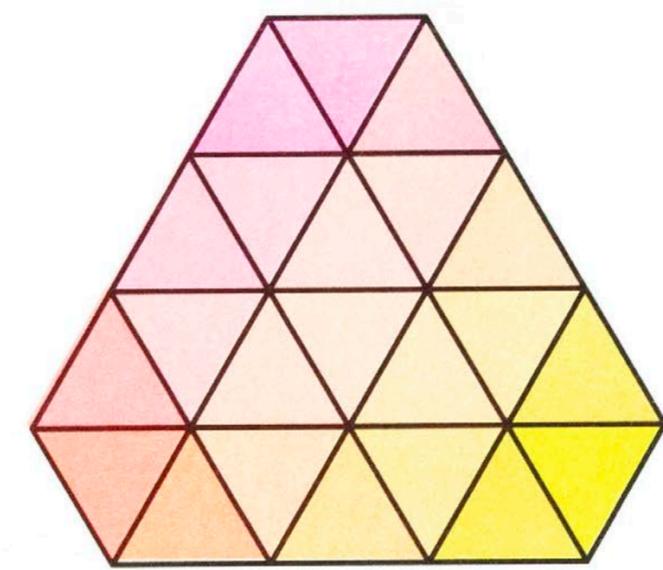
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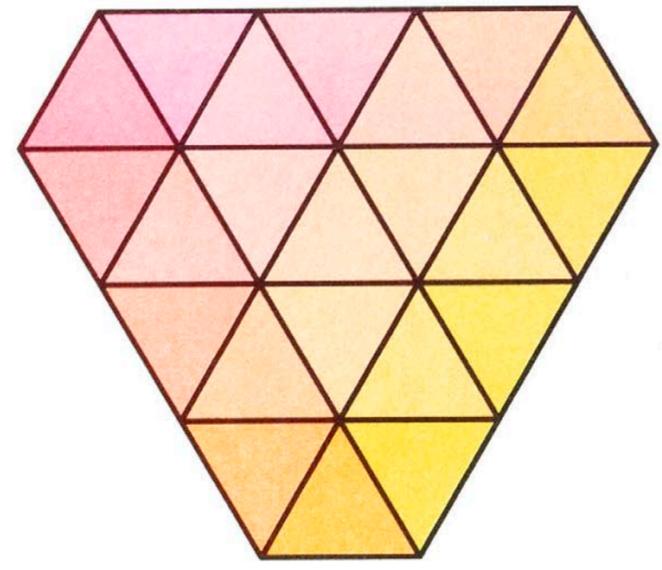
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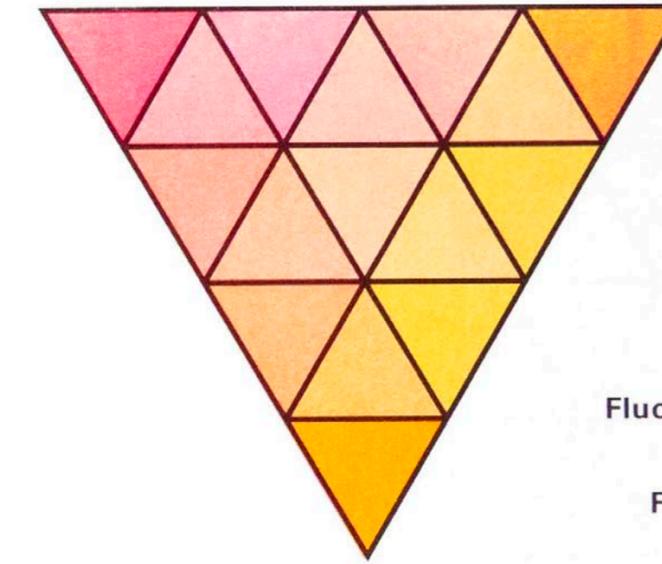
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Fluorescent Orange

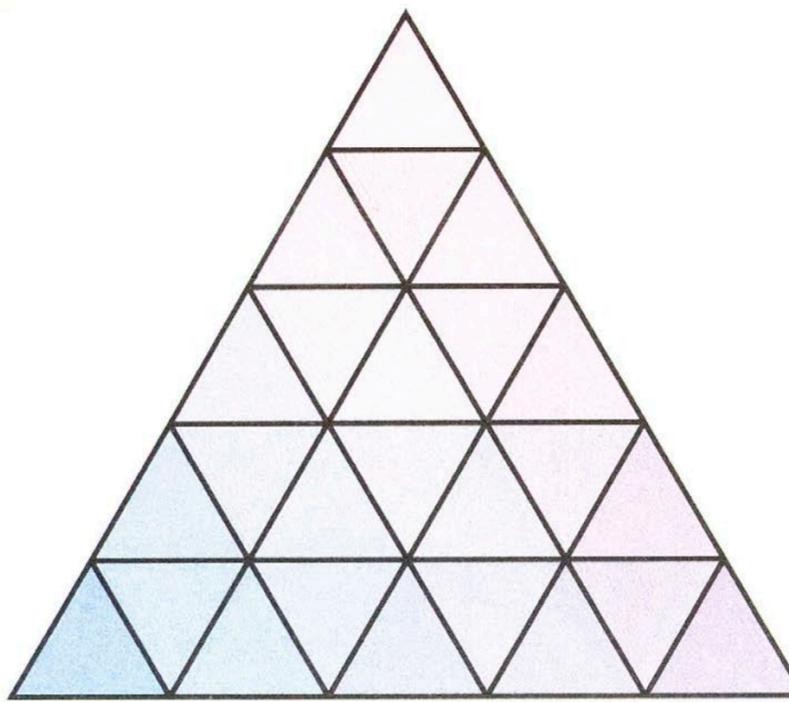


Fluorescent Pink

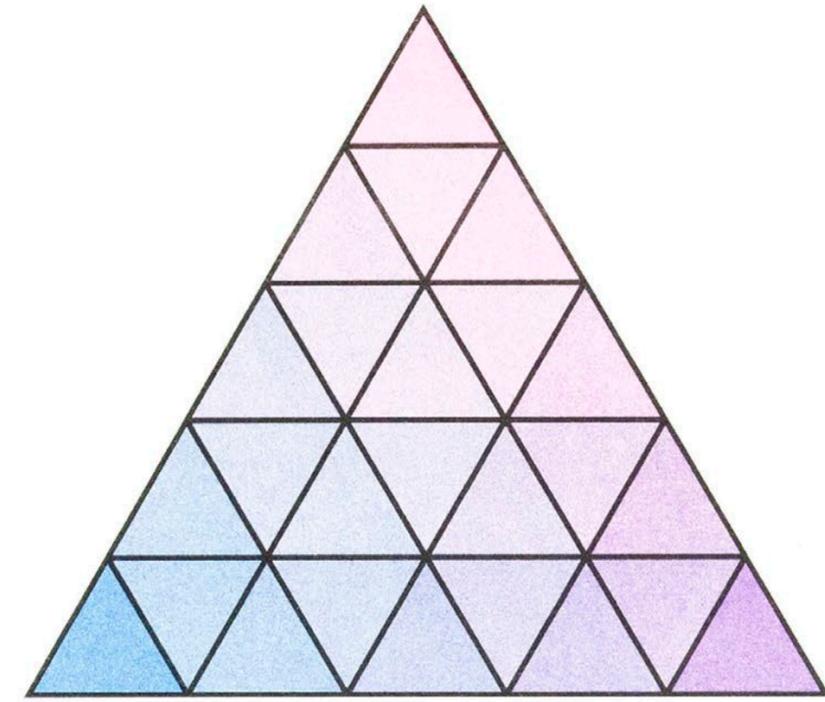


Light Lime

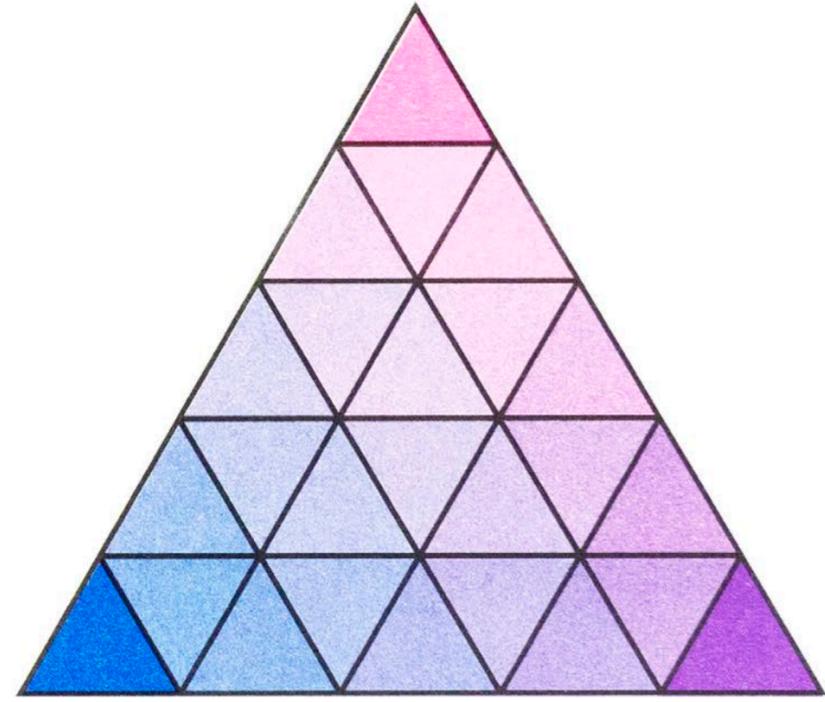




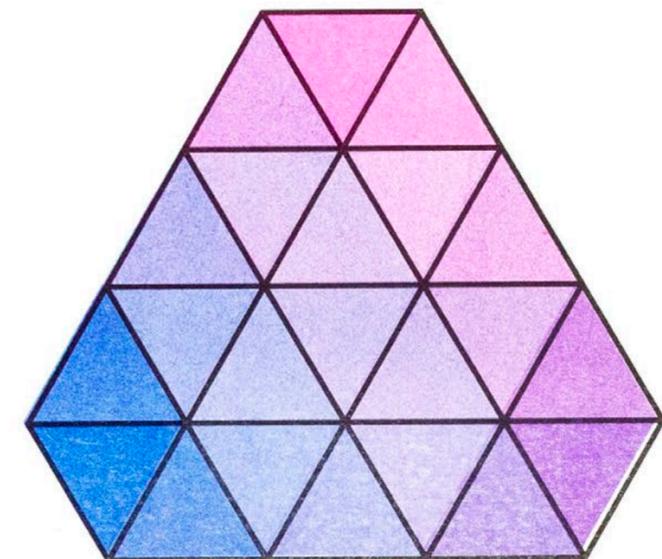
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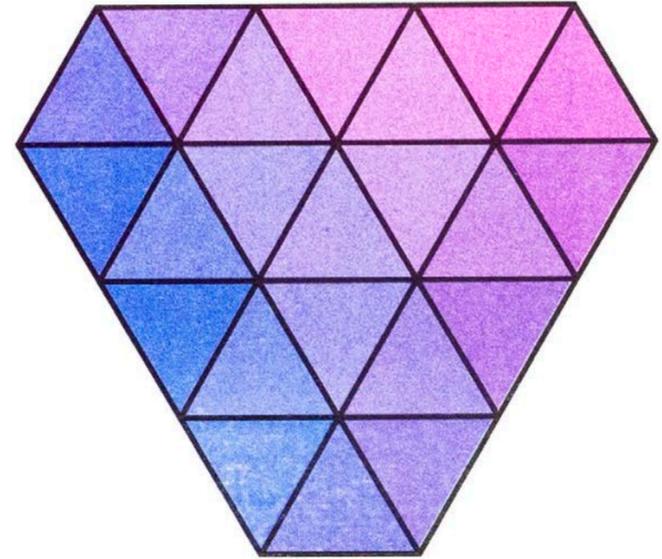
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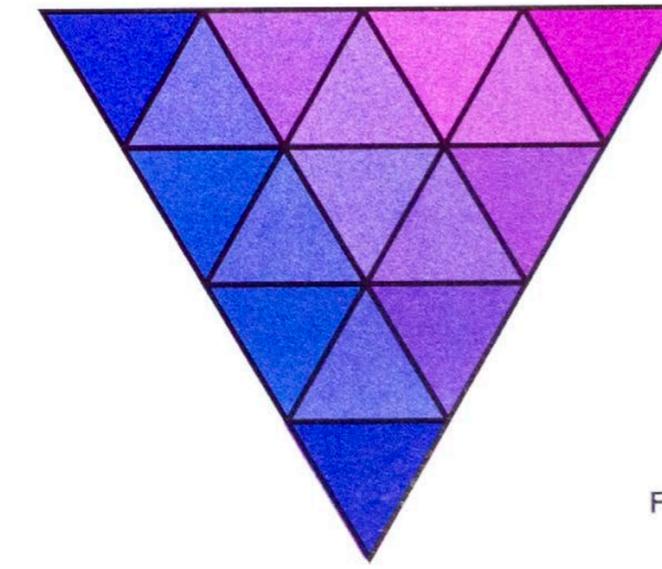
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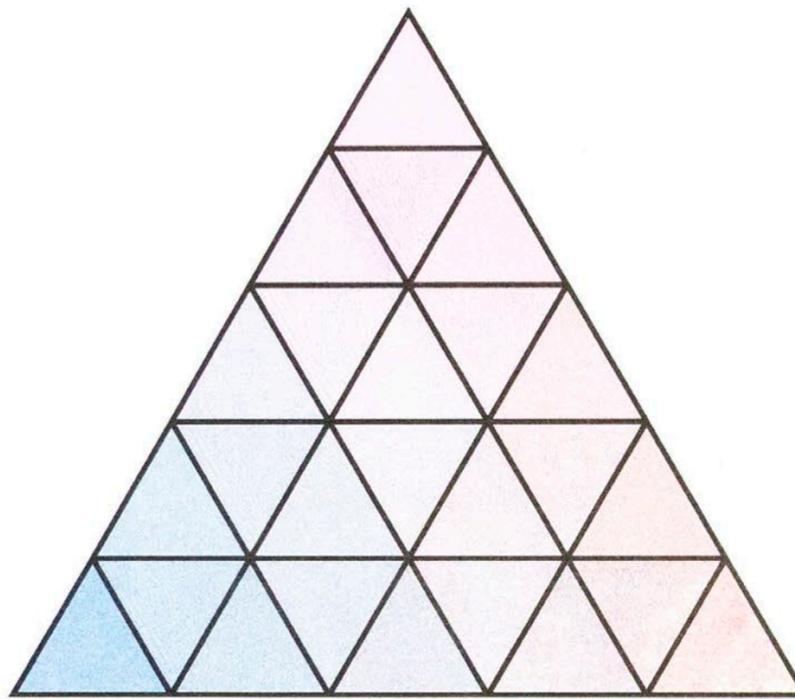


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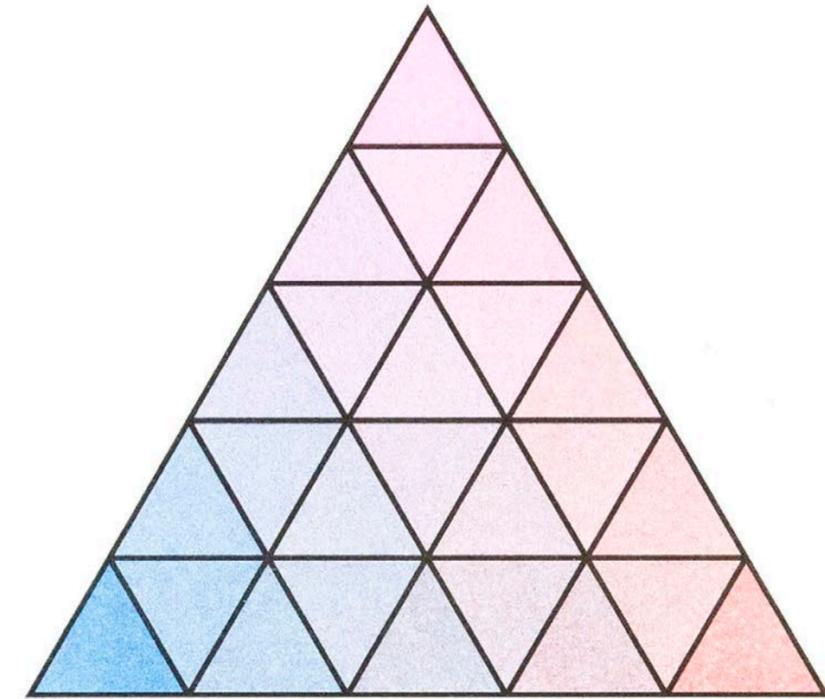


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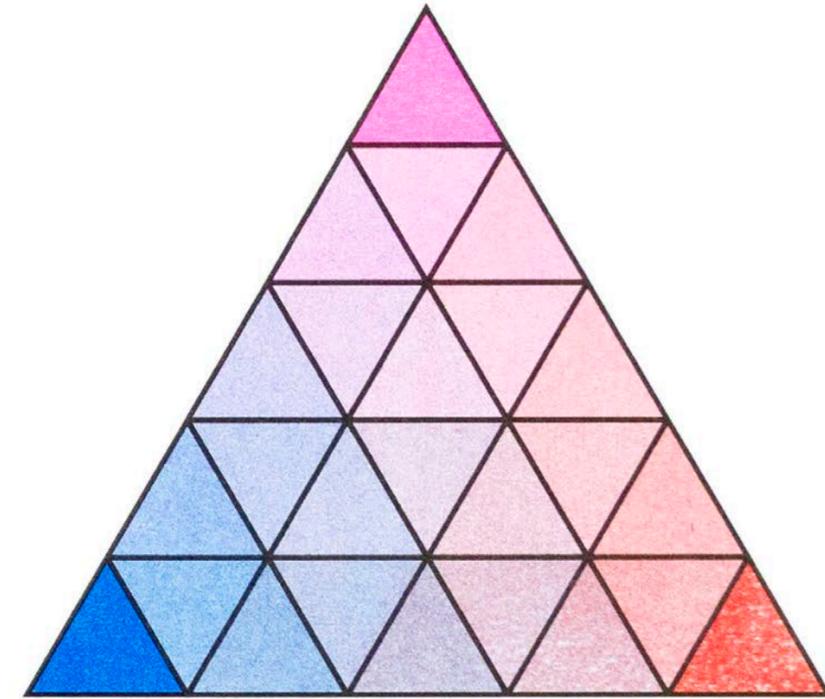
- Blue 
- Fluorescent Pink 
- Orchid 



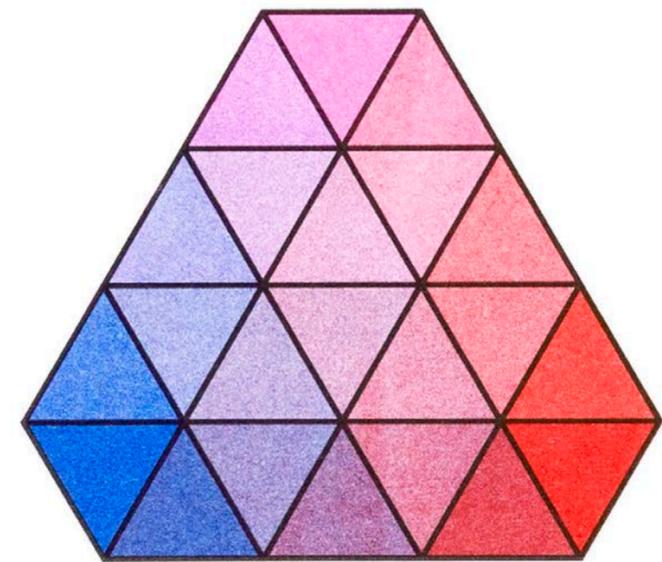
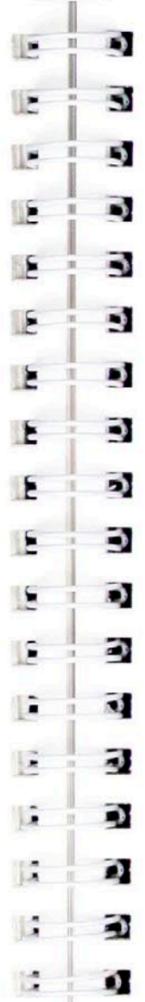
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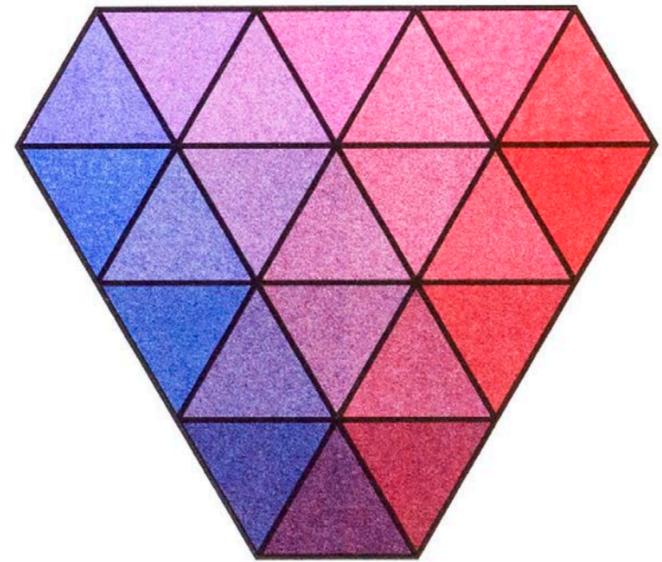
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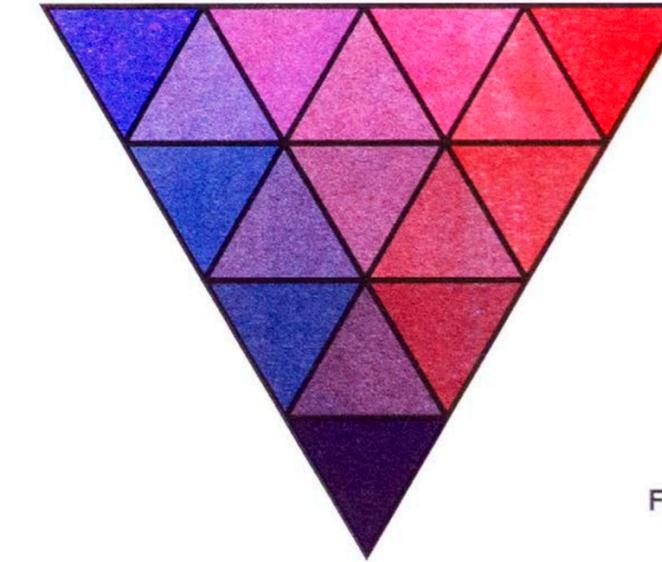
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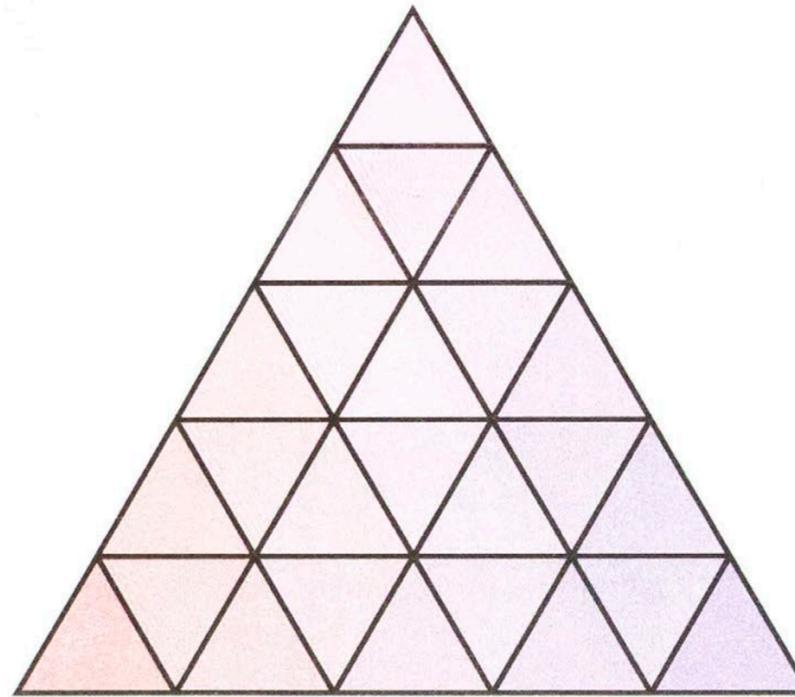


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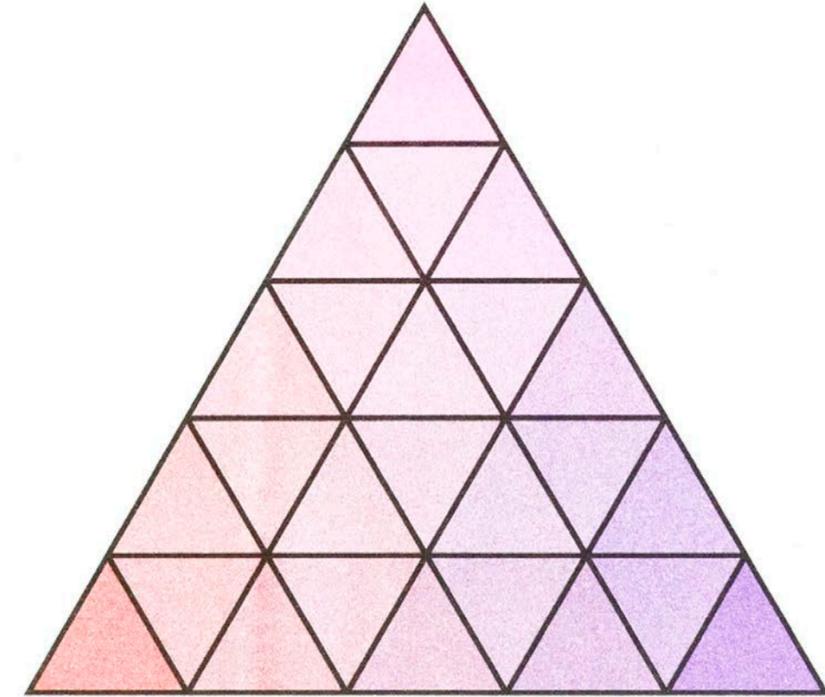


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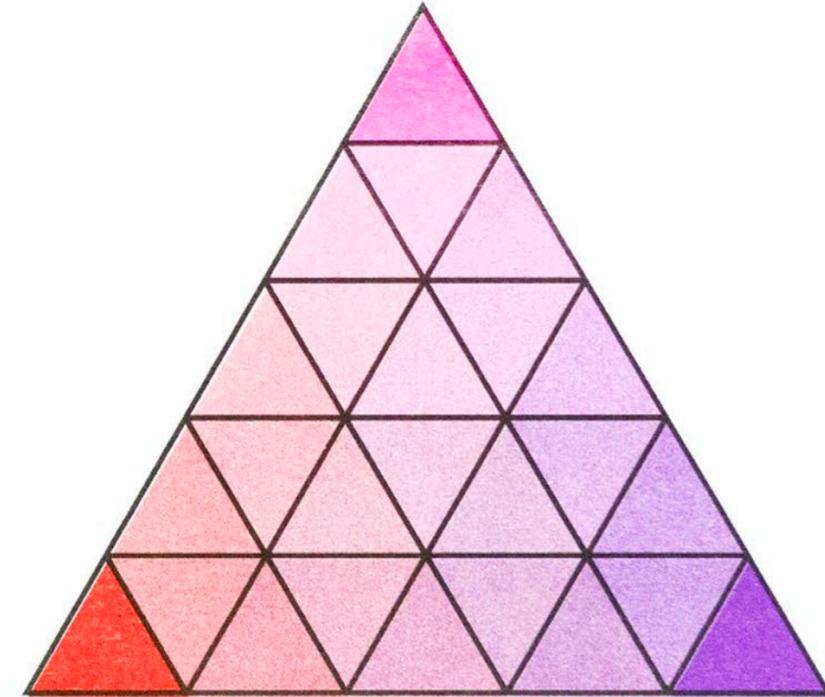
- Blue 
- Fluorescent Pink 
- Crimson 



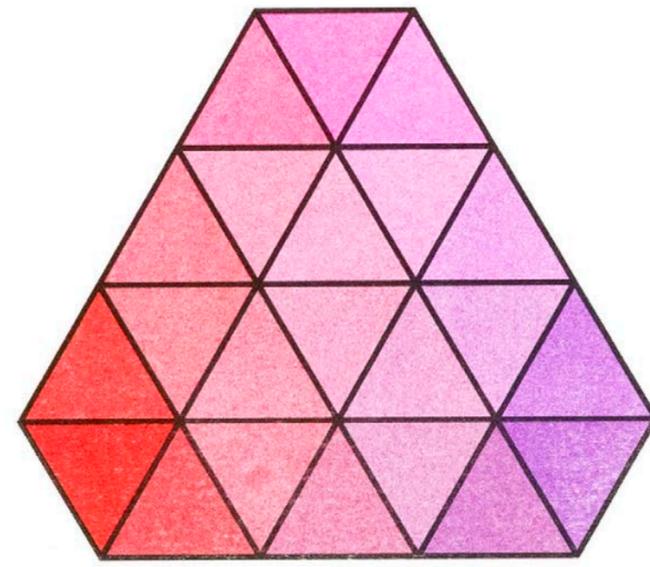
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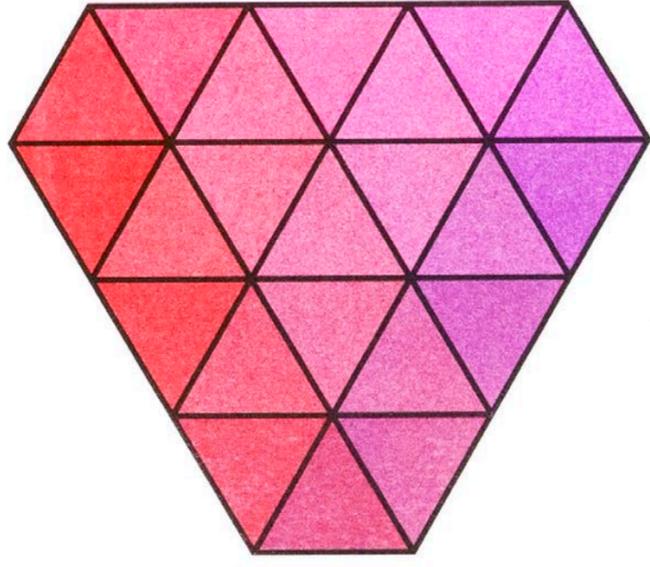
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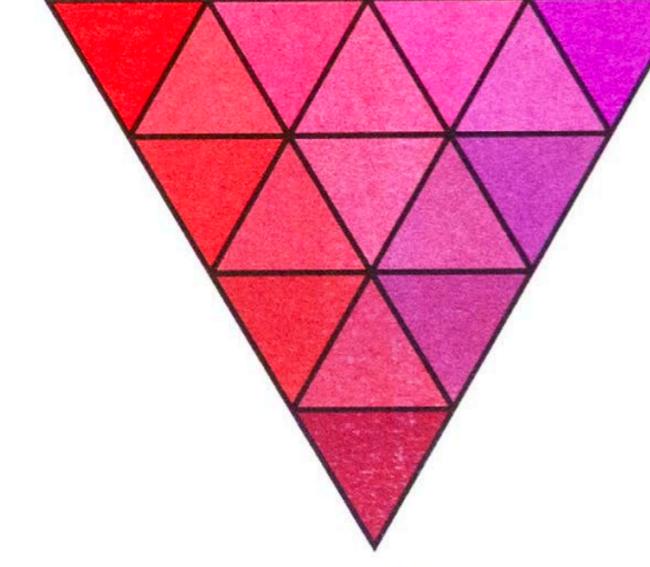
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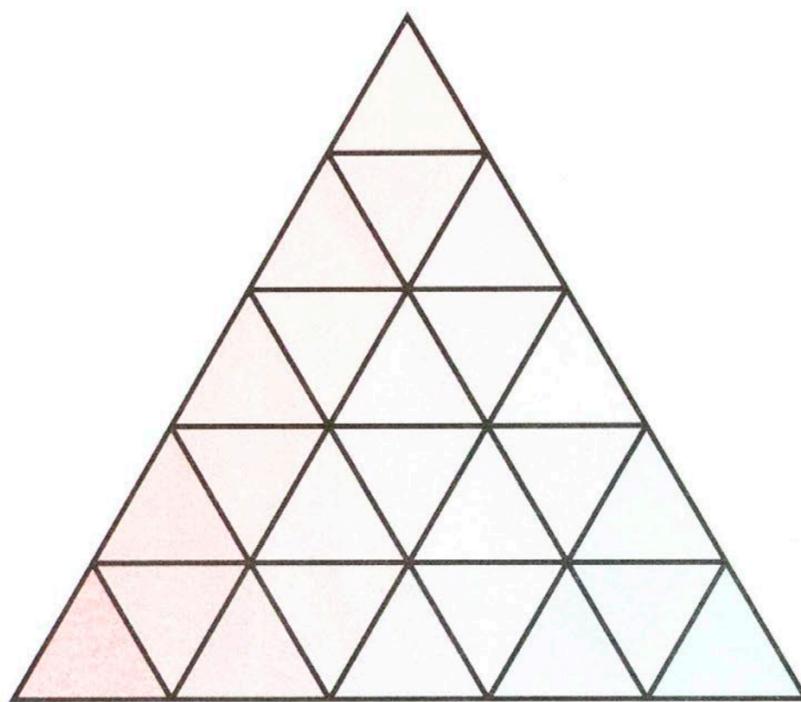


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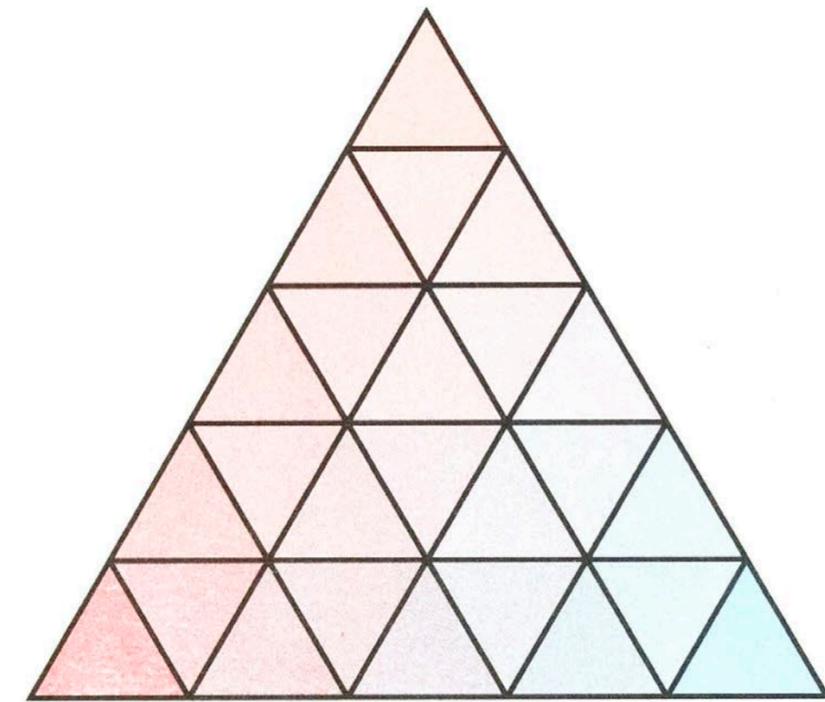


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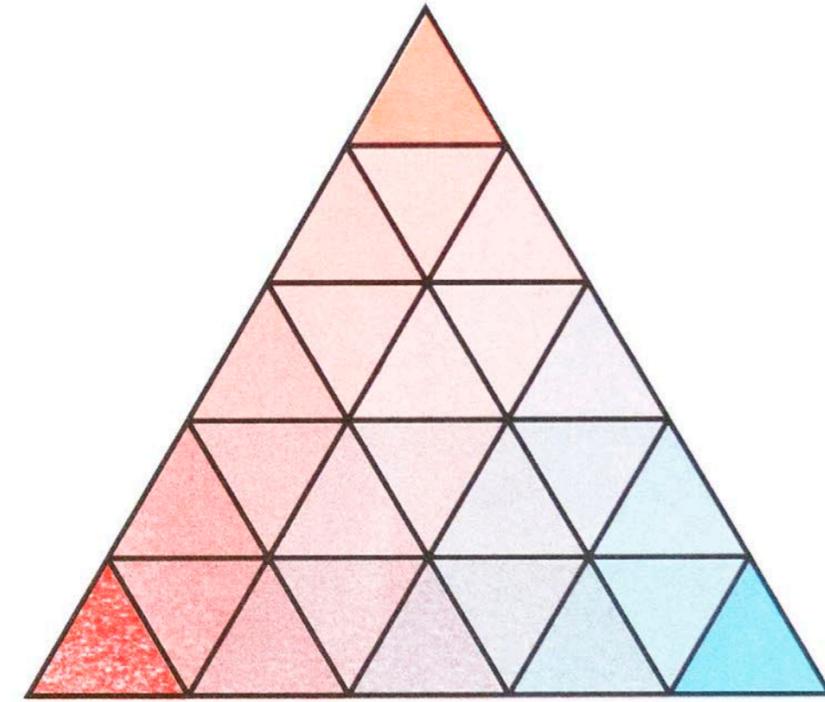
- Crimson 
- Fluorescent Pink 
- Orchid 



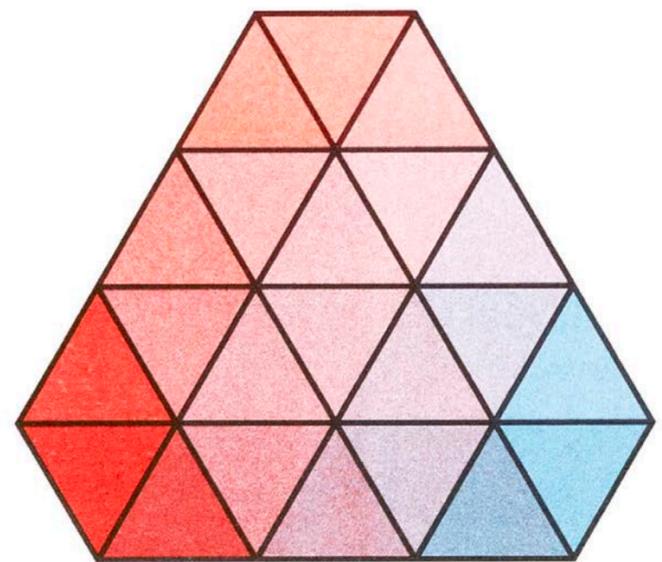
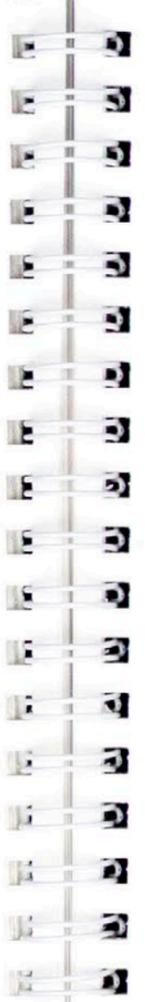
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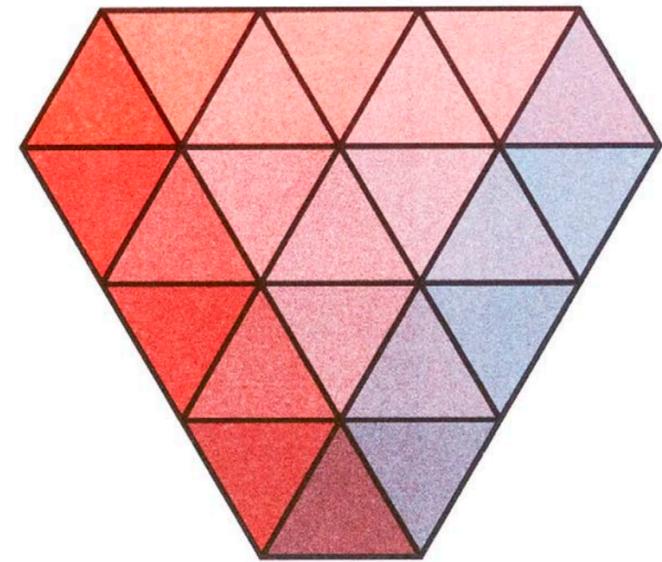
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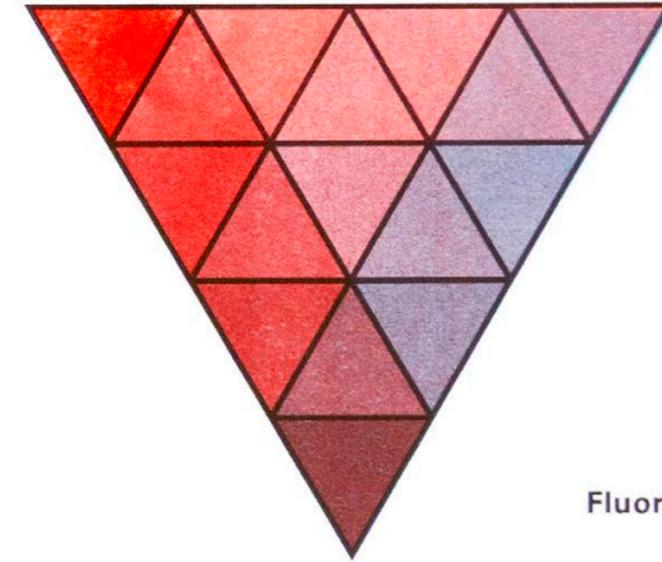
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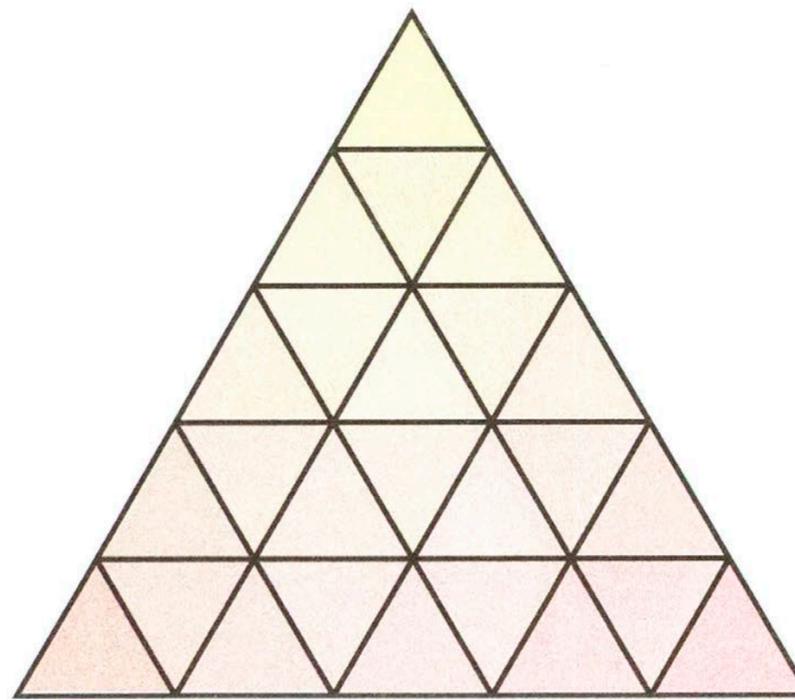


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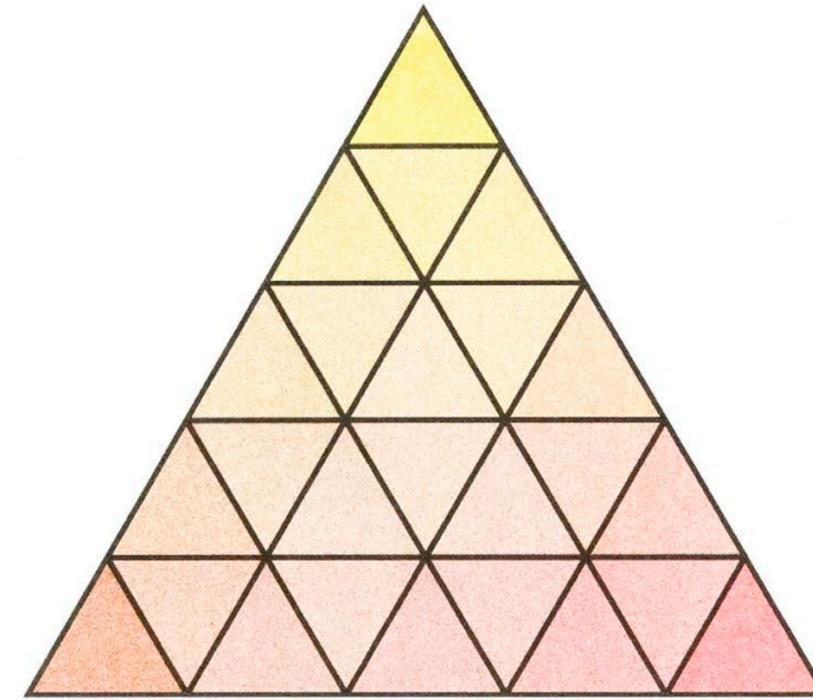


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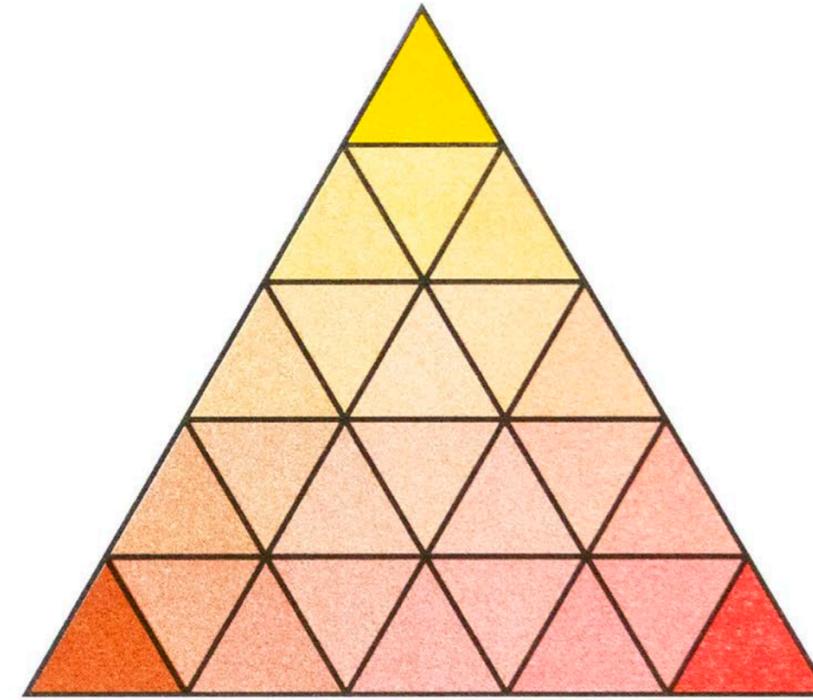
- Crimson 
- Fluorescent Orange 
- Aqua 



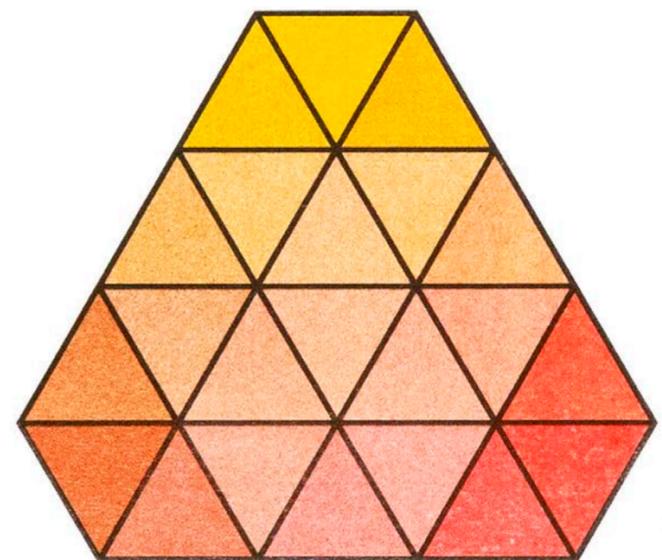
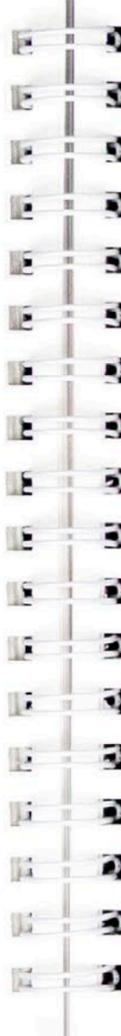
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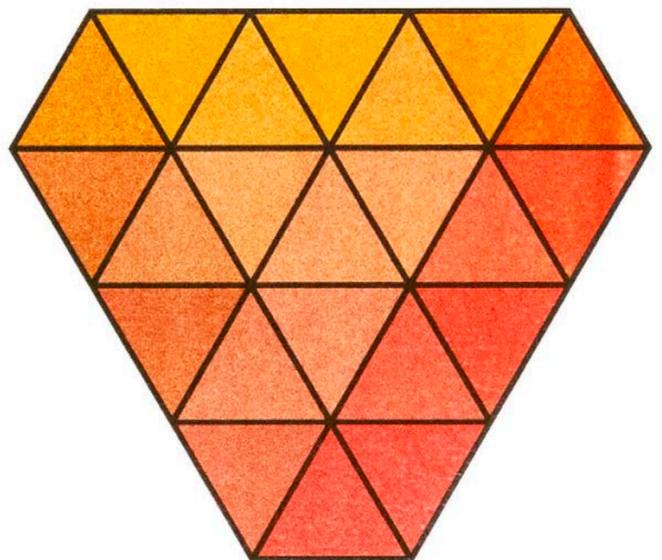
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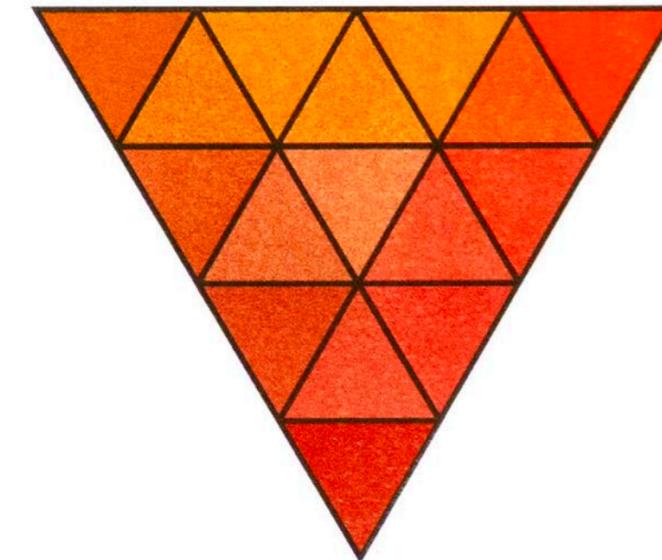
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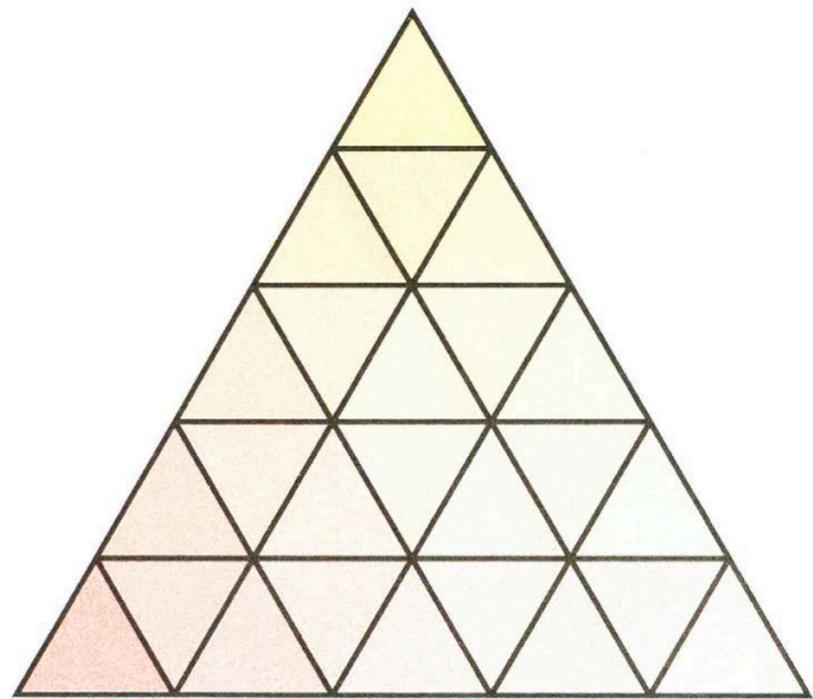


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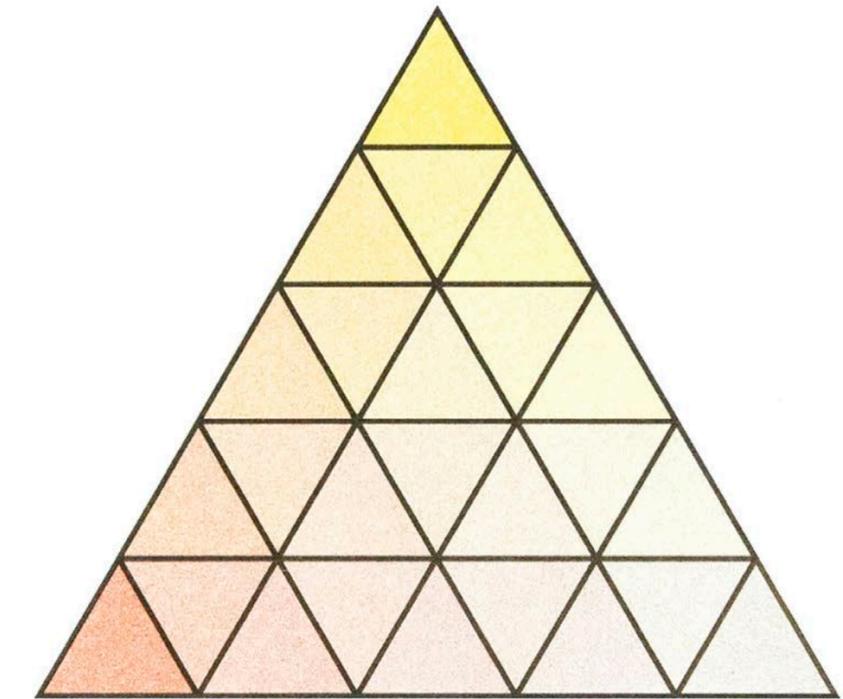


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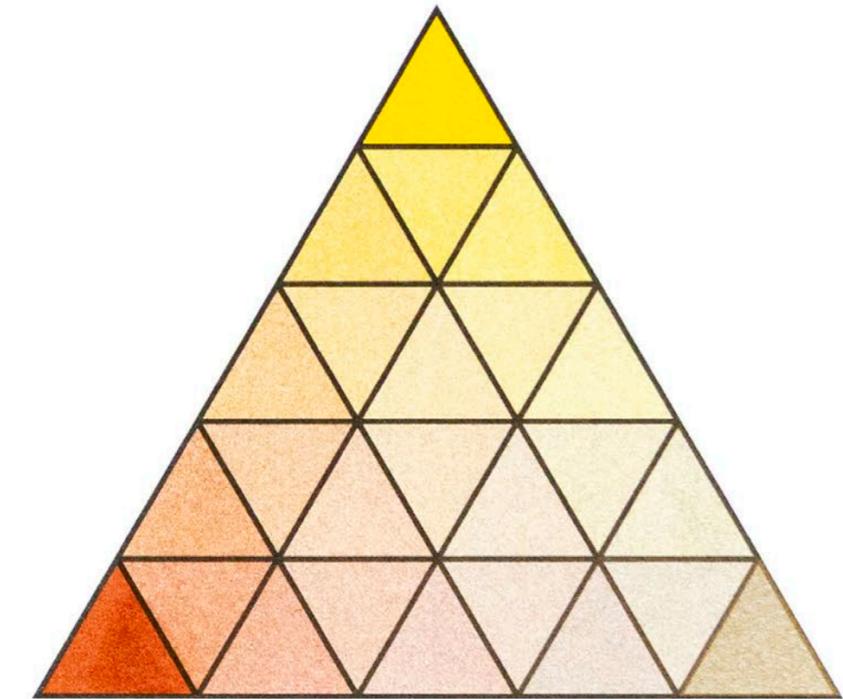
- Copper 
- Sunflower 
- Crimson 



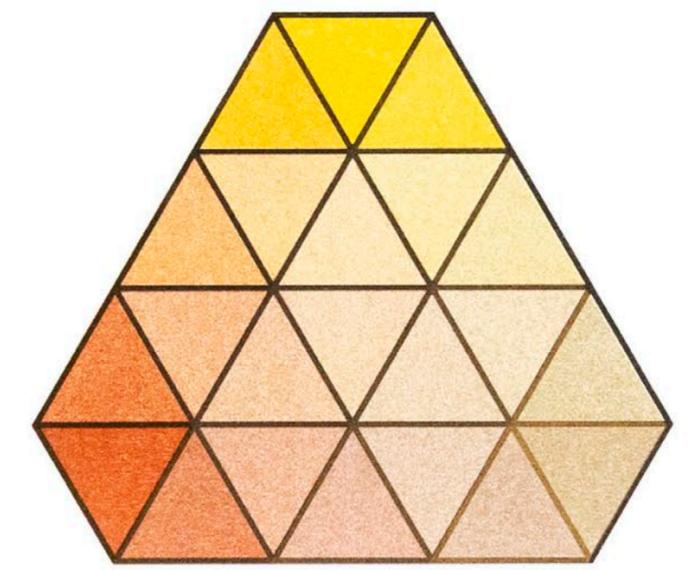
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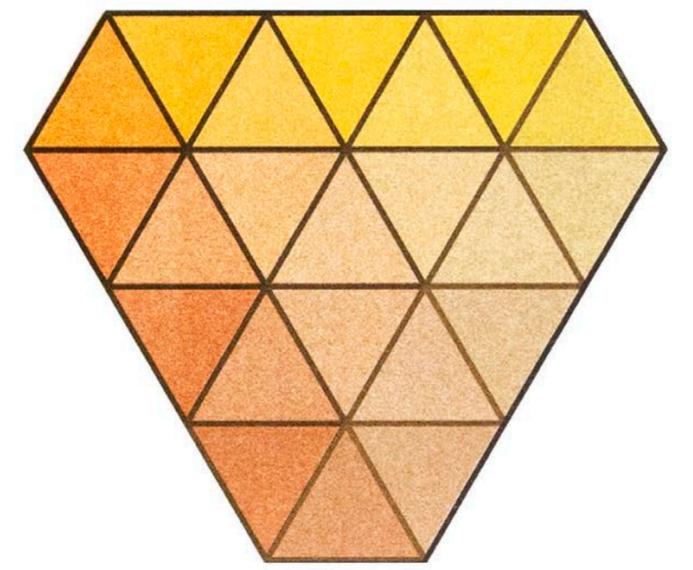
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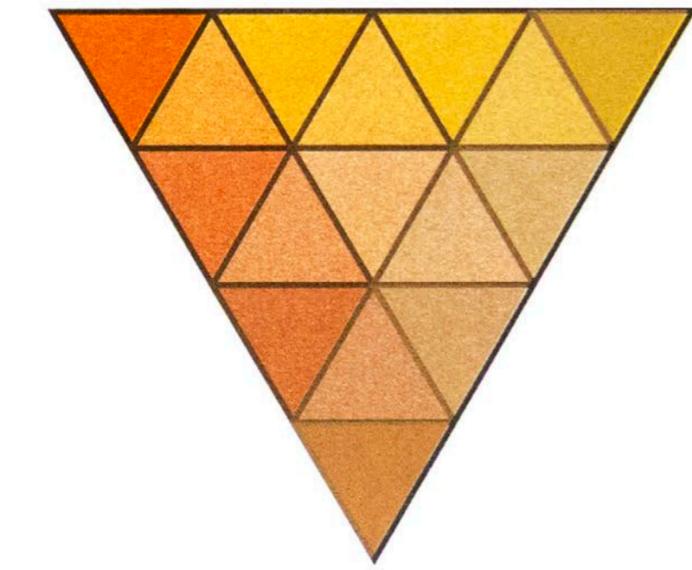
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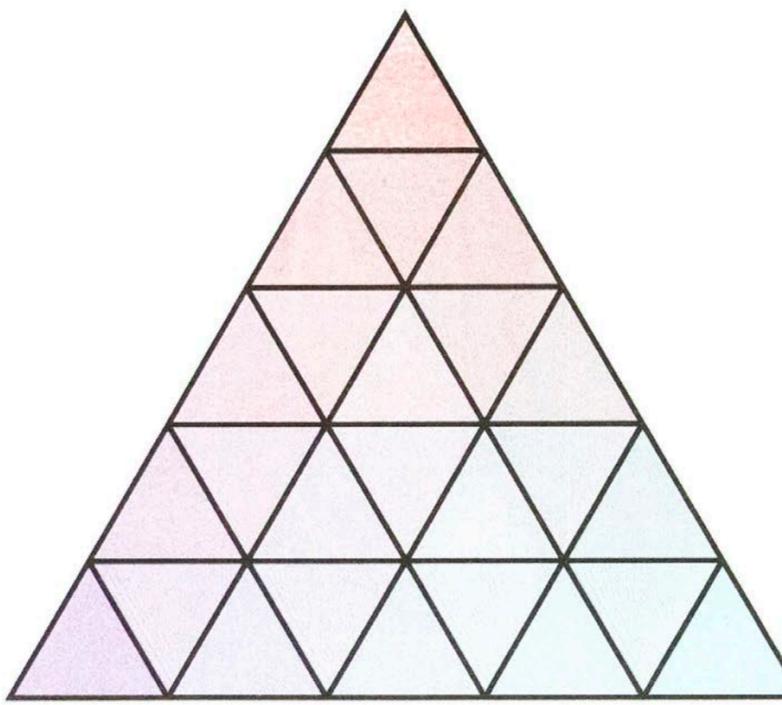


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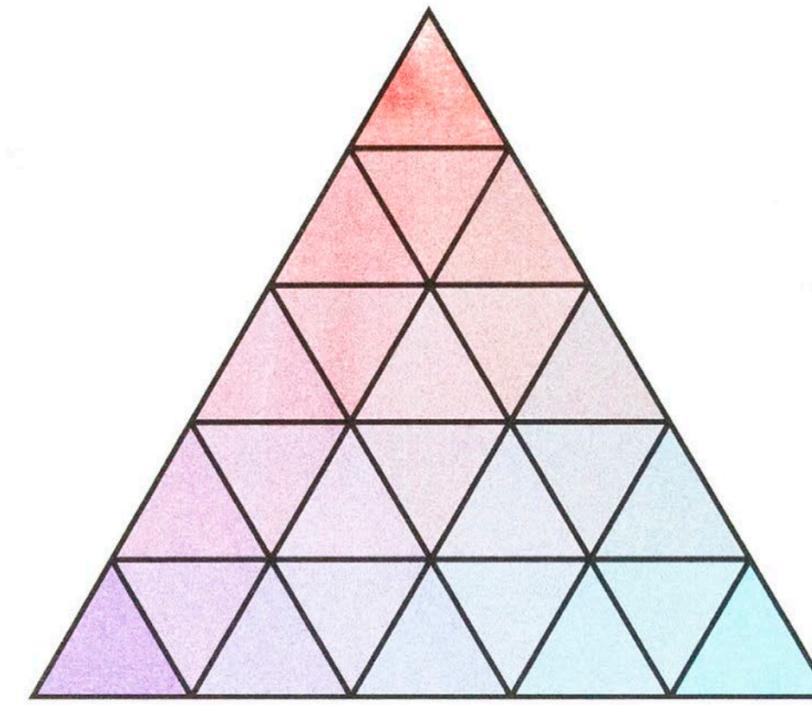


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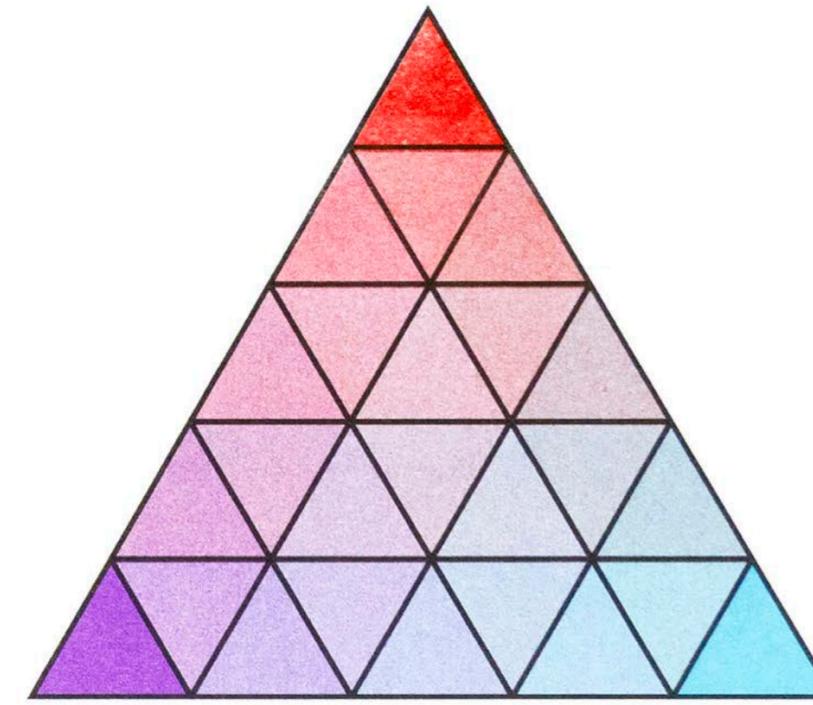
- Copper 
- Sunflower 
- Metallic Gold 



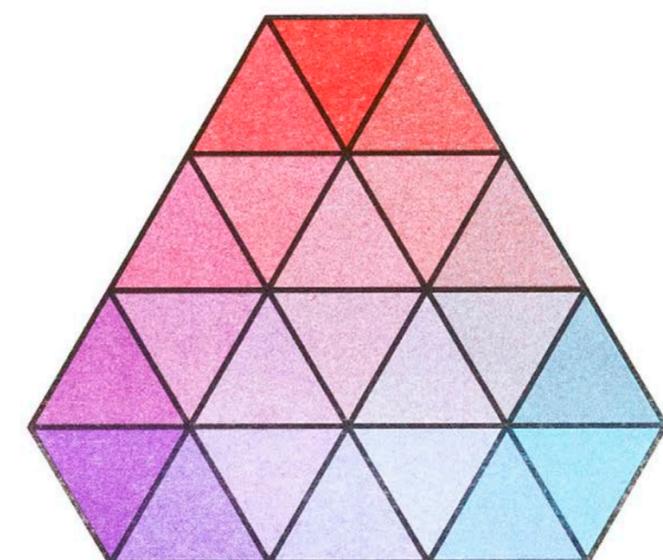
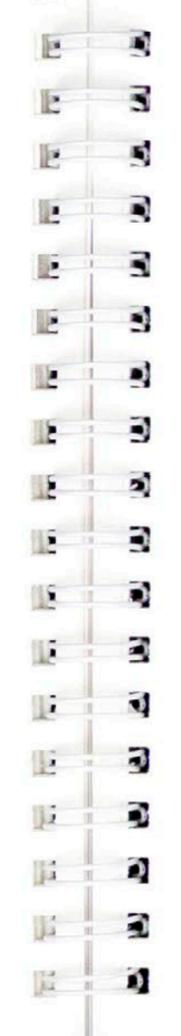
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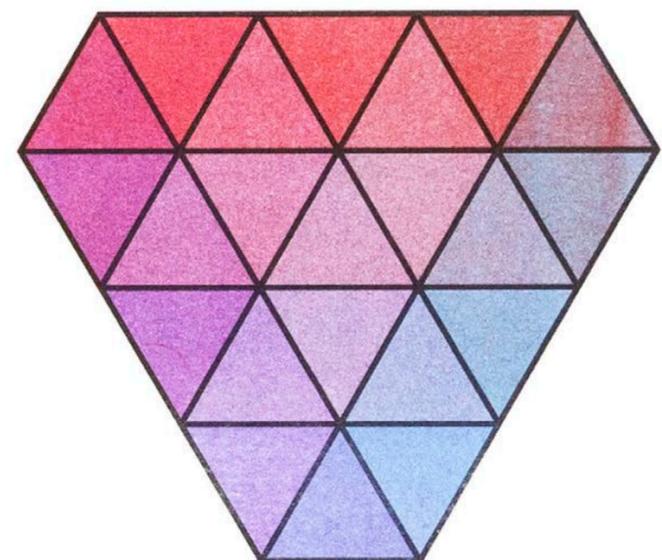
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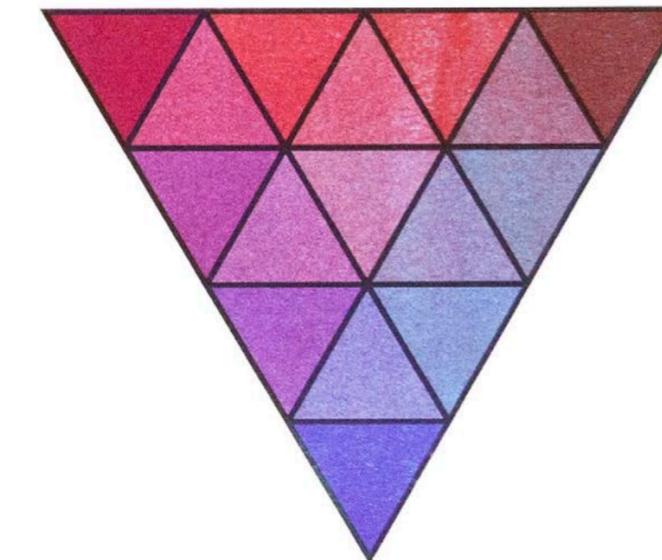
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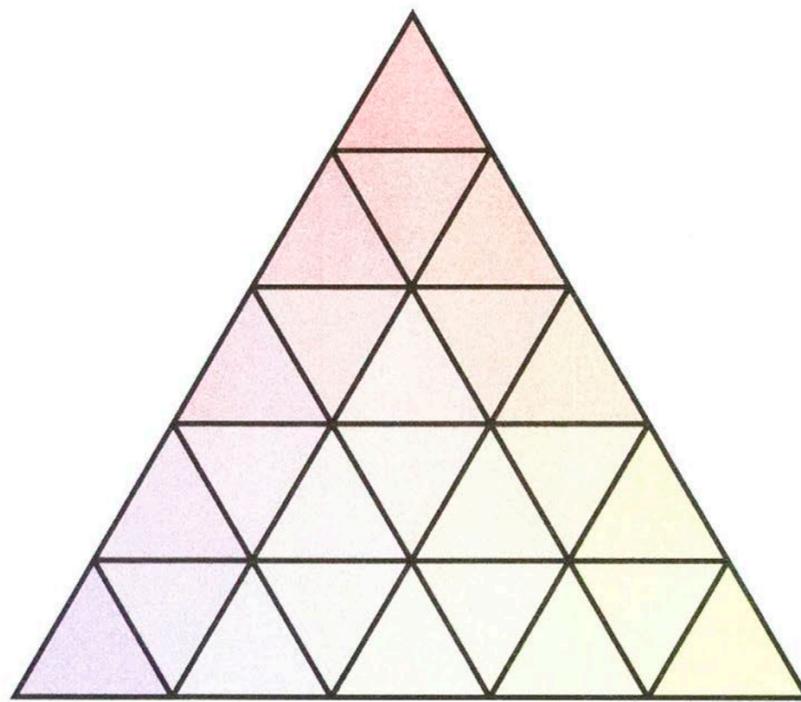


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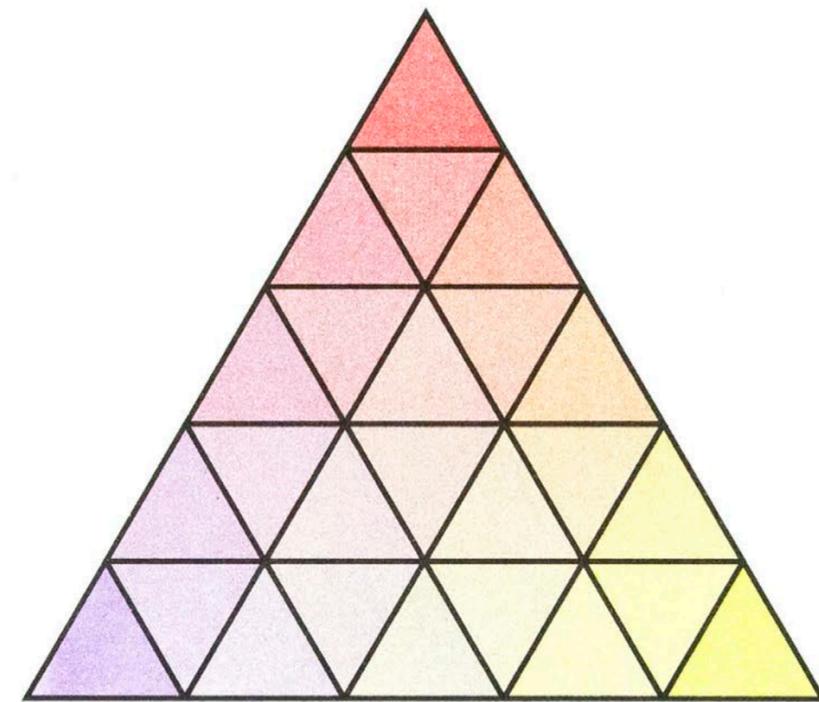


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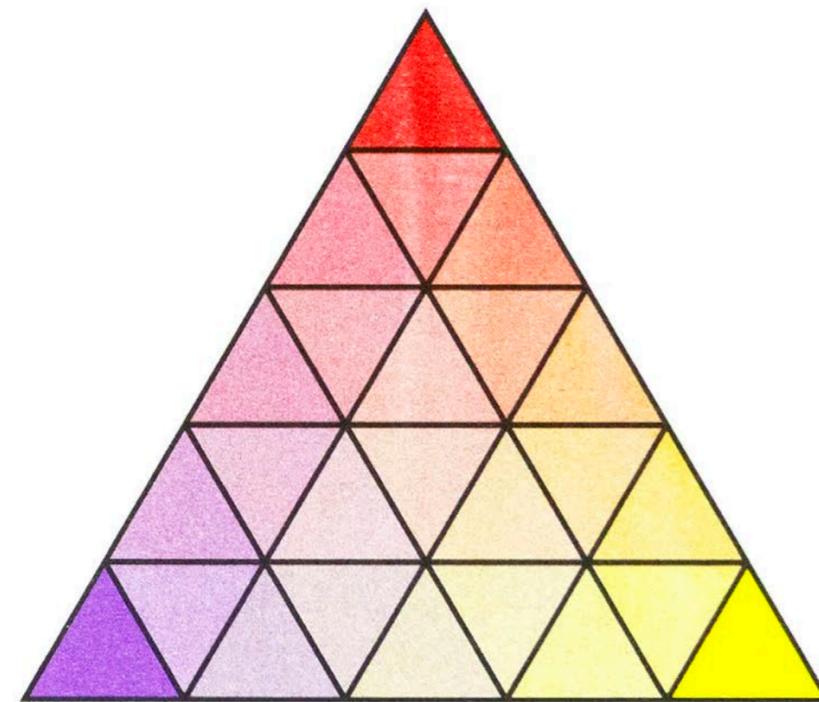
- Orchid 
- Crimson 
- Aqua 



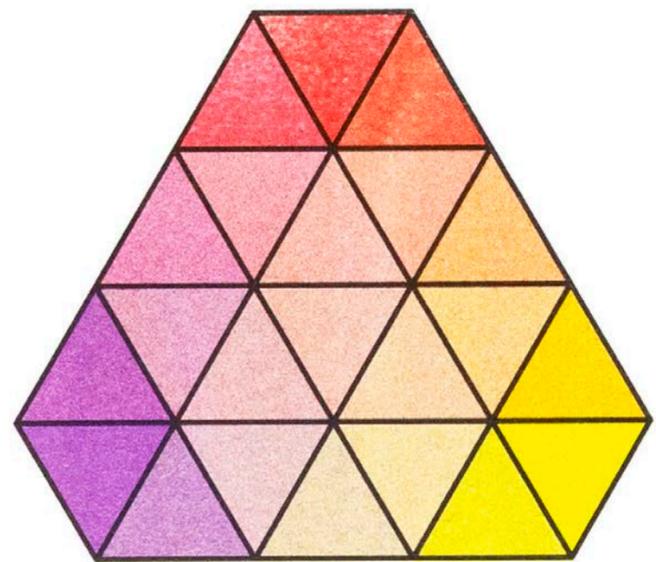
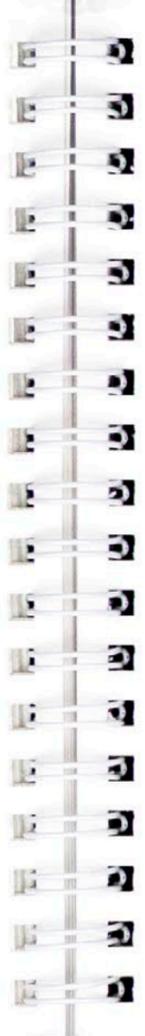
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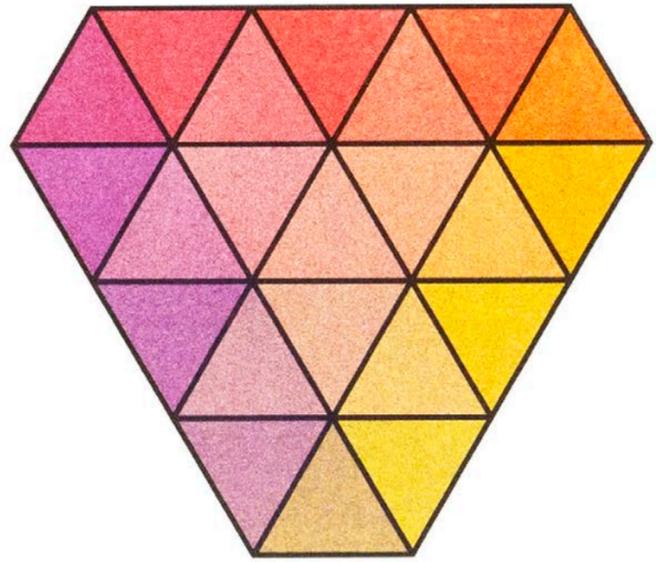
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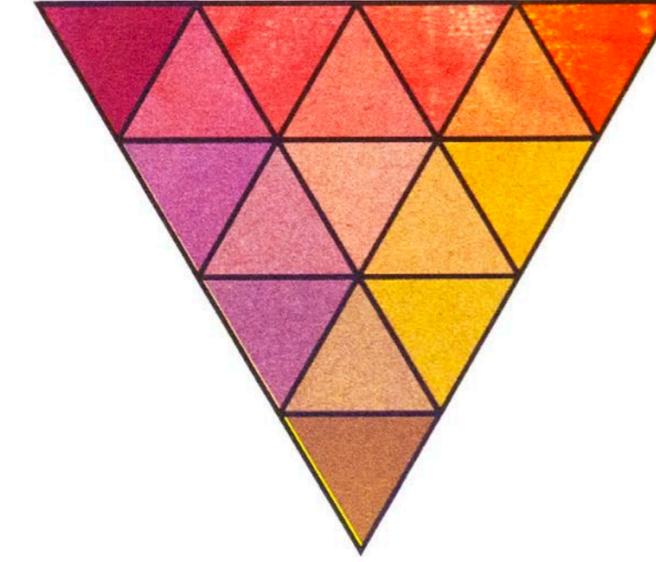
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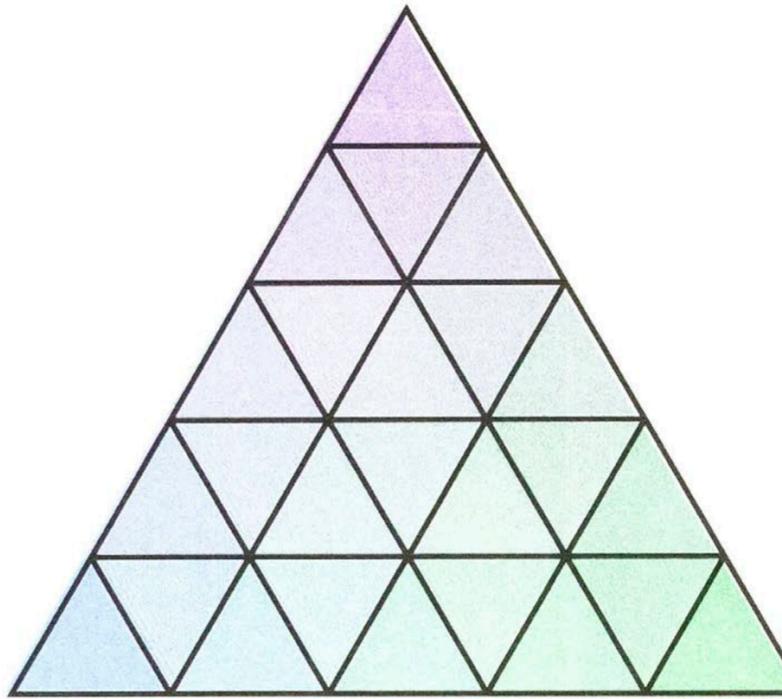


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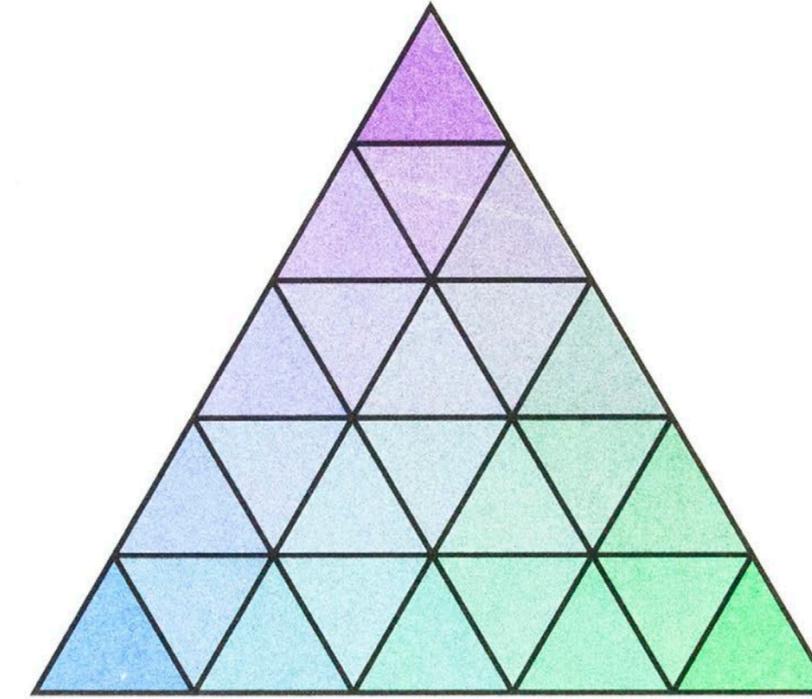


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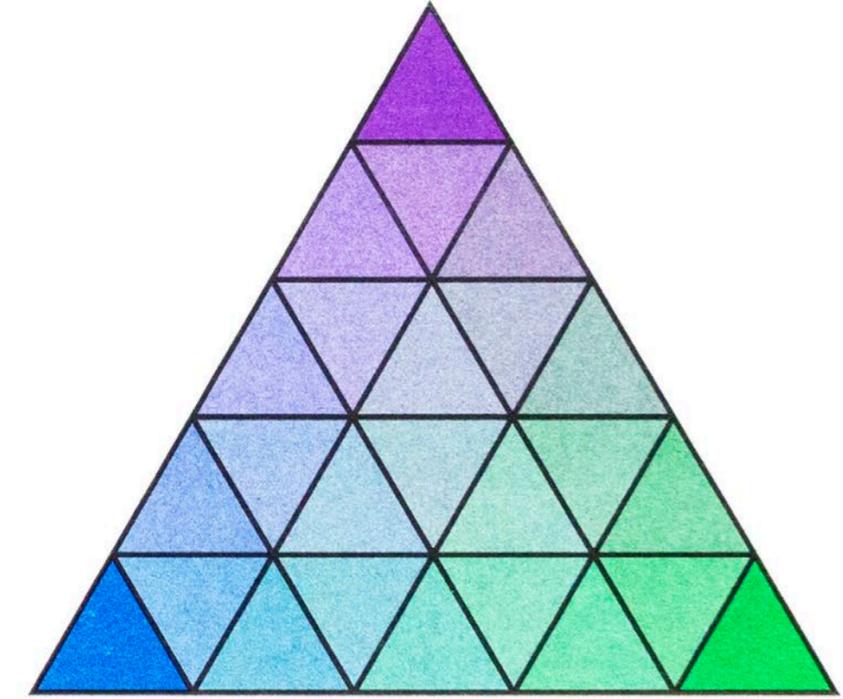
- Orchid 
- Crimson 
- Yellow 



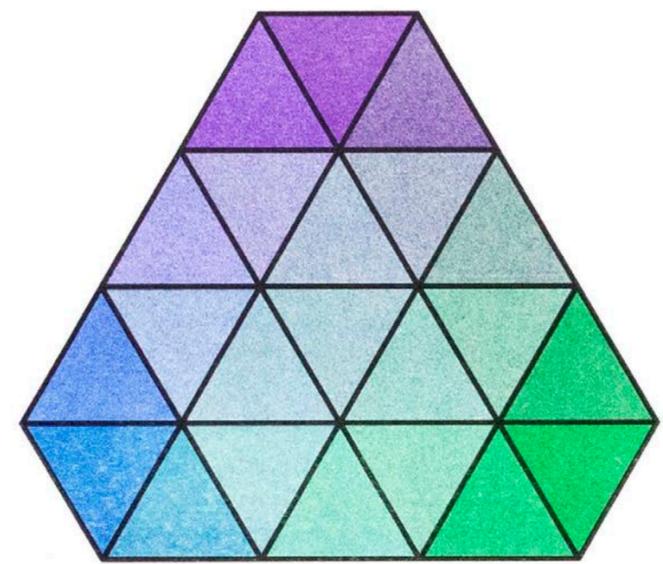
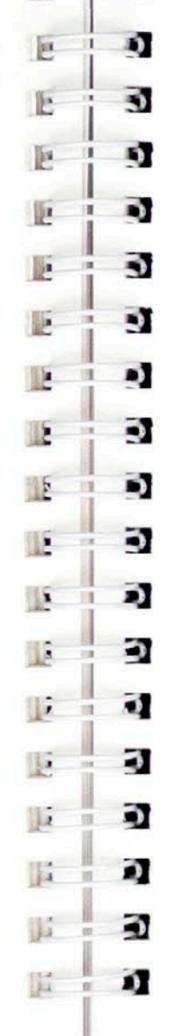
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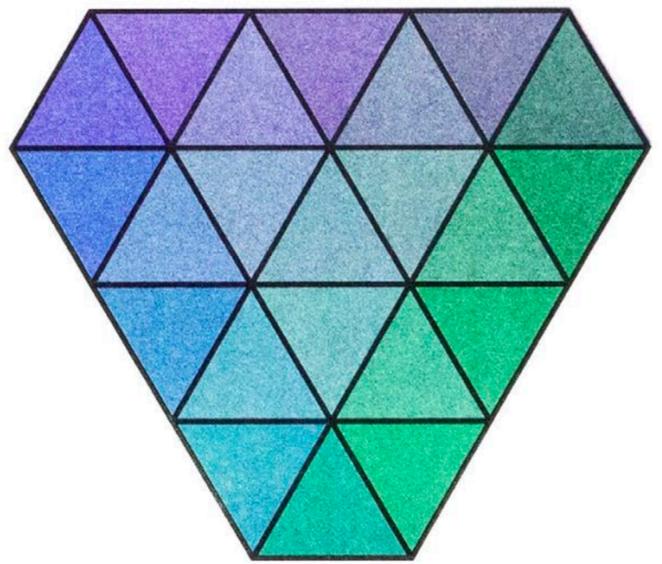
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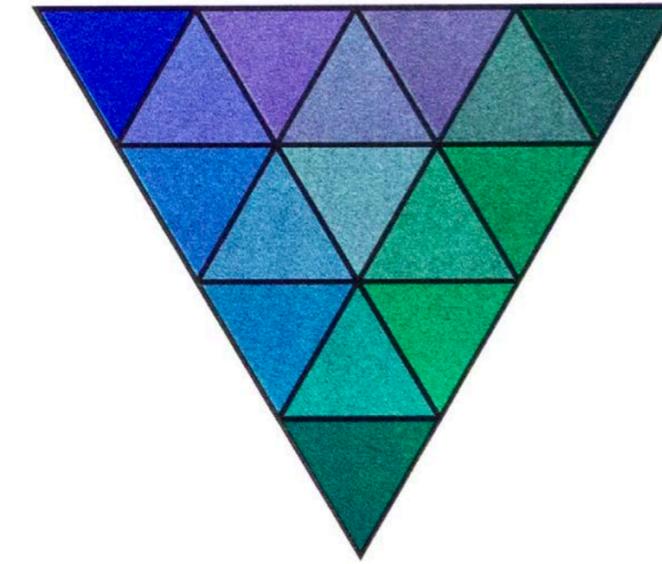
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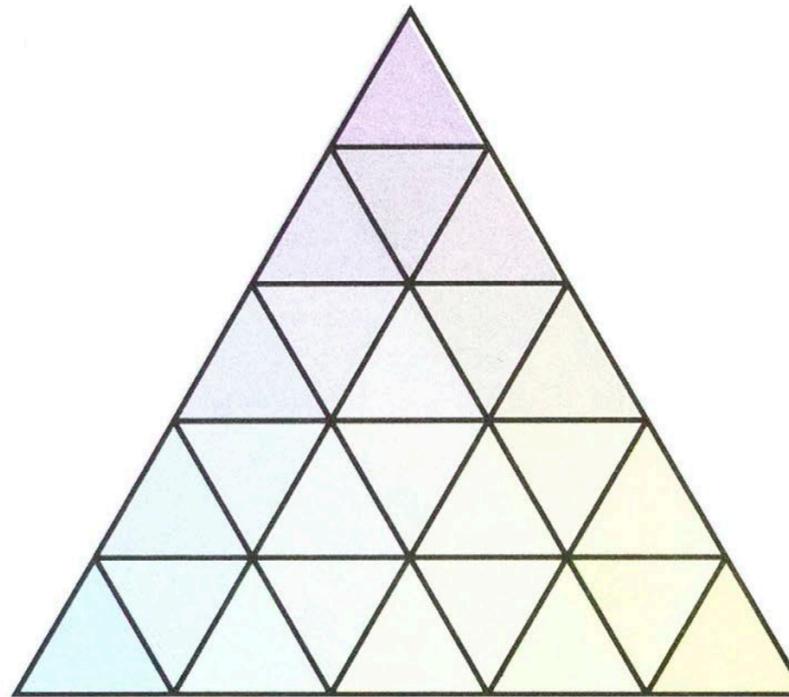


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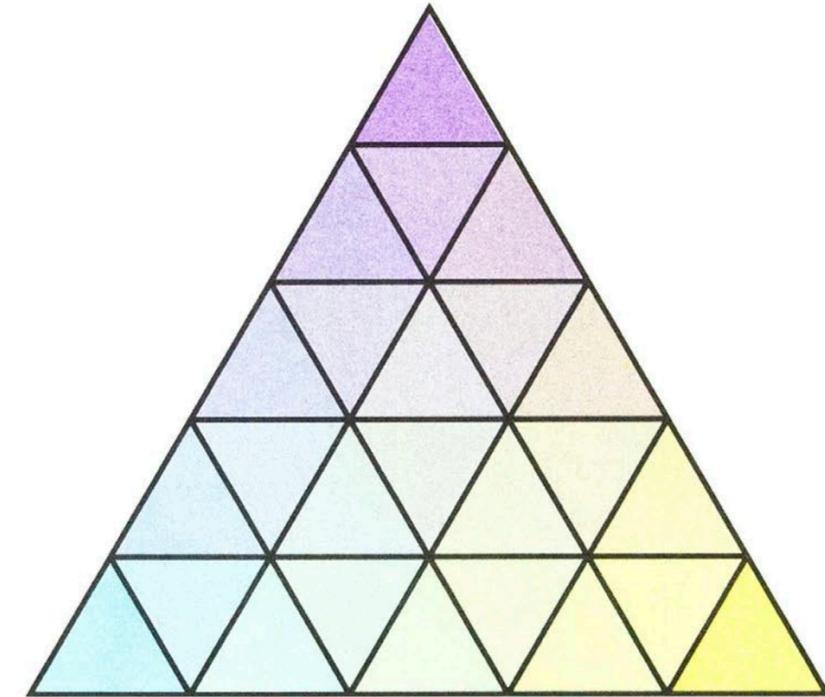


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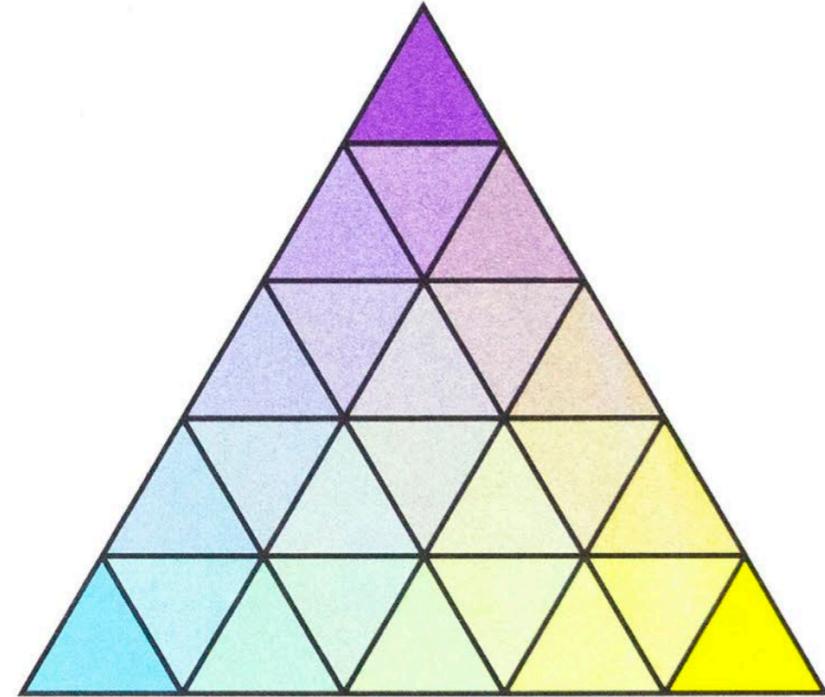
- Blue 
- Orchid 
- Green 



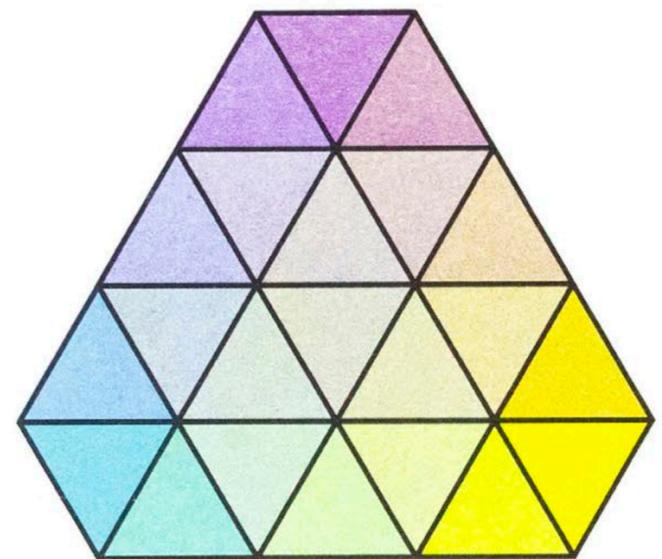
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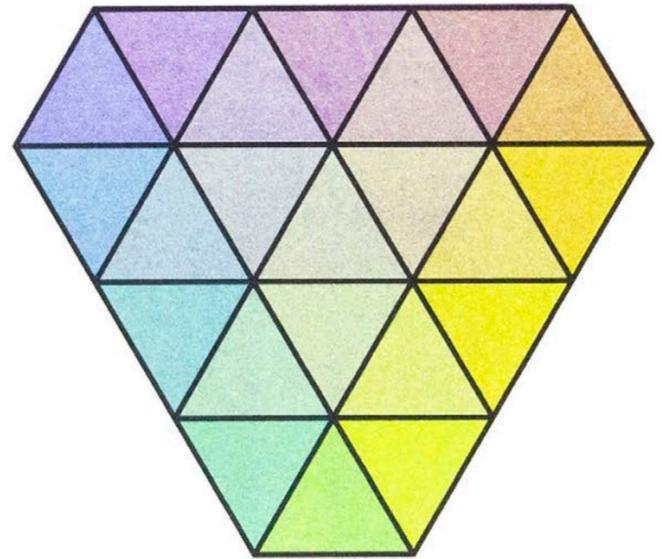
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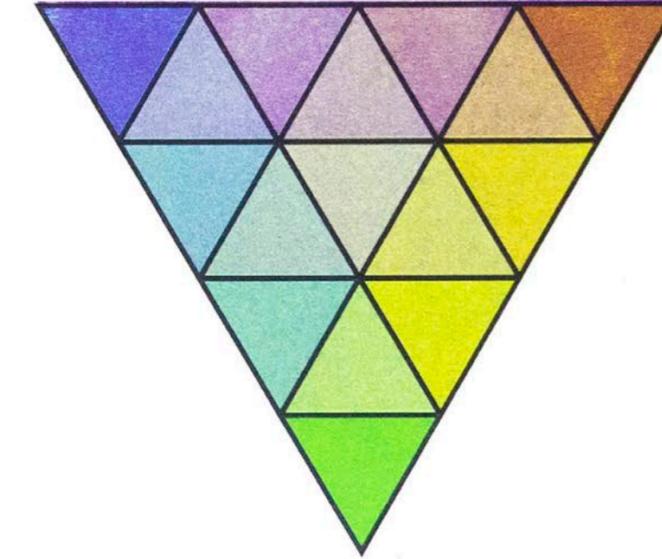
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Aqua

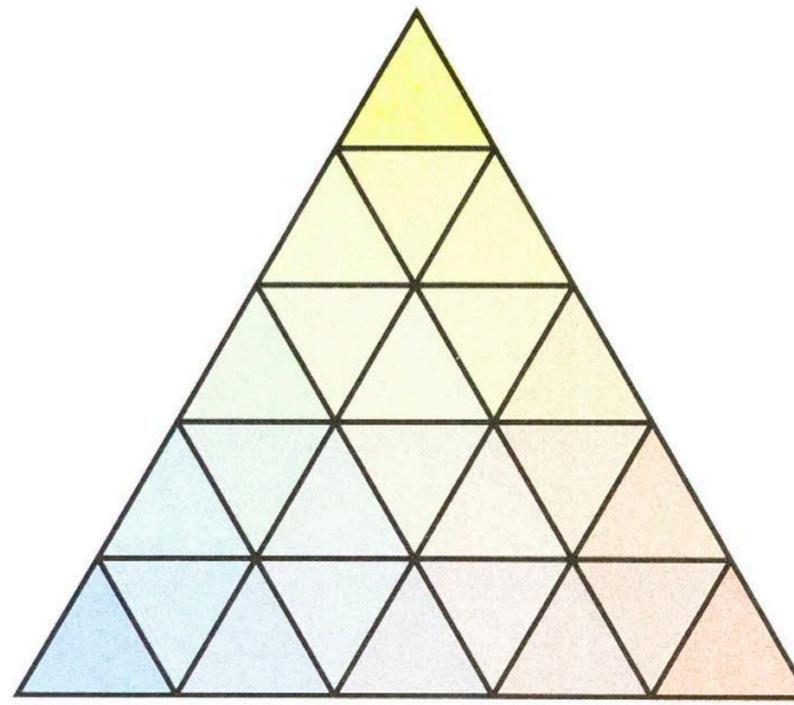


Orchid

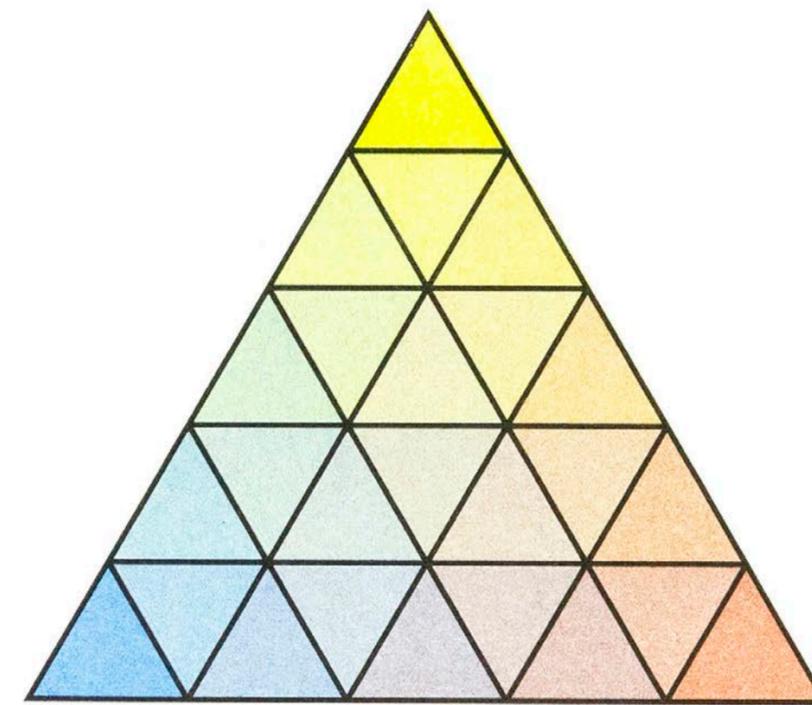


Yellow

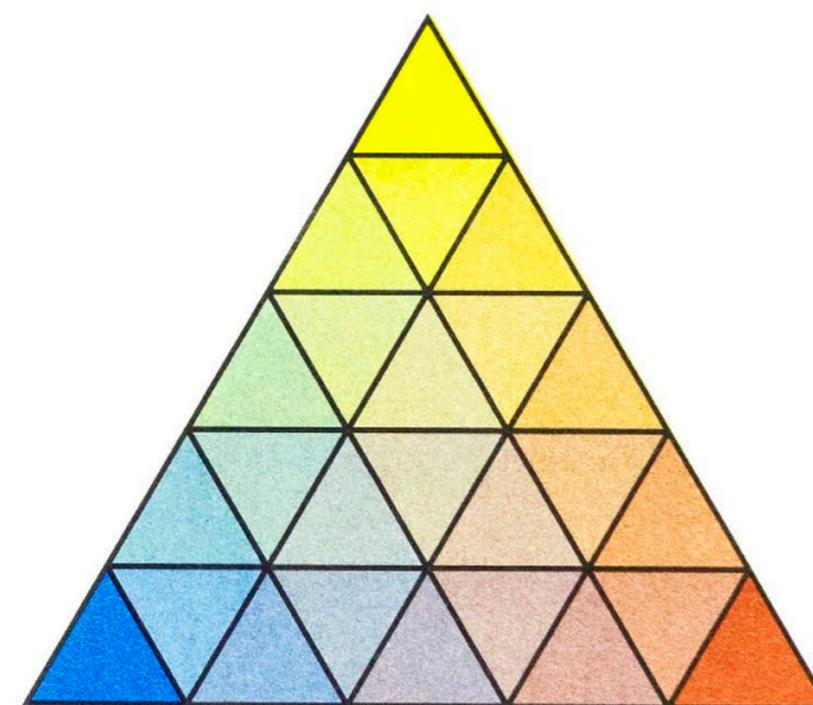




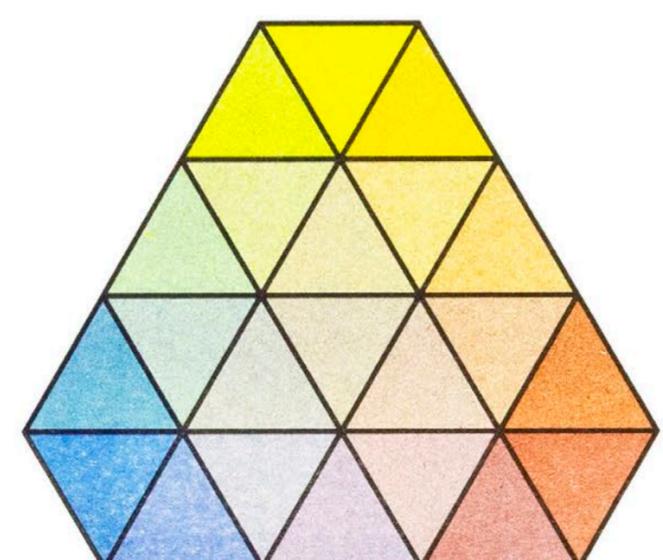
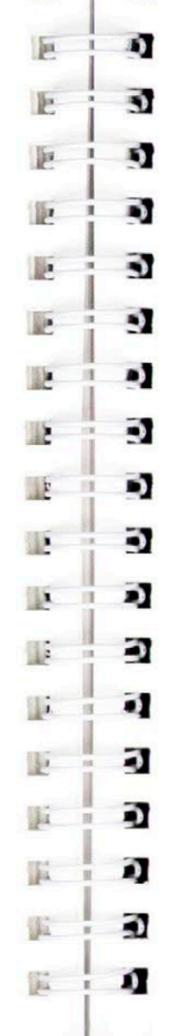
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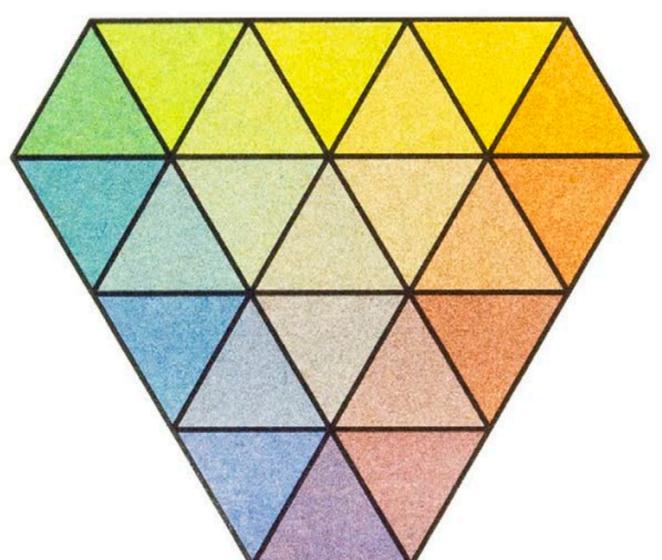
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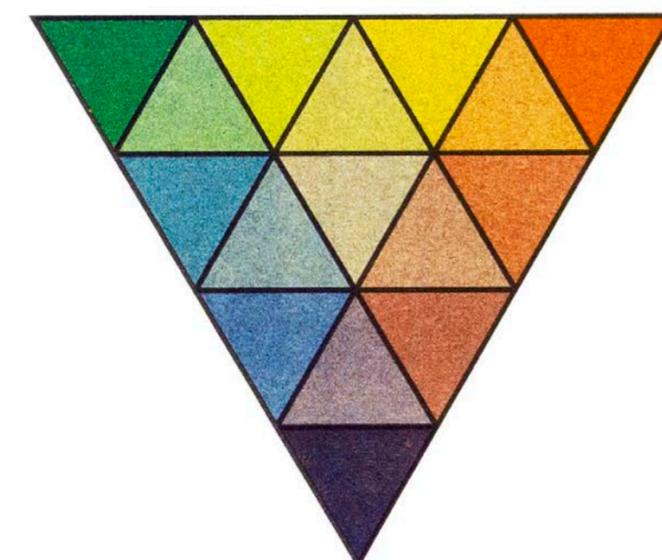
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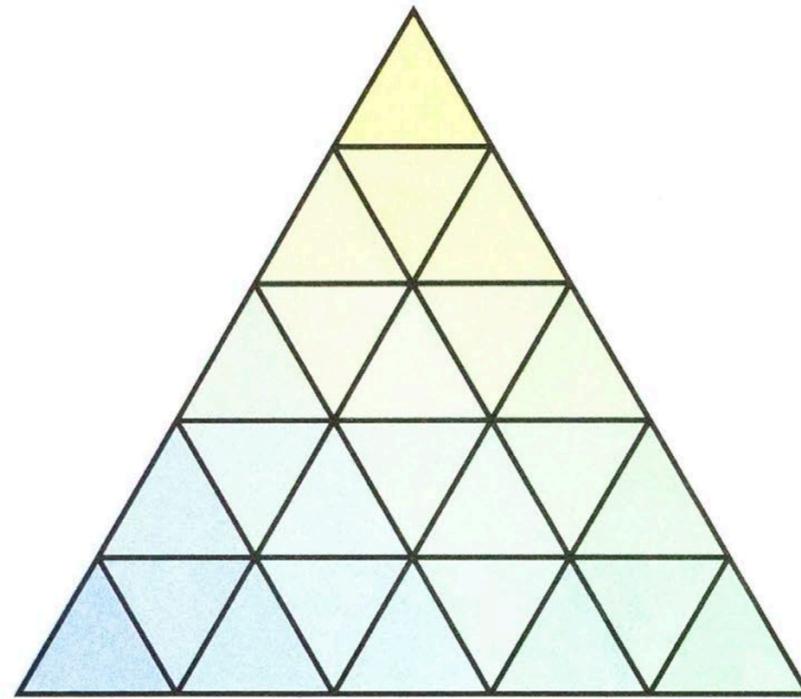


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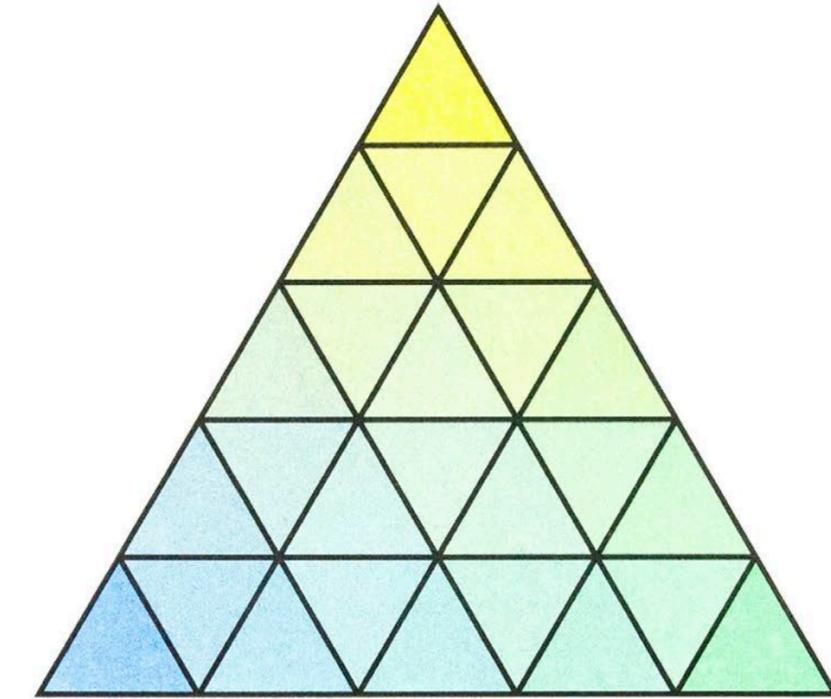


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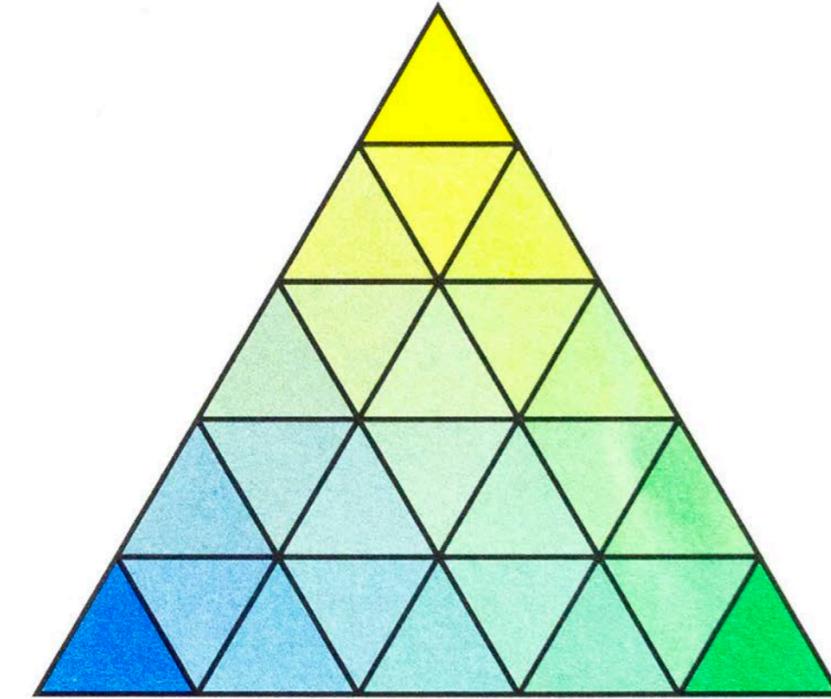
- Blue 
- Yellow 
- Copper 



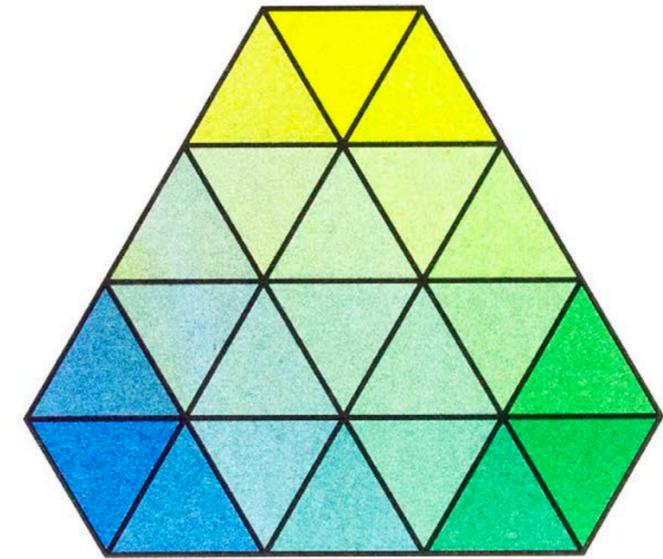
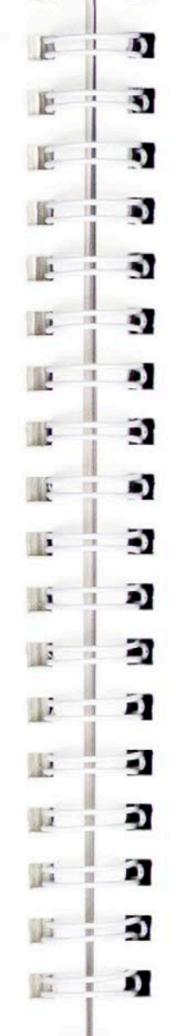
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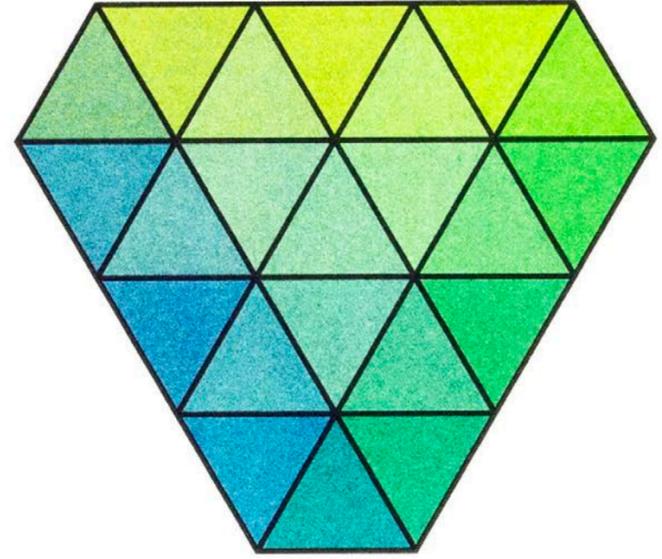
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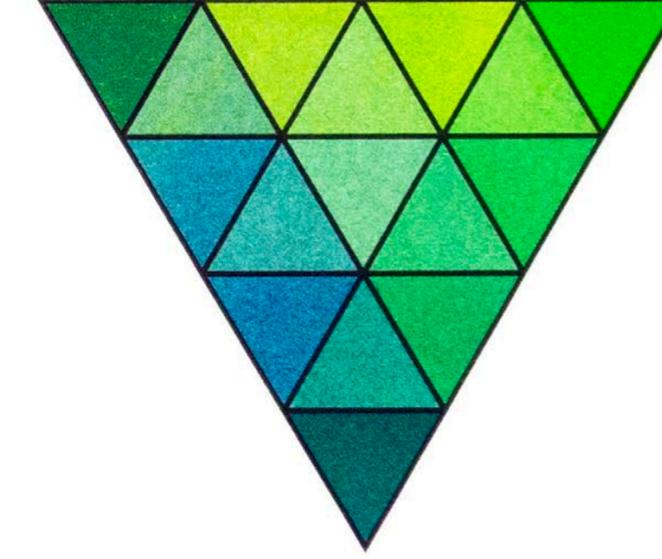
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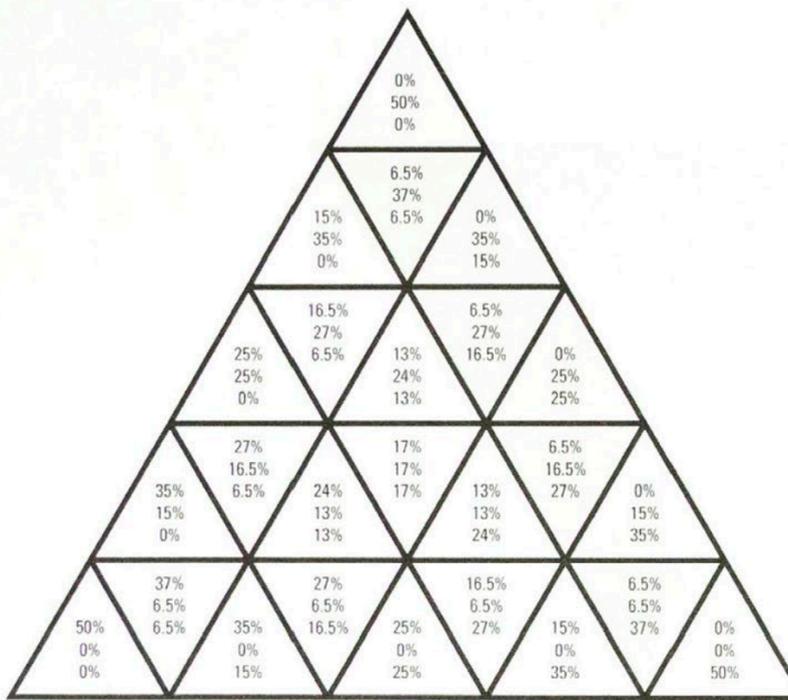


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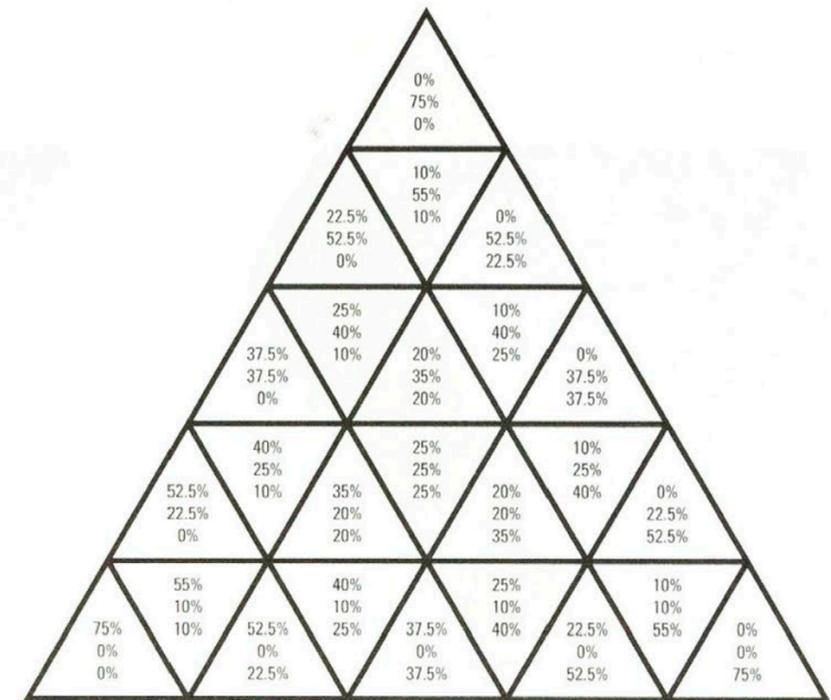


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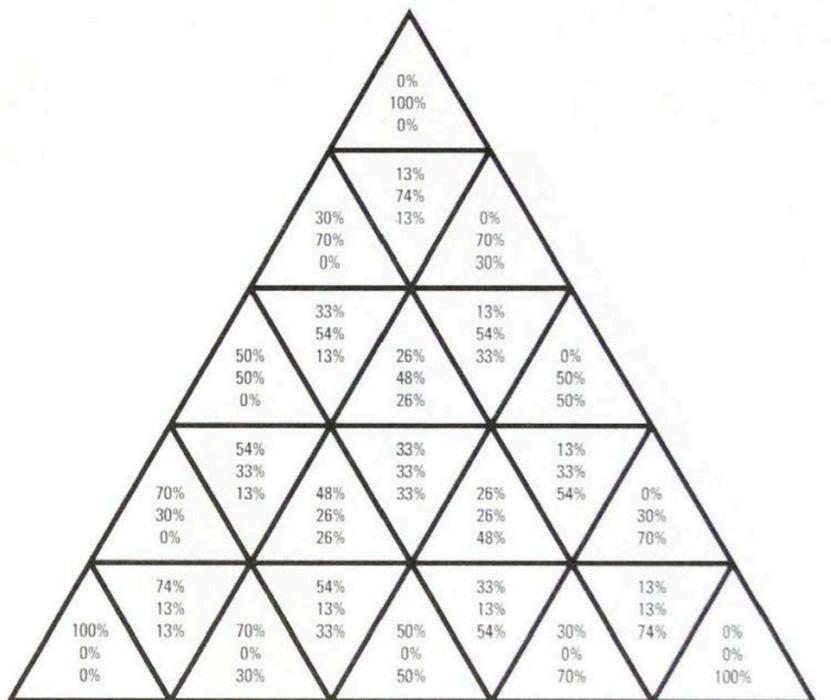
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- Yellow 
- Green 



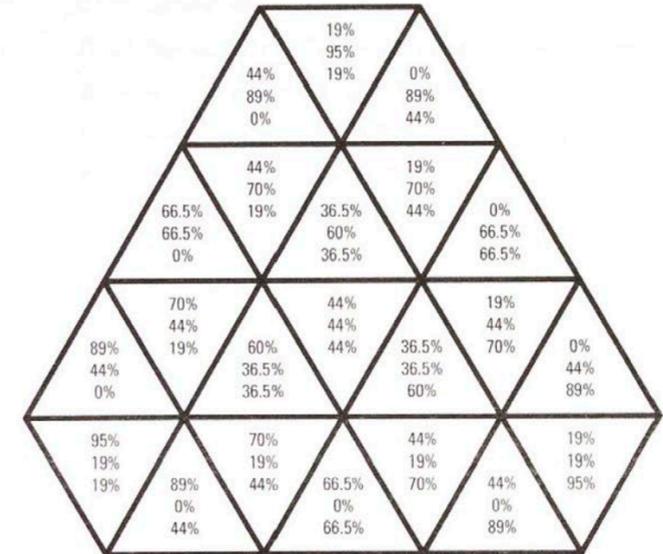
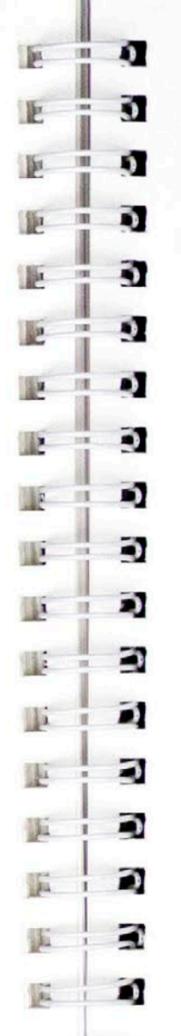
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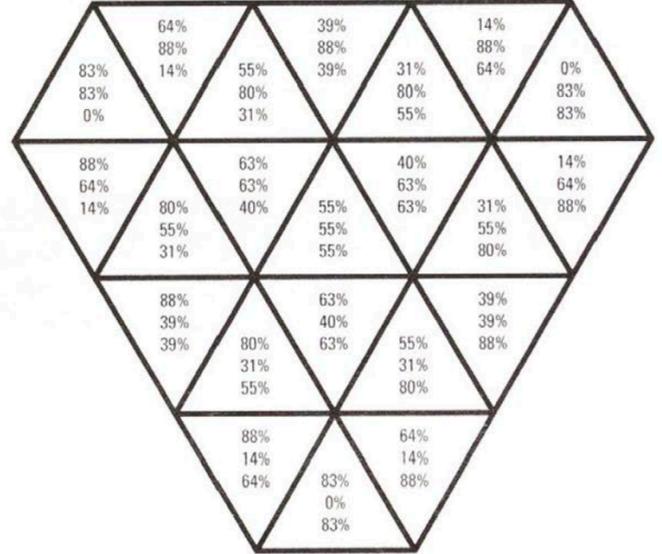
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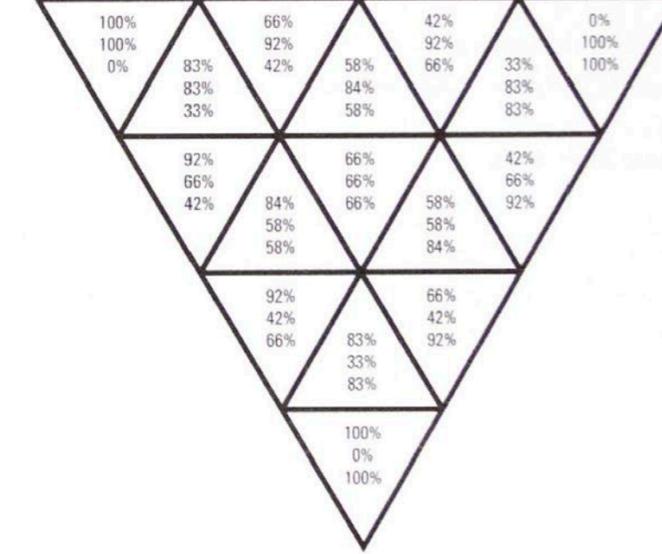
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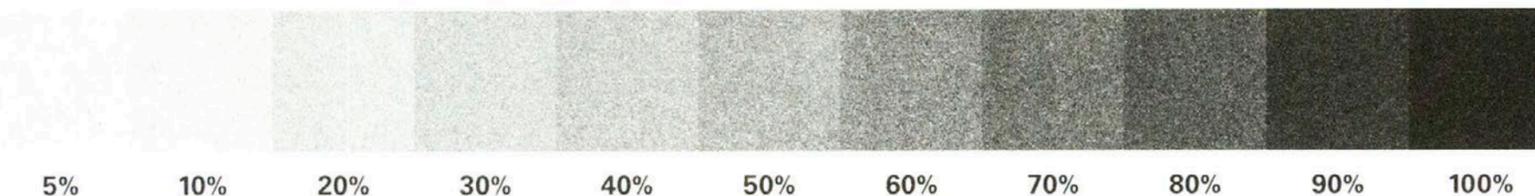
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200%

Swatch
Percentage
Guide

Calibration Test Strip



COLOPHON

Riso Barycentric Color Atlas was printed by Daniel Mellis on a Riso ME9450 using the following inks: HD Black, Charcoal, Yellow, Sunflower, Light Lime, Fluorescent Orange, Fluorescent Pink, Aqua, Crimson, Copper, Orchid, Green, Blue, Federal Blue, White, and Metallic Gold; in that order. Colors were printed individually to improve ink trapping and color mixing. The grain-touch screen was used throughout.

The paper is Mohawk Superfine Smooth Ultrawhite and Mohawk Loop Antique Vellum Urban Gray.

The diagrams on the covers show the location of the coordinates that represent each swatch. The image of a truncated cube on the title page represents all possible combinations of three inks with up to 200% total coverage. It was printed with Aqua, Yellow, and Fluorescent Pink.

The values used for printing are the same as those in the swatch percentage guide. The small deviations from the total coverage for each figure are a result of rounding to integer percentages.

The calibration test strip should help account for dot gain and other print production variables. Individual swatches can be isolated with the swatch viewer located in the envelope on the inside back cover.

Special thanks are due to Madeleine Aguilar, Jen Wandro, Steve Tomecek (in whose book, *Dirtmeister's Nitty Gritty Planet Earth*, I saw the soil texture triangle that inspired the organization of the swatches), and the Illinois Arts Council, which partially supported this publication through a Creative Catalyst grant.





