**Solutions of Bongard Problems**

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| **Note:** the solutions of Bongard Problems, below, are stated as have been supplied by their respective designers (the designer can be seen by clicking on the linked BP). The exceptions are BP’s #101–156, for which  Hofstadter did not supply solutions, so those have been added by the author of this page. The same applies to the occasional alternative solution for a few BP’s.   |  |  |  | | --- | --- | --- | | **Bongard Problem #** | **Left-side Rule** | **Right-side Rule** | | [BP#1](http://www.foundalis.com/res/bps/bongard/p001.htm) | Empty picture | Not empty picture | | [BP#2](http://www.foundalis.com/res/bps/bongard/p002.htm) | Large figures | Small figures | | [BP#3](http://www.foundalis.com/res/bps/bongard/p003.htm) | Outline figures | Solid figures | | [BP#4](http://www.foundalis.com/res/bps/bongard/p004.htm) | Convex figures | Nonconvex figures | | [BP#5](http://www.foundalis.com/res/bps/bongard/p005.htm) | Polygons | Curvilinear figures | | [BP#6](http://www.foundalis.com/res/bps/bongard/p006.htm) | Triangles | Quadrangles | | [BP#7](http://www.foundalis.com/res/bps/bongard/p007.htm) | Figures elongated vertically | Figures elongated horizontally | | [BP#8](http://www.foundalis.com/res/bps/bongard/p008.htm) | Figures on the right side | Figures on the left side | | [BP#9](http://www.foundalis.com/res/bps/bongard/p009.htm) | Smooth contour figures | Twisting contour figures | | [BP#10](http://www.foundalis.com/res/bps/bongard/p010.htm) | Triangles | Quadrangles | | [BP#11](http://www.foundalis.com/res/bps/bongard/p011.htm) | Elongated figures | Compact figures | | [BP#12](http://www.foundalis.com/res/bps/bongard/p012.htm) | Convex hull of figure elongated | Convex hull of figure compact | | [BP#13](http://www.foundalis.com/res/bps/bongard/p013.htm) | Vertical rectangles or horizontal ellipses | Vertical ellipses or horizontal rectangles | | [BP#14](http://www.foundalis.com/res/bps/bongard/p014.htm) | Large total line length | Small total line length | | [BP#15](http://www.foundalis.com/res/bps/bongard/p015.htm) | Closed lines | Open lines | | [BP#16](http://www.foundalis.com/res/bps/bongard/p016.htm) | Spiral curls counterclockwise | Spiral curls clockwise | | [BP#17](http://www.foundalis.com/res/bps/bongard/p017.htm) | An acute angle directed inward | No angle directed inward | | [BP#18](http://www.foundalis.com/res/bps/bongard/p018.htm) | A neck | No neck | | [BP#19](http://www.foundalis.com/res/bps/bongard/p019.htm) | Neck horizontal | Neck vertical | | [BP#20](http://www.foundalis.com/res/bps/bongard/p020.htm) | Points located on one side of the neck | Points located on both sides of the neck | | [BP#21](http://www.foundalis.com/res/bps/bongard/p021.htm) | Small figure present | No small figure present | | [BP#22](http://www.foundalis.com/res/bps/bongard/p022.htm) | Areas of figures approximately equal | Areas of figures differ greatly | | [BP#23](http://www.foundalis.com/res/bps/bongard/p023.htm) | One figure | Two figures | | [BP#24](http://www.foundalis.com/res/bps/bongard/p024.htm) | A circle | No circle | | [BP#25](http://www.foundalis.com/res/bps/bongard/p025.htm) | Black figure is a triangle | Black figure is a circle | | [BP#26](http://www.foundalis.com/res/bps/bongard/p026.htm) | Solid black triangle | No solid black triangle | | [BP#27](http://www.foundalis.com/res/bps/bongard/p027.htm) | More solid black figures | More outline figures | | [BP#28](http://www.foundalis.com/res/bps/bongard/p028.htm) | More solid black circles | More outline circles | | [BP#29](http://www.foundalis.com/res/bps/bongard/p029.htm) | There are more small circles inside the figure outline than outside | There are fewer small circles inside the figure outline than outside | | [BP#30](http://www.foundalis.com/res/bps/bongard/p030.htm) | A line with a self-crossing | A line without a self-crossing | | [BP#31](http://www.foundalis.com/res/bps/bongard/p031.htm) | One line | Two lines | | [BP#32](http://www.foundalis.com/res/bps/bongard/p032.htm) | A sharp projection | No sharp projection | | [BP#33](http://www.foundalis.com/res/bps/bongard/p033.htm) | Acute angle | No acute angle | | [BP#34](http://www.foundalis.com/res/bps/bongard/p034.htm) | A large hole | A small hole | | [BP#35](http://www.foundalis.com/res/bps/bongard/p035.htm) | The axis of the hole is parallel to the figure axis | The axis of the hole is perpendicular to the figure axis | | [BP#36](http://www.foundalis.com/res/bps/bongard/p036.htm) | Triangle above circle | Circle above triangle | | [BP#37](http://www.foundalis.com/res/bps/bongard/p037.htm) | Triangle above circle | Circle above triangle | | [BP#38](http://www.foundalis.com/res/bps/bongard/p038.htm) | Triangle larger than circle | Triangle smaller than circle | | [BP#39](http://www.foundalis.com/res/bps/bongard/p039.htm) | Segments almost parallel to each other | Large angles between segments | | [BP#40](http://www.foundalis.com/res/bps/bongard/p040.htm) | Three points on a straight line | No three points on a straight line | | [BP#41](http://www.foundalis.com/res/bps/bongard/p041.htm) | Outline circles on one straight line | Outline circles not on one straight line | | [BP#42](http://www.foundalis.com/res/bps/bongard/p042.htm) | Points inside the figure outline are on a straight line | Points inside the figure outline are not on a straight line | | [BP#43](http://www.foundalis.com/res/bps/bongard/p043.htm) | The vibration amplitude increases from left to right | The vibration amplitude decreases from left to right | | [BP#44](http://www.foundalis.com/res/bps/bongard/p044.htm) | Small circles on different arcs | Small circles on one arc | | [BP#45](http://www.foundalis.com/res/bps/bongard/p045.htm) | Outline figure on top of solid black figure | Black figure on top of outline figure | | [BP#46](http://www.foundalis.com/res/bps/bongard/p046.htm) | Triangle on top of the circle | Circle on top of the triangle | | [BP#47](http://www.foundalis.com/res/bps/bongard/p047.htm) | Triangle inside of the circle | Circle inside of the triangle | | [BP#48](http://www.foundalis.com/res/bps/bongard/p048.htm) | Solid dark figures above the outline figures | Outline figures above the solid dark figures | | [BP#49](http://www.foundalis.com/res/bps/bongard/p049.htm) | Points inside the figure outline are grouped more densely than outside the contour | Points outside the figure contour are grouped more densely than inside the contour | | [BP#50](http://www.foundalis.com/res/bps/bongard/p050.htm) | Axes of symmetry | No axes of symmetry | | [BP#51](http://www.foundalis.com/res/bps/bongard/p051.htm) | Two circles close to each other | No two circles close to each other | | [BP#52](http://www.foundalis.com/res/bps/bongard/p052.htm) | Arrows pointing in different directions | Arrows pointing in the same direction | | [BP#53](http://www.foundalis.com/res/bps/bongard/p053.htm) | Inside figure has fewer angles than outside figure | Inside figure has more angles than outside figure | | [BP#54](http://www.foundalis.com/res/bps/bongard/p054.htm) | A cross, circle, and triangle arranged counterclockwise | A cross, circle, and triangle arranged clockwise | | [BP#55](http://www.foundalis.com/res/bps/bongard/p055.htm) | A circle is at the left of the cavity if you look from inside the figure | A circle is at the right of the cavity if you look from inside the figure | | [BP#56](http://www.foundalis.com/res/bps/bongard/p056.htm) | All figures of the same color | Figures of different colors | | [BP#57](http://www.foundalis.com/res/bps/bongard/p057.htm) | Identical figures | Figures not identical | | [BP#58](http://www.foundalis.com/res/bps/bongard/p058.htm) | Solid dark quadrangles are identical | Solid dark quadrangles are different | | [BP#59](http://www.foundalis.com/res/bps/bongard/p059.htm) | Figures are similar | Figures are not similar | | [BP#60](http://www.foundalis.com/res/bps/bongard/p060.htm) | Some similar figures | No similar figures | | [BP#61](http://www.foundalis.com/res/bps/bongard/p061.htm) | A line separates the crosses in half | A line does not separate the crosses in half | | [BP#62](http://www.foundalis.com/res/bps/bongard/p062.htm) | Ends of the curve are far apart | Ends of the curve are close together | | [BP#63](http://www.foundalis.com/res/bps/bongard/p063.htm) | Shading thicker on the right side | Shading thicker on the left side | | [BP#64](http://www.foundalis.com/res/bps/bongard/p064.htm) | A cross is located on the extension of the ellipse axis | A circle is located on the extension of the ellipse axis | | [BP#65](http://www.foundalis.com/res/bps/bongard/p065.htm) | A set of triangles elongated horizontally | A set of triangles elongated vertically | | [BP#66](http://www.foundalis.com/res/bps/bongard/p066.htm) | Unconnected circles on a horizontal line | Unconnected circles on a vertical line | | [BP#67](http://www.foundalis.com/res/bps/bongard/p067.htm) | The right branch begins at a higher point than the left branch | The right branch begins at a lower point than the left branch | | [BP#68](http://www.foundalis.com/res/bps/bongard/p068.htm) | The end of the right branch is higher than that of the left branch | The end of the right branch is lower than that of the left branch | | [BP#69](http://www.foundalis.com/res/bps/bongard/p069.htm) | Large black dot on the main branch | Large black dot on a side branch | | [BP#70](http://www.foundalis.com/res/bps/bongard/p070.htm) | There are no side branches of the second order | There are side branches of the second order | | [BP#71](http://www.foundalis.com/res/bps/bongard/p071.htm) | There are inside figures of the second order | There are no inside figures of the second order | | [BP#72](http://www.foundalis.com/res/bps/bongard/p072.htm) | Ends of the curve are parallel | Ends of the curve are perpendicular | | [BP#73](http://www.foundalis.com/res/bps/bongard/p073.htm) | The long axes of the ellipse and rectangle are perpendicular | The long axes of the ellipse and rectangle are parallel | | [BP#74](http://www.foundalis.com/res/bps/bongard/p074.htm) | A tail grows from the obtuse end | A tail grows from the acute end | | [BP#75](http://www.foundalis.com/res/bps/bongard/p075.htm) | Triangle located at the concave side of an arc | Triangle located at the convex side of an arc | | [BP#76](http://www.foundalis.com/res/bps/bongard/p076.htm) | Long sides concave | Long sides convex | | [BP#77](http://www.foundalis.com/res/bps/bongard/p077.htm) | Angle divided in half | Angle not divided in half | | [BP#78](http://www.foundalis.com/res/bps/bongard/p078.htm) | Extensions of segments cross at one point | Extensions of segments do not cross at one point | | [BP#79](http://www.foundalis.com/res/bps/bongard/p079.htm) | A dark circle is closer to the outline circle than to the triangle | A dark circle is closer to the triangle than to the outline circle | | [BP#80](http://www.foundalis.com/res/bps/bongard/p080.htm) | Points located at the same distances from a cross | Points located at different distances from a cross | | [BP#81](http://www.foundalis.com/res/bps/bongard/p081.htm) | Dark figures can be divided from outline figures by a straight line alternatively: Convex hulls of filled and outlined figures overlap | Dark figures are impossible to separate alternatively: Convex hulls of filled and outlined figures do not overlap | | [BP#82](http://www.foundalis.com/res/bps/bongard/p082.htm) | The convex hull of the crosses forms an equilateral triangle | The convex hull of the crosses does not form an equilateral triangle | | [BP#83](http://www.foundalis.com/res/bps/bongard/p083.htm) | A circle is inside of a figure made by crosses | A circle is outside of a figure made by crosses | | [BP#84](http://www.foundalis.com/res/bps/bongard/p084.htm) | A quadrangle is outside of a figure made by circles | A quadrangle is inside of a figure made by circles | | [BP#85](http://www.foundalis.com/res/bps/bongard/p085.htm) | Three parts | Five parts | | [BP#86](http://www.foundalis.com/res/bps/bongard/p086.htm) | Three parts | Five parts | | [BP#87](http://www.foundalis.com/res/bps/bongard/p087.htm) | Four parts | Five parts | | [BP#88](http://www.foundalis.com/res/bps/bongard/p088.htm) | Three parts | Five parts | | [BP#89](http://www.foundalis.com/res/bps/bongard/p089.htm) | Three parts | Five parts | | [BP#90](http://www.foundalis.com/res/bps/bongard/p090.htm) | Three parts | Four parts | | [BP#91](http://www.foundalis.com/res/bps/bongard/p091.htm) | Three identical elements | Four identical elements | | [BP#92](http://www.foundalis.com/res/bps/bongard/p092.htm) | The chain does not branch | The chain branches | | [BP#93](http://www.foundalis.com/res/bps/bongard/p093.htm) | Branches at outlined circle | Branches at solid dark circle | | [BP#94](http://www.foundalis.com/res/bps/bongard/p094.htm) | Solid dark circle not at end | Solid dark circle at end | | [BP#95](http://www.foundalis.com/res/bps/bongard/p095.htm) | Vertical hatched lines | Horizontal hatched lines | | [BP#96](http://www.foundalis.com/res/bps/bongard/p096.htm) | Triangles | Quadrangles | | [BP#97](http://www.foundalis.com/res/bps/bongard/p097.htm) | Triangles | Circles | | [BP#98](http://www.foundalis.com/res/bps/bongard/p098.htm) | Triangles | Quadrangles | | [BP#99](http://www.foundalis.com/res/bps/bongard/p099.htm) | Outlines made by triangles and circles intersect | Outlines made by triangles and circles do not intersect | | [BP#100](http://www.foundalis.com/res/bps/bongard/p100.htm) | The letter А | The letter Б | | [BP#101](http://www.foundalis.com/res/bps/doughof/p101.htm) | Parallel dents | Perpendicular dents | | [BP#102](http://www.foundalis.com/res/bps/doughof/p102.htm) | Internal arrows point outward | Internal arrows point inward | | [BP#103](http://www.foundalis.com/res/bps/doughof/p103.htm) | Isosceles triangle | Scalene triangle | | [BP#104](http://www.foundalis.com/res/bps/doughof/p104.htm) | One circle passes through the center of the other circle | No circle passes through the center of the other circle | | [BP#105](http://www.foundalis.com/res/bps/doughof/p105.htm) | Ends of line point to the same direction | Ends of line point to opposite directions | | [BP#106](http://www.foundalis.com/res/bps/doughof/p106.htm) | Negative slope | Positive slope | | [BP#107](http://www.foundalis.com/res/bps/doughof/p107.htm) | Three simple lines | Three complex lines | | [BP#108](http://www.foundalis.com/res/bps/doughof/p108.htm) | Petals taper off | Petals thicken | | [BP#109](http://www.foundalis.com/res/bps/doughof/p109.htm) | Circle on the right of the box | Circle on the left of the box | | [BP#110](http://www.foundalis.com/res/bps/doughof/p110.htm) | Four out of five objects are circles | Never four out of five objects are circles | | [BP#111](http://www.foundalis.com/res/bps/doughof/p111.htm) | Middle shape is a triangle | Middle shape is not a triangle | | [BP#112](http://www.foundalis.com/res/bps/doughof/p112.htm) | X-coordinates of dots are equidistant | Y-coordinates of dots are equidistant | | [BP#113](http://www.foundalis.com/res/bps/doughof/p113.htm) | T-like junction | Y-like junction | | [BP#114](http://www.foundalis.com/res/bps/doughof/p114.htm) | Four X-like points | Two X-like points | | [BP#115](http://www.foundalis.com/res/bps/doughof/p115.htm) | Innermost shape is reachable from the outermost one | Innermost shape is unreachable from the outermost one | | [BP#116](http://www.foundalis.com/res/bps/doughof/p116.htm) | Polygon stands on side | Polygon stands on vertex | | [BP#117](http://www.foundalis.com/res/bps/doughof/p117.htm) | Triangle points to center of circle | Triangle does not point to center of circle | | [BP#118](http://www.foundalis.com/res/bps/doughof/p118.htm) | No cycle | A cycle exists | | [BP#119](http://www.foundalis.com/res/bps/doughof/p119.htm) | A small correction will result into a circle | No small correction will result into a circle | | [BP#120](http://www.foundalis.com/res/bps/doughof/p120.htm) | All turns are in one direction alternatively: Rectangular loop exists | Turns are not all in one direction alternatively: No rectangular loop | | [BP#121](http://www.foundalis.com/res/bps/doughof/p121.htm) | Circle: VV; square: VΛ; triangle: ΛΛ; blank: ΛV | Circle: ΛΛ; square: ΛV; triangle: VV; blank: VΛ | | [BP#122](http://www.foundalis.com/res/bps/doughof/p122.htm) | Line divides interior into two regions | Not so | | [BP#123](http://www.foundalis.com/res/bps/doughof/p123.htm) | Similar shapes | Dissimilar shapes | | [BP#124](http://www.foundalis.com/res/bps/doughof/p124.htm) | Similar textures | Dissimilar textures | | [BP#125](http://www.foundalis.com/res/bps/doughof/p125.htm) | One protrusion and one indentation of the same shape | Not so | | [BP#126](http://www.foundalis.com/res/bps/doughof/p126.htm) | One large and one small object | Not so | | [BP#127](http://www.foundalis.com/res/bps/doughof/p127.htm) | Exactly one circle | Not exactly one circle | | [BP#128](http://www.foundalis.com/res/bps/doughof/p128.htm) | Same objects inside and outside the large shape | Not same objects inside and outside the large shape | | [BP#129](http://www.foundalis.com/res/bps/doughof/p129.htm) | Indentation on protrusion | Indentation on indentation | | [BP#130](http://www.foundalis.com/res/bps/doughof/p130.htm) | Closed region is made of curves if “flaws” are ignored | Closed region is a polygon if “flaws” are ignored | | [BP#131](http://www.foundalis.com/res/bps/doughof/p131.htm) | Dots are vertices of a parallelogram | Dots are not vertices of a parallelogram | | [BP#132](http://www.foundalis.com/res/bps/doughof/p132.htm) | Dots are vertices of a triangle standing on a side | Dots are vertices of a triangle standing on a vertex | | [BP#133](http://www.foundalis.com/res/bps/doughof/p133.htm) | Dots collinear with center of circle | Dots not collinear with center of circle | | [BP#134](http://www.foundalis.com/res/bps/doughof/p134.htm) | Circle centers are collinear | Circle centers are not collinear | | [BP#135](http://www.foundalis.com/res/bps/doughof/p135.htm) | Circles on same side of curve | Circles on different sides of curves | | [BP#136](http://www.foundalis.com/res/bps/doughof/p136.htm) | Concave shape | Convex shape | | [BP#137](http://www.foundalis.com/res/bps/doughof/p137.htm) | Dots equal in number to the sides of the closed region | Dots unequal in number to the sides of the closed region | | [BP#138](http://www.foundalis.com/res/bps/doughof/p138.htm) | No dot well within the convex hull | At least one dot well within the convex hull | | [BP#139](http://www.foundalis.com/res/bps/doughof/p139.htm) | Similar components that change regularly | Not so | | [BP#140](http://www.foundalis.com/res/bps/doughof/p140.htm) | One large shape and two smaller identical ones | Not so | | [BP#141](http://www.foundalis.com/res/bps/doughof/p141.htm) | Two clusters of three and two objects each | One cluster of three objects and two different objects | | [BP#142](http://www.foundalis.com/res/bps/doughof/p142.htm) | Two clusters of three and two that are adjacent | Two clusters of three and two that are not adjacent | | [BP#143](http://www.foundalis.com/res/bps/doughof/p143.htm) | Two clusters of three and two | Two clusters of four and one | | [BP#144](http://www.foundalis.com/res/bps/doughof/p144.htm) | Two clusters of three and two but sharing a property alternatively: Different features yield different 3-2 splits | Two clusters of three and two, separable alternatively: Different features yield the same 3-2 split | | [BP#145](http://www.foundalis.com/res/bps/doughof/p145.htm) | Two clusters of four and one, the four are of same kind alternatively: Different features yield same 4-1 split | Two clusters of four and one, the four are three and one alternatively: Different features yield different 4-1 splits | | [BP#146](http://www.foundalis.com/res/bps/doughof/p146.htm) | A shape contains a square if and only if it is a circle | A shape contains a square if and only if it is a triangle | | [BP#147](http://www.foundalis.com/res/bps/doughof/p147.htm) | Two clusters of three and two, the two are vertical | Two clusters of three and two, the two are horizontal | | [BP#148](http://www.foundalis.com/res/bps/doughof/p148.htm) | A little less than a regular shape | A little more than a regular shape | | [BP#149](http://www.foundalis.com/res/bps/doughof/p149.htm) | Lone square | Lone circle | | [BP#150](http://www.foundalis.com/res/bps/doughof/p150.htm) | Odd number of squares | Even number of squares | | [BP#151](http://www.foundalis.com/res/bps/doughof/p151.htm) | If the circle closest to the cross is removed, the rest form an equilateral triangle | Not so | | [BP#152](http://www.foundalis.com/res/bps/doughof/p152.htm) | No vertical axis of symmetry | Vertical axis of symmetry | | [BP#153](http://www.foundalis.com/res/bps/doughof/p153.htm) | Predominance of curves and hook-like endings | Predominance of straight lines and staple-like endings | | [BP#154](http://www.foundalis.com/res/bps/doughof/p154.htm) | Wedged endings | Rounded endings | | [BP#155](http://www.foundalis.com/res/bps/doughof/p155.htm) | Curves are longer than straight lines | Curves are shorter than straight lines | | [BP#156](http://www.foundalis.com/res/bps/doughof/p156.htm) | Three spatially separated clusters | Two spatially separated clusters | | [BP#157](http://www.foundalis.com/res/bps/foundal/p157.htm) | White background | Black background | | [BP#158](http://www.foundalis.com/res/bps/foundal/p158.htm) | Some slope | Another slope | | [BP#159](http://www.foundalis.com/res/bps/foundal/p159.htm) | Two clusters of 2+3, middle shape must be seen as rectangle | Two clusters of 2+3, middle shape must be seen as piece of straight line | | [BP#160](http://www.foundalis.com/res/bps/foundal/p160.htm) | Quadrilateral that is nearly a triangle | Typical quadrilateral | | [BP#161](http://www.foundalis.com/res/bps/foundal/p161.htm) | Midpoints are collinear | Midpoints are not collinear | | [BP#162](http://www.foundalis.com/res/bps/foundal/p162.htm) | Every other side, if extended, passes through one point | Not so | | [BP#163](http://www.foundalis.com/res/bps/foundal/p163.htm) | Line connecting small shapes does not intersect large one | Line connecting small shapes intersects large one | | [BP#164](http://www.foundalis.com/res/bps/foundal/p164.htm) | Number of objects is one less than sides | Number of objects is one more than sides | | [BP#165](http://www.foundalis.com/res/bps/foundal/p165.htm) | Line perpendicular to one side of the object | Line parallel to one side of the object | | [BP#166](http://www.foundalis.com/res/bps/foundal/p166.htm) | Two clusters of dots | Three clusters of dots | | [BP#167](http://www.foundalis.com/res/bps/foundal/p167.htm) | Every cluster has two clusters of dots | Every cluster has three clusters of dots | | [BP#168](http://www.foundalis.com/res/bps/foundal/p168.htm) | Bulky interior, if closed | Narrow interior, if closed | | [BP#169](http://www.foundalis.com/res/bps/foundal/p169.htm) | Two clusters of different numbers of elements | Two clusters of an equal number of elements | | [BP#170](http://www.foundalis.com/res/bps/foundal/p170.htm) | Π-like shape | X-like shape | | [BP#171](http://www.foundalis.com/res/bps/foundal/p171.htm) | Angle bisectors meet at the incenter | Perpendicular bisectors meet at the orthocenter | | [BP#172](http://www.foundalis.com/res/bps/foundal/p172.htm) | Radially symmetric | Not radially symmetric | | [BP#173](http://www.foundalis.com/res/bps/foundal/p173.htm) | Small variance of slopes | Large variance of slopes | | [BP#174](http://www.foundalis.com/res/bps/foundal/p174.htm) | Convex central interior | Concave central interior | | [BP#175](http://www.foundalis.com/res/bps/foundal/p175.htm) | Small object can glide in the bay | Small object cannot glide in the bay | | [BP#176](http://www.foundalis.com/res/bps/foundal/p176.htm) | Line that connects dots avoiding obstacles is short | Line that connects dots avoiding obstacles is long | | [BP#177](http://www.foundalis.com/res/bps/foundal/p177.htm) | All interiors are convex | At least one concave interior | | [BP#178](http://www.foundalis.com/res/bps/foundal/p178.htm) | Center of circle in triangle perpendicular to the other two | Not so | | [BP#179](http://www.foundalis.com/res/bps/foundal/p179.htm) | Object thinner at top | Object thicker at top | | [BP#180](http://www.foundalis.com/res/bps/foundal/p180.htm) | Black region narrows at the boundary or black/white | Black region widens at the boundary or black/white | | [BP#181](http://www.foundalis.com/res/bps/foundal/p181.htm) | One concavity | Two concavities | | [BP#182](http://www.foundalis.com/res/bps/foundal/p182.htm) | Concave if proximal points are connected | Convex if proximal points are connected | | [BP#183](http://www.foundalis.com/res/bps/foundal/p183.htm) | Same curvature close to the middle alternative expression of the same idea: Tangent near the middle leaves curve on the same side | Change of curvature close to the middle alternative expression of the same idea: Tangent near the middle leaves curve on opposite sides | | [BP#184](http://www.foundalis.com/res/bps/foundal/p184.htm) | Curve is smooth close to the middle | Curve zigzags close to the middle | | [BP#185](http://www.foundalis.com/res/bps/foundal/p185.htm) | Curve with two complex parts | Curve with three complex parts | | [BP#186](http://www.foundalis.com/res/bps/foundal/p186.htm) | Object made of objects | Object made of objects made of objects | | [BP#187](http://www.foundalis.com/res/bps/foundal/p187.htm) | Sides of parts are one more than sides of whole | Sides of parts are one less than sides of whole | | [BP#188](http://www.foundalis.com/res/bps/foundal/p188.htm) | Shape of whole different from shape of parts | Shape of whole same as shape of parts | | [BP#189](http://www.foundalis.com/res/bps/foundal/p189.htm) | All clusters are made of objects of the same texture | Not all clusters are made of objects of the same texture | | [BP#190](http://www.foundalis.com/res/bps/foundal/p190.htm) | All connected objects have the same texture | Some connected objects have different textures | | [BP#191](http://www.foundalis.com/res/bps/foundal/p191.htm) | Orifice on the left | Orifice on the right | | [BP#192](http://www.foundalis.com/res/bps/foundal/p192.htm) | Elongated vertically | Elongated horizontally | | [BP#193](http://www.foundalis.com/res/bps/foundal/p193.htm) | “Ghost” triangle | “Ghost” rectangle | | [BP#194](http://www.foundalis.com/res/bps/foundal/p194.htm) | Background is a parallelogram | Background is a triangle | | [BP#195](http://www.foundalis.com/res/bps/foundal/p195.htm) | Bottom object in front of top objects in 3-D | Bottom object behind top objects in 3-D | | [BP#196](http://www.foundalis.com/res/bps/foundal/p196.htm) | Light-colored texture | Dark-colored texture | | [BP#197](http://www.foundalis.com/res/bps/foundal/p197.htm) | Some style (font) | Another style (font) | | [BP#198](http://www.foundalis.com/res/bps/foundal/p198.htm) | Stays in alternative lower-level expression of the same idea: One end of the chain is inside the large shape | Escapes alternative lower-level expression of the same idea: Both ends of the chain are outside the large shape | | [BP#199](http://www.foundalis.com/res/bps/foundal/p199.htm) | Stays put alternative lower-level expression of the same idea: Vertical from barycenter intersects the base of the object | Tumbles alternative lower-level expression of the same idea: Vertical from barycenter avoids the base of the object | | [BP#200](http://www.foundalis.com/res/bps/foundal/p200.htm) | Bongard Problem with solution based on features | Bongard Problem with solution based on numerosity | | [BP#201](http://www.foundalis.com/res/bps/insana/p201.htm) | Two of the shapes make tiles along their border lines | Not so | | [BP#202](http://www.foundalis.com/res/bps/insana/p202.htm) | Even number | Odd number | | [BP#203](http://www.foundalis.com/res/bps/insana/p203.htm) | Prime number | Composite number | | [BP#204](http://www.foundalis.com/res/bps/insana/p204.htm) | Five | Four | | [BP#205](http://www.foundalis.com/res/bps/insana/p205.htm) | Two clusters of two elements each | Not so | | [BP#206](http://www.foundalis.com/res/bps/insana/p206.htm) | Curve ends in a roughly up or down direction | Curve ends in a roughly left or right direction | | [BP#207](http://www.foundalis.com/res/bps/insana/p207.htm) | Curve ends on the left part of the box | Curve ends on the right part of the box | | [BP#208](http://www.foundalis.com/res/bps/insana/p208.htm) | All curves spiral counterclockwise, starting from maximum curvature | All curves spiral clockwise, starting from maximum curvature | | [BP#209](http://www.foundalis.com/res/bps/insana/p209.htm) | No objects are centered at the center of the box | One object is centered at the center of the box | | [BP#210](http://www.foundalis.com/res/bps/insana/p210.htm) | Part of at least one object is out of box | All objects are within the box | | [BP#211](http://www.foundalis.com/res/bps/insana/p211.htm) | More black than white | More white than black | | [BP#212](http://www.foundalis.com/res/bps/insana/p212.htm) | No dot is too far apart from another dot | At least one dot is far apart from all other dots | | [BP#213](http://www.foundalis.com/res/bps/insana/p213.htm) | Curve intersects itself at the point of greatest curvature | Not so | | [BP#214](http://www.foundalis.com/res/bps/insana/p214.htm) | “Smiley face” | Not a "smiley face” | | [BP#215](http://www.foundalis.com/res/bps/insana/p215.htm) | “Mouth” concave upwards | “Mouth” convex upwards | | [BP#216](http://www.foundalis.com/res/bps/insana/p216.htm) | “Ink tip” (non-homogeneous line) | “Marker tip” (homogeneous line) | | [BP#217](http://www.foundalis.com/res/bps/insana/p217.htm) | Perfectly drawn lines | Imperfectly drawn lines | | [BP#218](http://www.foundalis.com/res/bps/insana/p218.htm) | Something is missing in the sequence | Nothing is missing in the sequence | | [BP#219](http://www.foundalis.com/res/bps/insana/p219.htm) | Parallel curves | Non-parallel curves | | [BP#220](http://www.foundalis.com/res/bps/insana/p220.htm) | One cluster | Two clusters | | [BP#221](http://www.foundalis.com/res/bps/insana/p221.htm) | No small square at the end of any curve alternatively: Curves with a 3-D feeling | Curve ends at a small square alternatively: Flat (2-D) curves | | [BP#222](http://www.foundalis.com/res/bps/insana/p222.htm) | Border of black rectangle is incomplete | Border of black rectangle is complete | | [BP#223](http://www.foundalis.com/res/bps/insana/p223.htm) | Large black region if completed is a circle | Large black region if completed is an ellipse | | [BP#224](http://www.foundalis.com/res/bps/insana/p224.htm) | Diametrically opposite objects affect similarly the large black circular region | Not so | | [BP#225](http://www.foundalis.com/res/bps/insana/p225.htm) | Low contrast alternative lower-level expression of the same idea: No fully black region | High contrast alternative lower-level expression of the same idea: At least one fully black region | | [BP#226](http://www.foundalis.com/res/bps/insana/p226.htm) | What comes out of black circle has a clockwise direction | Not so | | [BP#227](http://www.foundalis.com/res/bps/insana/p227.htm) | Dots touch each other if and only if no large region touches the edges of the box | Dots don’t touch each other if and only if no large region touches the edges of the box | | [BP#228](http://www.foundalis.com/res/bps/insana/p228.htm) | After rotating so that the longest line is horizontal, there is a “left arm” raised and a “weight” down | After rotating so that the longest line is horizontal, there is a “left arm” down and a “weight” raised | | [BP#229](http://www.foundalis.com/res/bps/insana/p229.htm) | When the objects are rotated and their dots are overlapped and eliminated, they form three-square-tall structures with columns of the same color | Not so | | **Explanation / justification of BP#229 by its creator:**  Long (doubly sized) objects are purines (A & G). Short objects are pyrimidines (C & T). Black are those forming triple Hbond (G and C). White are those forming double Hbond (A & T).  On the left we have “matching codes”, i.e., bases, doublets or triplets that, when rotated, can pair correctly (A with T, G with C), binding the two “strands”.  On the right we have objects that no matter how they are rotated they do not pair correctly (because of bumps, wrong color codes, etc). | | | [BP#230](http://www.foundalis.com/res/bps/insana/p230.htm) | The sum of vertices, line ends, and dots is 7 | Not so | | [BP#231](http://www.foundalis.com/res/bps/insana/p231.htm) | Five concavities | Not five concavities | | [BP#232](http://www.foundalis.com/res/bps/insana/p232.htm) | Box divided into six areas | Box divided into four areas | | [BP#233](http://www.foundalis.com/res/bps/shanahan/p233.htm) | Lines plus triangles equal stars | Lines minus triangles equal stars | | [BP#234](http://www.foundalis.com/res/bps/shanahan/p234.htm) | Circle falls by gravity on the right half of box if let loose | Circle falls by gravity on the left half of box if let loose | | [BP#235](http://www.foundalis.com/res/bps/shanahan/p235.htm) | The “rope”, if extended, reaches the other ball | The “rope”, if extended, does not reach the other ball | | [BP#236](http://www.foundalis.com/res/bps/shanahan/p236.htm) | Texture with stripy squiggle | Texture with blotchy squiggle | | [BP#237](http://www.foundalis.com/res/bps/shanahan/p237.htm) | Upper central line *appears* shorter than lower central line | Upper central line *appears* longer than lower central line | | [BP#238](http://www.foundalis.com/res/bps/foundal/p238.htm) | C-like curves point to the same direction | C-like curves point to opposite directions | | [BP#239](http://www.foundalis.com/res/bps/foundal/p239.htm) | Straight line parallel to line joining the ends of curve alternatively: Sliding the straight line suitably can make a closed area | Straight line perpendicular to line joining the ends of curve alternatively: Not so | | [BP#240](http://www.foundalis.com/res/bps/howells/p240.htm) | Straight line joining the curve ends does not cut the curve | Straight line joining the curve ends intersects the curve | | [BP#241](http://www.foundalis.com/res/bps/howells/p241.htm) | Circumference shorter than length of everything else | Circumference longer than length of everything else | | [BP#242](http://www.foundalis.com/res/bps/howells/p242.htm) | Convex hull is a square | Convex hull is not a square | | [BP#243](http://www.foundalis.com/res/bps/howells/p243.htm) | Triangle closer to box corner than any of the circles | Not so | | [BP#244](http://www.foundalis.com/res/bps/howells/p244.htm) | Scanning left-to-right, top-to-bottom, each filled box is separated from the next filled box by the same number of empty boxes | Not so | | [BP#245](http://www.foundalis.com/res/bps/rispoli/p245.htm) | Can be completed to be made into a rectangle | Cannot be completed to be made into a rectangle | | [BP#246](http://www.foundalis.com/res/bps/rispoli/p246.htm) | Equal numbers of straight lines and continuous curves | Unequal numbers of straight lines and continuous curves | | [BP#247](http://www.foundalis.com/res/bps/gunnarsson/p247.htm) | Five straight or curved lines | Not five straight or curved lines | | [BP#248](http://www.foundalis.com/res/bps/gunnarsson/p248.htm) | Dashed lines inside solid shape make an identical but slightly smaller shape, “parallel” to the one outside | Not so | | [BP#249](http://www.foundalis.com/res/bps/gunnarsson/p249.htm) | Dashed lines form the same shape centered inside | Not so | | [BP#250](http://www.foundalis.com/res/bps/gunnarsson/p250.htm) | Tetrahedron projected on the box plane alternative lower-level expression of the same idea: Four points interconnected with straight lines where one of the points might lie on an edge | Not so | | [BP#251](http://www.foundalis.com/res/bps/gunnarsson/p251.htm) | Tetrahedron projected on the box plane | Not so | | [BP#252](http://www.foundalis.com/res/bps/gunnarsson/p252.htm) | Impossible solid in 3-D | Possible solid in 3-D | | [BP#253](http://www.foundalis.com/res/bps/gunnarsson/p253.htm) | Prime number solution without using the arithmetic concept of primality: It is impossible to create subgroups all of which have the same number of two-or-more identically shaped objects | Composite number solution without using the arithmetic concept of primality: It is possible to create subgroups all of which have the same number of two-or-more identically shaped objects | | [BP#254](http://www.foundalis.com/res/bps/gunnarsson/p254.htm) | Circle and two vertices are collinear | No two vertices and the circle are collinear | | [BP#255](http://www.foundalis.com/res/bps/gunnarsson/p255.htm) | Three pairs of parallel and non-collinear pieces of straight lines, each pair with a different slope | Not so | | [BP#256](http://www.foundalis.com/res/bps/gunnarsson/p256.htm) | Each large circle closer to a small circle than a large one, and each small circle closer to a large one than a small one | Not so | | [BP#257](http://www.foundalis.com/res/bps/gunnarsson/p257.htm) | The distance from the center of the line to the bottom of the square is the same as the distance from the dot to the right edge of the square | Not so | | [BP#258](http://www.foundalis.com/res/bps/gunnarsson/p258.htm) | Objects identical after mirroring horizontally | Objects identical after mirroring vertically | | [BP#259](http://www.foundalis.com/res/bps/gunnarsson/p259.htm) | Two identical overlapping objects of which the top is rotated slightly clockwise | Not so | | [BP#260](http://www.foundalis.com/res/bps/rispoli/p260.htm) | Squares are either all empty or all contain something | Not so | | [BP#261](http://www.foundalis.com/res/bps/ihde/p261.htm) | Straight lines that join filled and outlined circles intersect | Straight lines that join filled and outlined circles do not intersect | | [BP#262](http://www.foundalis.com/res/bps/barenbaum/p262.htm) | Exactly one point where lines bend at an angle | Not exactly one point where lines bend at an angle | | [BP#263](http://www.foundalis.com/res/bps/barenbaum/p263.htm) | At least one ending edge is straight | All ending edges are curved | | [BP#264](http://www.foundalis.com/res/bps/merse/p264.htm) | Closed area | No closed area | | [BP#265](http://www.foundalis.com/res/bps/merse/p265.htm) | Axis of symmetry | No axis of symmetry | | [BP#266](http://www.foundalis.com/res/bps/merse/p266.htm) | At least one touch or cross point | No touch or cross point | | [BP#267](http://www.foundalis.com/res/bps/merse/p267.htm) | Odd number of straight line segments | Even number of straight line segments | | [BP#268](http://www.foundalis.com/res/bps/merse/p268.htm) | Convex hull elongated vertically | Convex hull elongated horizontally | | [BP#269](http://www.foundalis.com/res/bps/merse/p269.htm) | Center of symmetry | No center of symmetry | | [BP#270](http://www.foundalis.com/res/bps/merse/p270.htm) | Only vertical or horizontal lines | Neither vertical nor horizontal lines | | [BP#271](http://www.foundalis.com/res/bps/merse/p271.htm) | Can be hand-written without raising the pen | Cannot be hand-written without raising the pen | | [BP#272](http://www.foundalis.com/res/bps/merse/p272.htm) | Convex hull is a triangle | Convex hull is a quadrilateral | | [BP#273](http://www.foundalis.com/res/bps/merse/p273.htm) | Stays put | Tumbles | | [BP#274](http://www.foundalis.com/res/bps/merse/p274.htm) | Notch from above (holds poured water) | No notch from above (does not hold poured water) | | [BP#275](http://www.foundalis.com/res/bps/merse/p275.htm) | Straight line joining the ends does not intersect the object | Straight line joining the ends intersects the object | | [BP#276](http://www.foundalis.com/res/bps/merse/p276.htm) | At least one endpoint | No endpoints | | [BP#277](http://www.foundalis.com/res/bps/merse/p277.htm) | One object | Two or more objects | | [BP#278](http://www.foundalis.com/res/bps/merse/p278.htm) | Shorter on the left, taller on the right | Taller on the left, shorter on the right | | [BP#279](http://www.foundalis.com/res/bps/merse/p279.htm) | The left part has more pixels than the right part | The left part has fewer pixels than the right part | | [BP#280](http://www.foundalis.com/res/bps/merse/p280.htm) | The left part is wider than the right part | The left part is narrower than the right part | | [BP#281](http://www.foundalis.com/res/bps/joon/p281.htm) | Equal number of horizontal and vertical lines | Unequal number of horizontal and vertical lines | | [BP#282](http://www.foundalis.com/res/bps/joon/p282.htm) | Shape of black region same as overall shape of object | Shape of black region different from overall shape of object | | [BP#283](http://www.foundalis.com/res/bps/joon/p283.htm) | Rectangle left after tiling all black shapes into empty square | Triangle left after tiling all black shapes into empty square | | [BP#284](http://www.foundalis.com/res/bps/lewis/p284.htm) | Half of the square is filled | Either more or less than half of the square is filled | | [BP#285](http://www.foundalis.com/res/bps/lewis/p285.htm) | The centers (“barycenters”) of the objects are collinear | The centers (“barycenters”) of the objects are not collinear | | [BP#286](http://www.foundalis.com/res/bps/lewis/p286.htm) | Decreasing in size from top to bottom | Increasing in size from top to bottom | | [BP#287](http://www.foundalis.com/res/bps/lewis/p287.htm) | “Rays” emanating from a central point alternative lower-level expression of the same idea: Altitudes of isosceles triangles meet at a point if extended from top to base | Not so | | [BP#288](http://www.foundalis.com/res/bps/lewis/p288.htm) | The sum of the ratios of the filled areas is 1 | The sum of the ratios of the filled areas is other than 1 | | [BP#289](http://www.foundalis.com/res/bps/lewis/p289.htm) | Shapes, if tiled up properly, form a square | Shapes cannot form a square no matter how they are tiled | | [BP#290](http://www.foundalis.com/res/bps/lewis/p290.htm) | If any non-nosed faces exist, they are happy if and only if happy nosed faces exist as well | Not so | | [BP#291](http://www.foundalis.com/res/bps/lewis/p291.htm) | The shapes in the large square never appear outside of it | At least one shape in the large square appears outside of it | | [BP#292](http://www.foundalis.com/res/bps/lewis/p292.htm) | Angle made by shapes with vertex at square is not acute | Angle made by shapes with vertex at square is acute | | [BP#293](http://www.foundalis.com/res/bps/lewis/p293.htm) | Square divided into four areas of the same size and shape | Not so | | [BP#294](http://www.foundalis.com/res/bps/lewis/p294.htm) | The two points are reachable through a path | The two points are unreachable by any path | | [BP#295](http://www.foundalis.com/res/bps/lewis/p295.htm) | Line joins large and small square | Line joins the two middle-sized squares | | [BP#296](http://www.foundalis.com/res/bps/lewis/p296.htm) | All three sizes are present | Only two of the three sizes present | | [BP#297](http://www.foundalis.com/res/bps/lewis/p297.htm) | “Ghost shape” is square | “Ghost shape” is rectangular | | [BP#298](http://www.foundalis.com/res/bps/lewis/p298.htm) | One of the two small squares is near the lower-right corner | One of the two small squares is near the upper-right corner | | [BP#299](http://www.foundalis.com/res/bps/lewis/p299.htm) | Lines if slightly extended make up a regular polygon | Lines if slightly extended cannot make up a regular polygon | | [BP#300](http://www.foundalis.com/res/bps/foundal/p300.htm) | Acceleration and deceleration | Constant speed | | [BP#301](http://www.foundalis.com/res/bps/lewis/p301.htm) | Large and medium-sized square, the latter can be hidden | Large and small-sized square, the latter can be hidden | | [BP#302](http://www.foundalis.com/res/bps/lewis/p302.htm) | Collinear objects, of which the 3rd is moved elsewhere | Collinear objects, of which the 2nd/4th is moved elsewhere | | [BP#303](http://www.foundalis.com/res/bps/lewis/p303.htm) | Three objects are identical, the fourth differs | Not so | | [BP#304](http://www.foundalis.com/res/bps/lewis/p304.htm) | At least one (interior or exterior) right angle | No right angle (either interior or exterior) | | [BP#305](http://www.foundalis.com/res/bps/lewis/p305.htm) | Shapes identical after rotation | Shapes identical after rotation and mirroring | | [BP#306](http://www.foundalis.com/res/bps/lewis/p306.htm) | Ratio of inside to outside identical shapes is constant | Not so | | [BP#307](http://www.foundalis.com/res/bps/lewis/p307.htm) | Barycenter of each cluster of dots near a vertex alternative: Three or more small clusters of dots | Not so | | [BP#308](http://www.foundalis.com/res/bps/lewis/p308.htm) | Three or more small clusters of dots | Not so | | [BP#309](http://www.foundalis.com/res/bps/lewis/p309.htm) | Ball touches curve at a point of local minimum downwards | Ball touches curve at a point of local maximum upwards | | [BP#310](http://www.foundalis.com/res/bps/lewis/p310.htm) | Enclosed square “repelled” by the outside squares, closest to the side of the enclosing square that’s farthest from the common center of the outside squares. | Enclosed square “attracted” by the outside squares, closest to the side of the enclosing square that’s closest to the common center of the outside squares. | | [BP#311](http://www.foundalis.com/res/bps/stepo/p311.htm) | Number of sides – number of pluses = 3 | Number of sides – number of pluses = 4 | | [BP#312](http://www.foundalis.com/res/bps/stepo/p312.htm) | Lines intersect within the box | Lines intersect out of the box | | [BP#313](http://www.foundalis.com/res/bps/stepo/p313.htm) | Closed curves clockwise, open curves counterclockwise | Closed curves counterclockwise, open curves clockwise | | [BP#314](http://www.foundalis.com/res/bps/stepo/p314.htm) | Long distance between the marked locations | Short distance between the marked locations | | [BP#315](http://www.foundalis.com/res/bps/stepo/p315.htm) | One area unreachable by the marked locations | All areas reachable by the marked locations | | [BP#316](http://www.foundalis.com/res/bps/stepo/p316.htm) | At least one path is a cycle | No path is a cycle | | [BP#317](http://www.foundalis.com/res/bps/fairbanks/p317.htm) | Number of enclosed dots proportional to the circle size | Not so | | [BP#318](http://www.foundalis.com/res/bps/fairbanks/p318.htm) | The numbers of dots are in sequence | Not so | | [BP#319](http://www.foundalis.com/res/bps/fairbanks/p319.htm) | The number of dots in one cluster is a multiple of the other | Not so | | [BP#320](http://www.foundalis.com/res/bps/fairbanks/p320.htm) | The numbers of dots in the two clusters are approximately equal | The numbers of dots in the two clusters differ a lot | | [BP#321](http://www.foundalis.com/res/bps/fairbanks/p321.htm) | Small round object unreachable from the border of the box | Small round object reachable from the border of the box | | [BP#322](http://www.foundalis.com/res/bps/fairbanks/p322.htm) | One outer outline | More than one outer outline | | [BP#323](http://www.foundalis.com/res/bps/fairbanks/p323.htm) | Jigsaw puzzle pieces can be assembled into a square | Jigsaw puzzle pieces cannot be assembled into a square | | [BP#324](http://www.foundalis.com/res/bps/fairbanks/p324.htm) | Left shapes can be placed on top of each other to make right shape | Not so | | [BP#325](http://www.foundalis.com/res/bps/fairbanks/p325.htm) | Left shapes can combine by symmetric difference (“xor” logical operator) to make right shape | Left shapes can combine by intersection (“and” logical operator) to make right shape | | [BP#326](http://www.foundalis.com/res/bps/fairbanks/p326.htm) | Straight line tangent to circle | Straight line not tangent to circle | | [BP#327](http://www.foundalis.com/res/bps/fairbanks/p327.htm) | Straight line tangent to curve | Straight line not tangent to curve | | [BP#328](http://www.foundalis.com/res/bps/fairbanks/p328.htm) | All sides are equal | All angles are equal | | [BP#329](http://www.foundalis.com/res/bps/fairbanks/p329.htm) | Regular polygon | Not regular polygon | | [BP#330](http://www.foundalis.com/res/bps/fairbanks/p330.htm) | 1-D (line drawing, locally straight line) | 2-D | | [BP#331](http://www.foundalis.com/res/bps/fairbanks/p331.htm) | 2-D (surface, locally flat) | 3-D | | [BP#332](http://www.foundalis.com/res/bps/fairbanks/p332.htm) | Transparent solid | Opaque solid | | [BP#333](http://www.foundalis.com/res/bps/fairbanks/p333.htm) | Platonic solid (regular polyhedron) | Not a platonic solid | |