Algebra 2 Unit 1 worksheet: Graphing by transforming a parent graph

Name _____ Date _____ Period _____

1. Each rule is a moved copy of one of the parents $y = x^2$, $y = x^3$, $y = \sqrt{x}$ or $y = \dfrac{1}{x}$. For each, give the new anchor (the vertex, the center, the endpoint, or both asymptotes), say which way the graph faces, and give the domain and range in interval notation.

(a) $y = -4(x + 3)^2$

(b) $y = \dfrac{1}{6 - x} + 2$

(c) $y = 4 - \sqrt{2x + 6}$

(d) $y = -(2x - 1)^3 + 4$

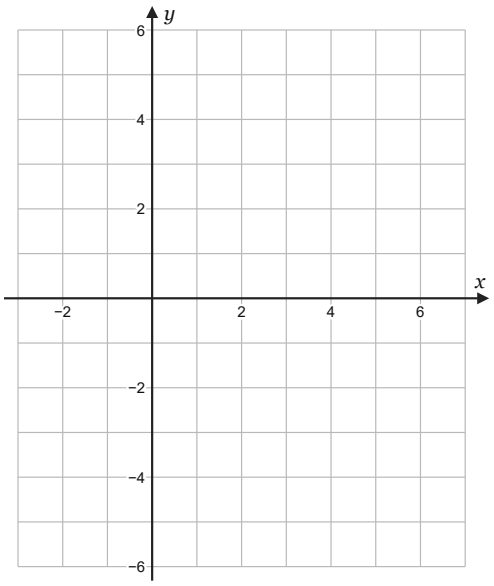
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2. Graph $y = \frac{1}{4}(2 - x)^3 + 1$ by moving $y = x^3$.

(a) Write the rule in the form $y = a\,f\big(b(x - h)\big) + k$ and give a, b, h and k.

(b) Make a table carrying the parent points $(-2, -8)$, $(-1, -1)$, $(0, 0)$, $(1, 1)$ and $(2, 8)$, then sketch the graph through the image points.

(c) Does the graph rise or fall from left to right? Give its center, and find exactly where it crosses the x-axis.



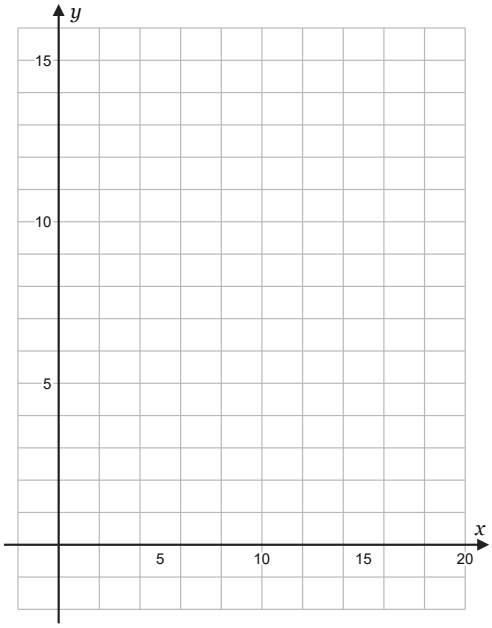
3. Graph $y = 2\sqrt{3x - 12} + 1$ by moving $y = \sqrt{x}$.

(a) Factor the inside and give a, b, h and k.

(b) Explain why the parent points $(1, 1)$ and $(4, 2)$ give image points with fractional x-coordinates here. Then find two parent points, other than $(0, 0)$, whose images have whole-number coordinates.

(c) Carry $(0, 0)$ and your two points, sketch the graph, and give its domain and range.

(d) Does the graph meet either axis? Explain using the domain and range.



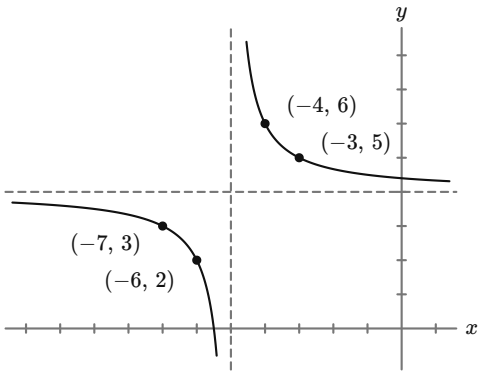
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4. Consider the graphs $y = 2\sqrt{x - h} + k$ for different numbers h and k.

(a) For which h and k does every point of the graph lie in Quadrant I, where $x > 0$ and $y > 0$, with no point on either axis?

(b) Explain why no choice of h and k puts the whole graph in Quadrant IV, where $x > 0$ and $y < 0$.

5. Jasmine was asked to graph $y = \dfrac{2}{x - 5} + 4$ by moving $y = \dfrac{1}{x}$. The figure shows her graph: she drew dashed asymptotes at $x = -5$ and $y = 4$, and carried the parent points $(1, 1)$, $\left(2, \dfrac{1}{2}\right)$, $(-1, -1)$ and $\left(-2, -\dfrac{1}{2}\right)$ to the four marked points.



(a) Test her marked point $(-3, 5)$ in the rule to show that her graph is wrong.

(b) What mistake did she make?

(c) Give the correct asymptotes and the correct images of the four parent points.

(d) Do her graph and the correct graph have the same domain? The same range?

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