Sample Mathematics Problems for the SAT

Thomas E. Price

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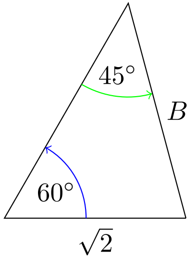
October 16, 2009

Problem: Determine the value of B in the given triangle.



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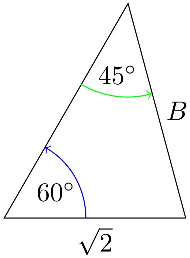

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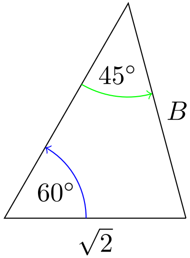
Solution

Use the **Law of Sines** to obtain the equation

$$\frac{B}{\sin 60^\circ} = \frac{\sqrt{2}}{\sin 45^\circ}$$



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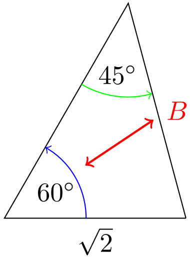

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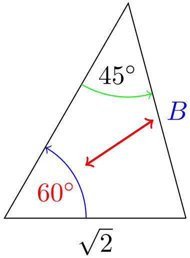

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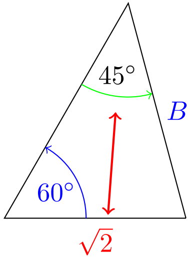

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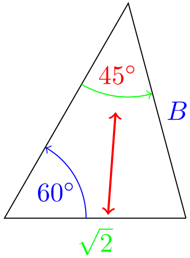

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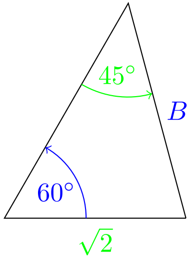

Solution

Use the **Law of Sines** to obtain the equation

$$\frac{B}{\sin 60^\circ} = \frac{\sqrt{2}}{\sin 45^\circ}$$

or, since $\sin 60^\circ = \sqrt{3}/2$ and $\sin 45^\circ = \sqrt{2}/2$,

$$\frac{B}{\sqrt{3}/2} = \frac{\sqrt{2}}{\sqrt{2}/2}.$$

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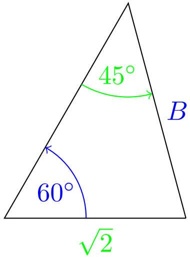

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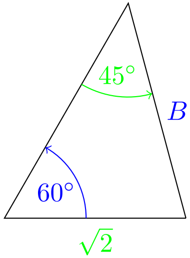

TOOLS FOR INTEGRATING (i)MAGINATION+[TEX]NOLOGY

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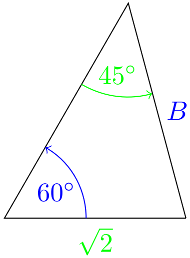
Solve this last equation for B:

$$B = \frac{\left(\sqrt{3}/2\right)\ \sqrt{2}}{\sqrt{2}/2}$$



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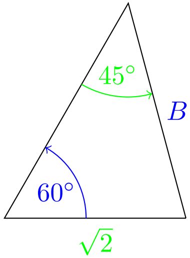

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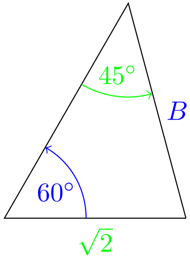

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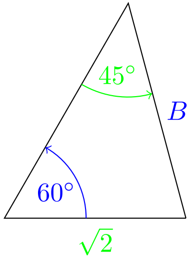

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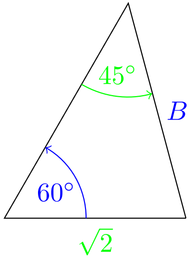

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fi TEX TOOLS FOR INTEGRATING (i)MAGINATION+[TEX]NOLOGY

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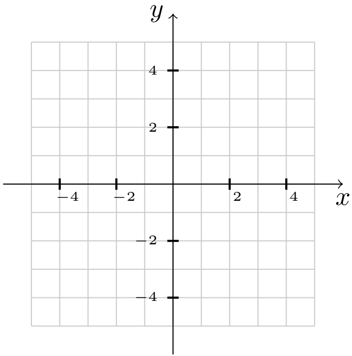

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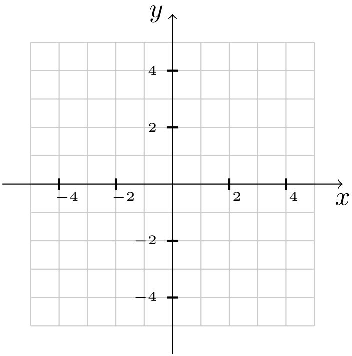
Solution

The graph is a parabola since y it is quadratic in x. Write $y = 3\left(x^2 - 2x\right) - 1$.



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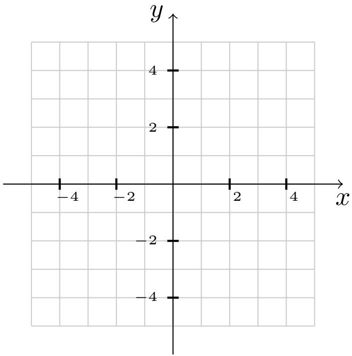

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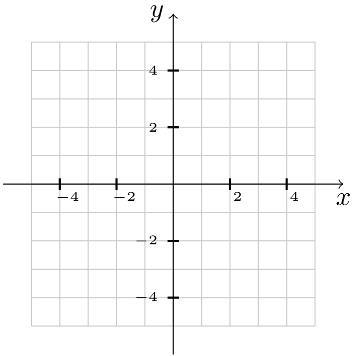

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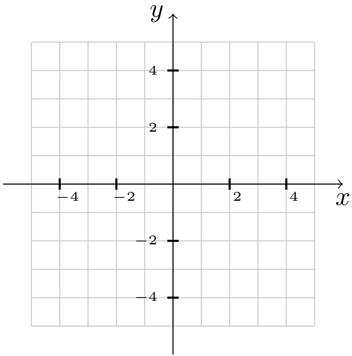

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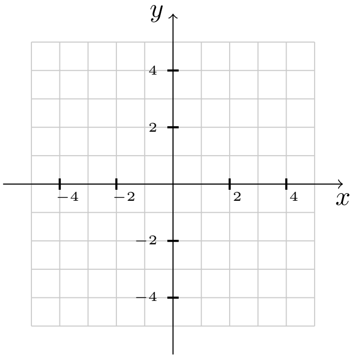
The graph is a parabola since y it is quadratic in x. Write $y = 3\left(x^2 - 2x\right) - 1$. Next, complete the square on $x^2 - 2x$

$$y = 3\left((x-1)^2 - 1\right) - 1$$



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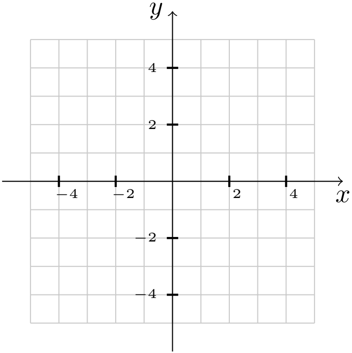
$$y = 3\left(\left(x-1\right)^2 - 1\right) - 1 = 3\left(x-1\right)^2 - 4.$$



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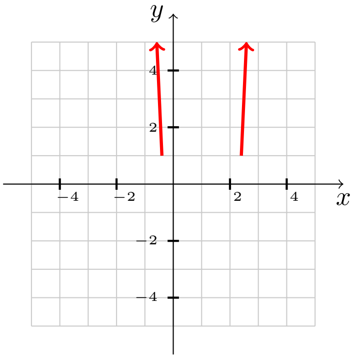
Since the leading coefficient (3) of y is positive, the parabola opens upward.



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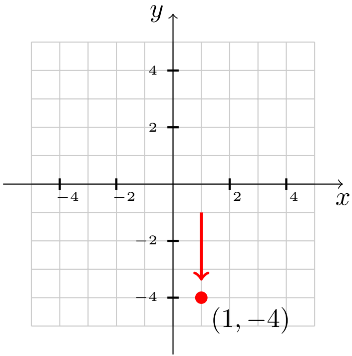

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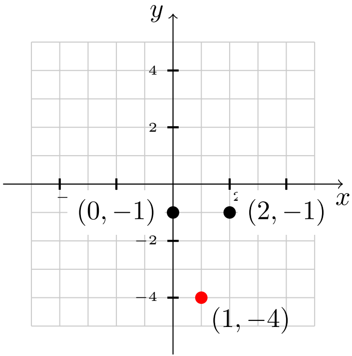

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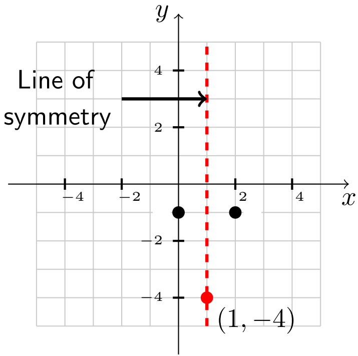

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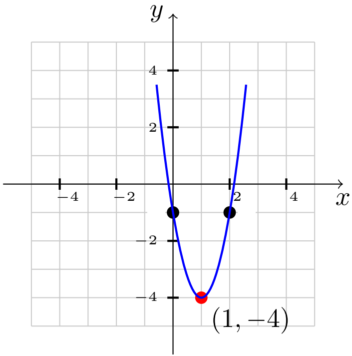

Finally, sketch the graph of the parabola.