

Section 2.3
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Determine all suspicious points and determine all points of discontinuity:

$$f(x) = \frac{3x+5}{2x-1}$$

$f(x)$ is not defined when $2x-1=0$

so $x = \frac{1}{2}$ is a suspicious point.

Also, this is a point of discontinuity.

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We want to show

$\cos x = x^2 - 1$ has a solution for some $x \in (0, \pi)$

This is the same as saying $f(x) = x^2 - 1 - \cos x$ is zero for some $x \in (0, \pi)$

$$f(0) = 0^2 - 1 - \cos 0 = -2 < 0$$

$$f(\pi) = \pi^2 - 1 - \cos \pi = \pi^2 > 0$$

Thus, since $f(x)$ is continuous, we know by the Intermediate Value theorem that $f(x) = 0$ for some $x \in (0, \pi)$

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$$e^{5 \ln 2} = e^{(\ln 2^5)} = 2^5 = 32$$

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If $\log_{\sqrt{b}} 106 = 2$, what is $\sqrt{b-25}$?

$$\log_{\sqrt{b}} 106 = 2$$

$$\Rightarrow (\sqrt{b})^2 = 106$$

$$\Rightarrow b = 106$$

$$\begin{aligned} \Rightarrow \sqrt{b-25} &= \sqrt{106-25} \\ &= \sqrt{81} \\ &= 9 \end{aligned}$$