

take up quiz:

$$1. f(x) = |3x| - 10 \quad g(x) = 2x^3$$

$$\begin{aligned} (g \circ f)(-2) &= g(f(-2)) & f(-2) \\ &= g(-4) &= |3(-2)| - 10 \\ &= 2(-4)^3 &= |-6| - 10 \\ &= -128 &= -4 \end{aligned}$$

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$$2. f(g(-3)) = f(5)$$
$$= 2$$

$$g(f(6)) = g(-3)$$
$$= 5$$

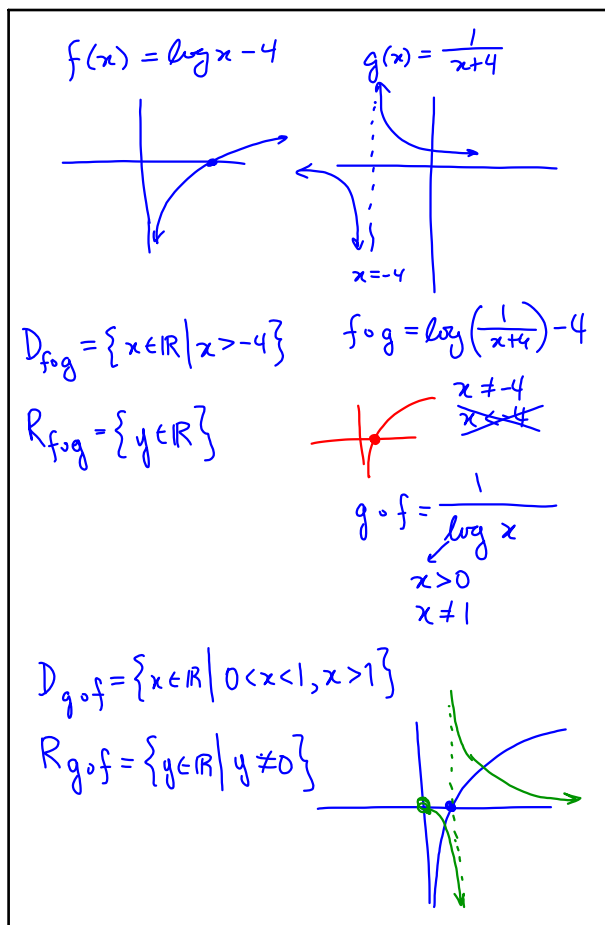
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$$3. f(x) = \log(x) - 4 \quad g(x) = \frac{1}{x+4}$$

$$\begin{aligned} (a) f \circ g &= f(g(x)) \\ &= \log(g(x)) - 4 \\ &= \log\left(\frac{1}{x+4}\right) - 4 \end{aligned}$$

$$\begin{aligned} g \circ f &= g(f(x)) \\ &= g(\log(x) - 4) \\ &= \frac{1}{(\log(x) - 4) + 4} \\ &= \frac{1}{\log(x)} \end{aligned}$$

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Solving Equations & Inequalities

Jan 13/2015

Many equations in the form

$$f(x) = g(x)$$

cannot be solved algebraically for an exact solution. In such cases, we may:

(1) solve by guess & check. For each guess, substitute into each side of the equation. Refine the guess and repeat until an acceptable precision is achieved.

(2) graph each function and determine the points of intersection. The x-coordinates are the solutions. If graphing with technology, finding points of intersection is often a feature.

(3) rearrange the equation to: $f(x) - g(x) = 0$
Determine the x-intercepts, which will be the solutions.

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For inequalities, first determine solutions for the equation.

(1) For numerical answers, create an interval table and test the inequality for each interval.

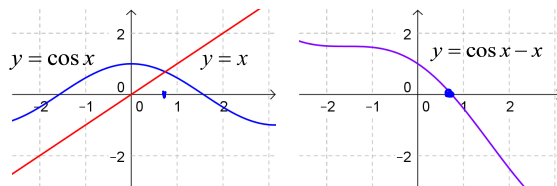
(2) For graphs, determine intervals which satisfy the inequality through visual inspection.

In general, express your answer using interval notation.

For example, $x \in (-\infty, 2] \cup (5, \infty)$

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Ex.1 Solve $\cos x = x$ to within 0.01 using the provided graph(s) and by refining your answer.



try $x = 0.7$: $LS = \cos 0.7$ $RS = 0.7$
 ≈ 0.765
 $LS - RS = 0.065$

try $x = 0.75$: $LS = 0.732$ $RS = 0.75$
 $LS - RS = 0.018$

try $x = 0.73$: $LS \approx 0.745$ $RS = 0.73$
 $LS - RS = 0.015$

$x = 0.74$: $LS \approx 0.738$ $RS = 0.74$
 $LS - RS = 0.002$

\therefore Solution is $x \approx 0.74$

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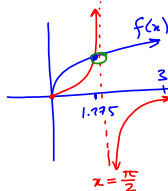
Assigned Work:

p.560 # 1, 3, 4, 5, 6, 9, 10

3. $x \approx -1.275$, $x \approx 1.844$

4. POI: $x = 1.25$

$f(x) = 3\sqrt[3]{x}$
 $g(x) = \tan x$



$f(1.25) \approx 3.23$

$g(1.25) \approx 3.01$

$f(1.275) \approx 3.25$

$f(1.3) \approx 3.27$

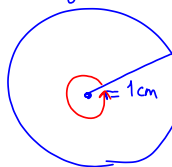
$g(1.275) \approx 3.28$

$g(1.3) \approx 3.60$

$f(x) < g(x) : x \in (1.275, \frac{\pi}{2})$

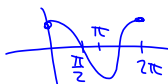
$f(x) = g(x) : x \approx 1.275, x = 0$

$f(x) > g(x) : x \in (0, 1.275) \cup (\frac{\pi}{2}, 3]$



$C = 2\pi(1) = 2\pi \text{ cm}$
 $\theta = \frac{C}{r} = \frac{2\pi \text{ cm}}{1 \text{ cm}} = 2\pi$

$\tan \theta = \frac{\sin \theta}{\cos \theta}$



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$$5(f) \quad \sin(2\pi x) = -4x^2 + 16x - 12$$

$$f(x) = \sin(2\pi x)$$

$$0 \leq x \leq 5$$

$$g(x) = -4x^2 + 16x - 12$$

$$f(2.5) = 0$$

$$g(2.5) = 3$$

$$f(2) = 0$$

$$g(2) = 4$$

$$f(3) = 0$$

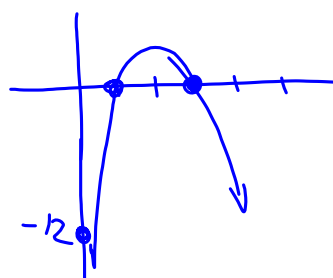
$$g(3) = 0$$

$$f(1) = 0$$

$$g(1) = 0$$

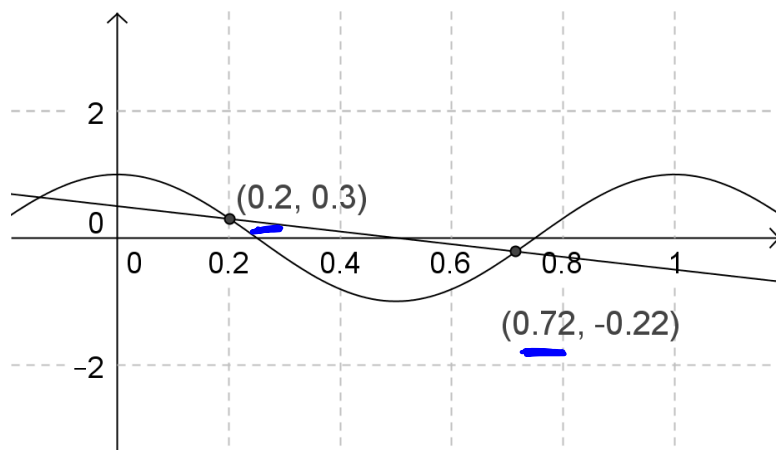
\therefore solutions

are $x=1, x=3$



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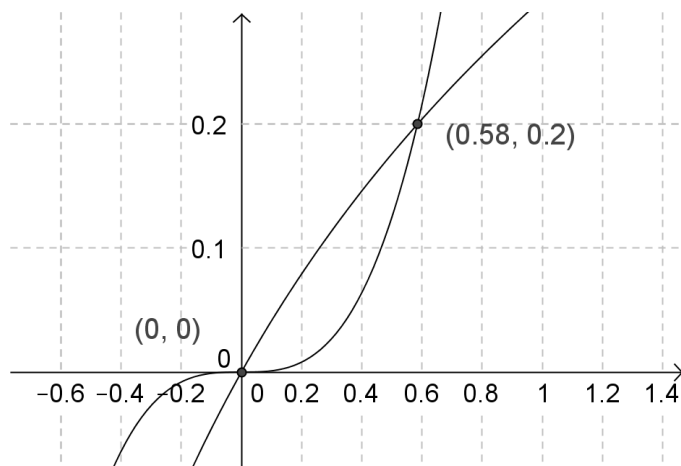
6 (e)



$$x \doteq 0.2, \quad x \doteq 0.72$$

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9(b)



$$x = 0, x = 0.58$$

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