D

Quiz 1 **Name:** Sample

1. Simplify the expression $\dfrac{2\cdot 3^5\, x\sqrt{x}\,(a-b)^3}{18\,x^{1/2}(a^2-b^2)}$.

$$= \frac{\cancel{2}\cdot 3^{\cancel{5}\,3}\, x \cdot \cancel{x^{\frac{1}{2}}}\,(a-b)^{\cancel{3}\,2}}{\cancel{2}\cdot 3^2\, \cancel{x^{\frac{1}{2}}}\,\cancel{(a-b)}(a+b)}$$

$$= \boxed{\frac{3^3 x (a-b)^2}{a+b}}$$

2. Evaluate the difference quotient $\dfrac{f(2+h)-f(2)}{h}$ for the function $f(x)=6-x^2$ and simplify your answer.

$$\frac{f(2+h)-f(2)}{h} = \frac{6-(2+h)^2-2}{h} =$$

$$= \frac{4-4-4h-h^2}{h} = \boxed{-4-h}$$

3. Find the domain of the function $f(x)=\dfrac{7-x}{\sqrt{x^2+3x-10}}$.

D: $x^2+3x-10>0$, $(x+5)(x-2)>0$

$+ \quad -5 \quad - \quad 2 \quad +$

$$\boxed{D=(-\infty,-5)\cup(2,\infty)}$$

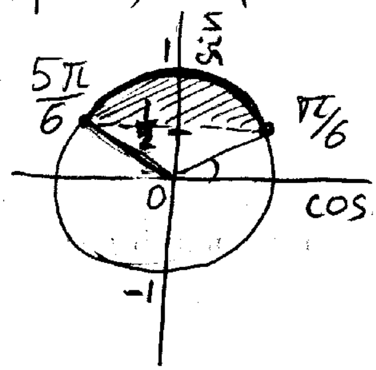
4. Find the functions $f \circ g$, $g \circ f$ and their domains if $f(x) = \sin x$, $g(x) = \sqrt{x - \frac{1}{2}}$

$f \circ g = f(g(x)) = \sin\sqrt{x - \frac{1}{2}}$, $D: x - \frac{1}{2} \geq 0$

$D = [\frac{1}{2}, \infty)$

$g \circ f = g(f(x)) = \sqrt{\sin x - \frac{1}{2}}$, $D: \sin x - \frac{1}{2} \geq 0$

The unit circle:



$\frac{\pi}{6} + 2\pi n \leq x \leq \frac{5}{6}\pi + 2\pi n$

n is integer

5. Sketch the graph of an example of a function $f(x)$ that satisfies all of the given conditions:

$\lim_{x \to -1^-} f(x) = -1$, $\lim_{x \to -1^+} f(x) = 2$, $f(-1) = -1$,

$\lim_{x \to 2^-} f(x) = \frac{1}{2}$, $\lim_{x \to 2^+} f(x) = -1$, $f(2) = 1$.

One of possible examples