E

Quiz 1 **Name:** Sample

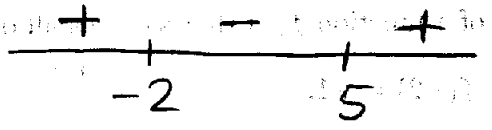
1. Simplify the expression $\dfrac{16x^5y^2\sqrt{y}(t-y)}{24x^3y^{1/2}(t^2-y^2)}$.

$= \dfrac{2\cdot 8\cdot x^5 y^2 y^{\frac{1}{2}}(t-y)}{3\cdot 8\cdot x^3 y^{\frac{1}{2}}(t-y)(t+y)}$

$= \boxed{\dfrac{2x^2y^2}{3(t+y)}}$

2. Find the domain of the function $f(x) = \dfrac{1+x^2}{\sqrt{x^2-3x-10}}$.

$D: \quad x^2-3x-10 = (x-5)(x+2) > 0$



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

3. Evaluate the difference quotient $\dfrac{f(7+h)-f(7)}{h}$ for the function $f(x) = (11-x)^2$ and simplify your answer.

$\dfrac{f(7+h)-f(7)}{h} = \dfrac{(11-(7+h))^2-16}{h} =$

$= \dfrac{(4-h)^2-16}{h} = \dfrac{16-8h+h^2-16}{h} = \boxed{-8+h}$

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

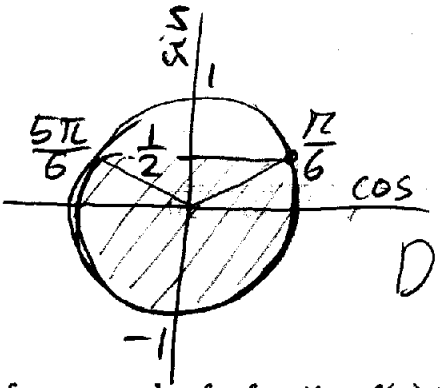
$f \circ g = f(g(x)) = \sin\sqrt{\frac{1}{2} - x}$, $D: \frac{1}{2} - x \geq 0 \Leftrightarrow$

$x \leq \frac{1}{2}$, $D = (-\infty, \frac{1}{2}]$

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

$\Leftrightarrow \sin x \leq \frac{1}{2}$

The unit circle



$\frac{\pi}{6} \to \frac{\pi}{6} + 2\pi = \frac{13}{6}\pi$

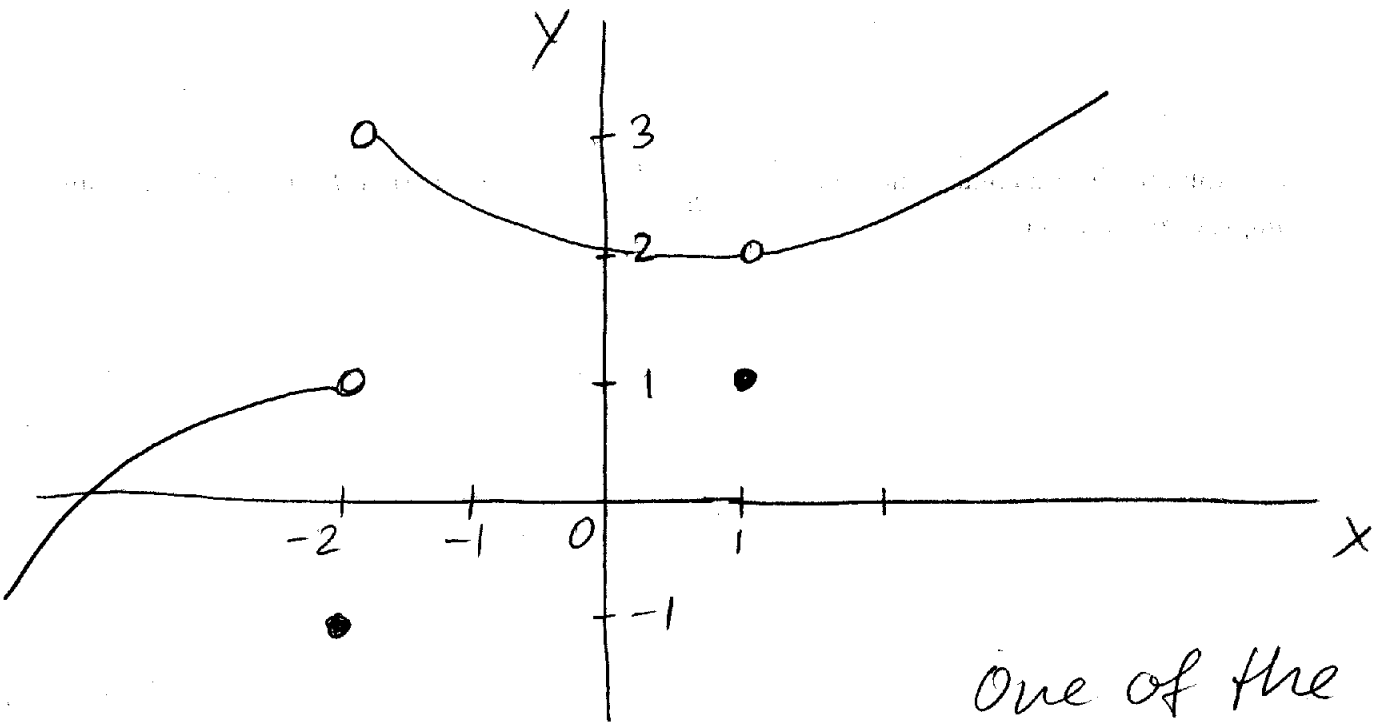
$D: \frac{5\pi}{6} + 2\pi n \leq x \leq \frac{13\pi}{6} + 2\pi n$

n is integer

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

$\lim_{x \to -2^-} f(x) = 1$, $\lim_{x \to -2^+} f(x) = 3$, $f(-2) = -1$,

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



One of the possible examples