$\boxed{3G}$ #3e $\sqrt{i} = a + bi$

$$i = (a + bi)^2$$

$$0 + 1i = (a^2 - b^2) + (2ab)i$$

$$\begin{cases} a^2 - b^2 = 0 \\ 2ab = 1 \longrightarrow b = \frac{1}{2a} \end{cases}$$

$$a^2 - \left(\frac{1}{2a}\right)^2 = 0$$

$$4a^2\left(a^2 - \frac{1}{4a^2}\right) = (0)\,4a^2$$

$$4a^4 - 1 = 0$$

$$a^4 = \frac{1}{4}$$

$$a = \pm\sqrt[4]{\frac{1}{4}} = \pm\sqrt{\sqrt{\frac{1}{4}}} = \pm\sqrt{\frac{1}{2}} = \pm\frac{1}{\sqrt{2}}$$

$$\boxed{\frac{\sqrt{2}}{2} + \frac{\sqrt{2}}{2}i}$$

$$a = \frac{1}{\sqrt{2}}$$

$$b = \frac{1}{2\left(\frac{1}{\sqrt{2}}\right)} = \frac{1}{\frac{2}{\sqrt{2}}} = \frac{\sqrt{2}}{2} \text{ or } \frac{1}{\sqrt{2}}$$

$$\boxed{\frac{1}{\sqrt{2}} + \frac{1}{\sqrt{2}}i}$$

$\frac{1}{\sqrt{2}}$ $\quad 1.4142 \overline{)\,1.0000\,0.0000}$

$\frac{\sqrt{2}}{2}$ $\quad$ $\begin{array}{r} .7071 \\ 2\overline{)\,1.4142} \end{array}$

$\boxed{3G}$ #1e

$i \cdot i^2 \cdot i^3 \cdots i^{2011} = i^{1+2+3+\cdots+2011}$

$= i^{\frac{2011}{2}(1+2011)} = i^{\frac{2011}{\cancel{2}}(\cancel{2012})}$ 1006

$= \overset{1}{\cancel{i^{2023064}}} \cdot i^2 = -1$

$$\begin{array}{r} 2011 \\ \times 1006 \\ \hline 12066 \\ 201100 \\ \hline 2023066 \end{array}$$

$i \cdot i^2 \cdot i^3 \cdot i^4$

$i \cdot (-1) \cdot (-i)(1) = -1$

$\underbrace{i \cdot i^2 \cdot i^3 \cdots i^8}_{1}$

$\overset{1}{\cancel{i^{2008}}} \cdot i^{2009} \cdot i^{2010} \cdot i^{2011}$

$i \cdot i^2 \cdot i^3$

$i \cdot (+1)(+i)$

-1

$i + i^2 + i^3$

A function is a set of ordered pairs (x, y)
with no repeated x-values.

A one-to-one function has no repeated y-values.

Ex. $\boxed{2A}$ #1(a) 1-1 function (it has an inverse)

inverse: $\{(1,0), (2,1), (3,2), (-1,3)\}$

1(b) function (not 1-1, has no inverse)

1(c) Relation (not a function)

1(d) not a function $\quad x^2+y^2=1$

. function (not 1-1) — Horizontal Line Test

$\boxed{2I}$ #1. $y = 3x - 1$ $\qquad$ inverse: ______

inverse: $x = 3y - 1$ $\qquad f^{-1}(x) = \frac{1}{3}x + \frac{1}{3}$

$x + 1 = 3y$

$\frac{1}{3}x + \frac{1}{3} = y$

EX. Find the inverse: $f(x) = \dfrac{3x+2}{x-5}$

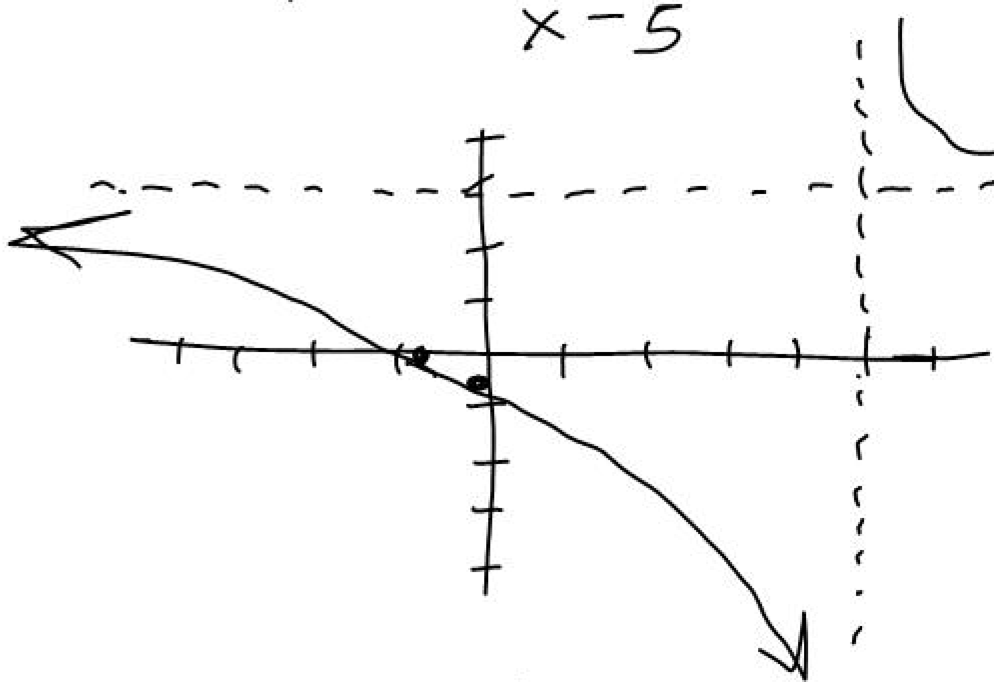
x-int. $0 = \dfrac{3x+2}{x-5}$

$x = -2/3$

y-int $y = \dfrac{3(0)+2}{0-5}$

vertical asymptote $x = 5$

non-vertical asymptote $y = 3$



inverse: $x = \dfrac{3y+2}{y-5}$

$$x(y-5) = 3y+2$$

$$xy - 5x = 3y + 2$$

$$xy - 3y = 2 + 5x$$

$$\frac{y\cancel{(x-3)}}{\cancel{x-3}} = \frac{2+5x}{x-3}$$

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

$(2,3)$

Ex. Find the inverse: $y = x^2 - 2x + 3, \ x \geq 1$

$$x = y^2 - 2y + 3$$

$\left[\frac{1}{2}(-2)\right]^2$

$(-1)^2$

1

$$x = (y^2 - 2y + 1) + 3 - 1$$

$$x = (y-1)^2 + 2$$

$$x - 2 = (y-1)^2$$

$$\pm\sqrt{x-2} = y - 1$$

$$y = 1 \pm \sqrt{x-2}$$

contains $(3,2)$

$$\boxed{f^{-1}(x) = 1 + \sqrt{x-2}}$$

$\boxed{2B}$ Ex. $y = \sqrt{2x-5}$

Domain	Range
$2x - 5 \geq 0$	$[0, \infty)$
$x \geq 5/2$	
$[5/2, \infty)$	

Ex. $y = -2x^2 + x - 7$

$\left(\frac{1}{2}\left(-\frac{1}{2}\right)\right)^2 = \frac{1}{16}$

Domain

$\mathbb{R}$

Range

$y = -2\left(x^2 - \frac{1}{2}x + \frac{1}{16}\right) - 7 + \frac{1}{8}$

$y = -2\left(x - \frac{1}{4}\right)^2 - \frac{55}{8}$

$V\left(\frac{1}{4}, \frac{-55}{8}\right)$

Range: $\left(-\infty, \frac{-55}{8}\right]$

HW: practice quiz

$\boxed{2B}$ #2c, e, f

$\boxed{2C}$ #6

$\boxed{2I}$ #3, 4, 5