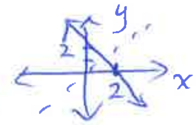
U1/L9

1. $\boxed{\text{Text p.47 } 6, 10, 20}$



6. a) $f(x) = x+7$

$f^{-1}(x) = x-7$

b) $f(x) = 2-x$

$= -x+2$

~~for $f^{-1}(x)$~~

$x = -y+2$

$\therefore f^{-1}(x) = \frac{x-2}{-1}$ or $2-x$ still

c) $f(x) = 5$

$x = 5$ is the inverse

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

for $f^{-1}(x)$

$x = -\frac{1}{5}y-2$

$x+2 = -\frac{1}{5}y$

$y = -5x-10$

or $f^{-1}(x) = -5(x+2)$

e) $f(x) = x$

then $f^{-1}(x) = x$

f) $f(x) = \frac{x-3}{4}$

for $f^{-1}(x)$

$x = \frac{y-3}{4}$

$4x = y-3$

$\therefore f^{-1}(x) = 4x+3$

10. $g(t) = 3t-2$ $\quad g^{-1}(t) = \frac{t+2}{3}$

a) $g(13) = 3(13)-2$

$= 37$

b) $g(7) = 3(7)-2$

$= 19$

c) $\frac{g(13)-g(7)}{13-7}$

$= \frac{37-19}{6}$

$= \frac{18}{6}$ or 3

d) $g^{-1}(t) = \frac{t+2}{3}$

$g^{-1}(13) = \frac{13+2}{3}$

$= \frac{15}{3}$ or 5

e) $g^{-1}(7) = \frac{7+2}{3}$

$= 3$

f) $\frac{g^{-1}(13)-g^{-1}(7)}{13-7}$

$= \frac{5-3}{6}$

$= \frac{2}{6}$ or $\frac{1}{3}$

20. If $f(x) = 3x+4$

for $f^{-1}(x)$

$x = 3y+4$

$y = \frac{x-4}{3}$

$\therefore f^{-1}(x) = \frac{x-4}{3}$

for $(f^{-1})^{-1}(x)$

$x = \frac{y-4}{3}$

$3x = y-4$

$y = 3x+4$

$\therefore (f^{-1})^{-1}(x) = 3x+4$

The original eq'n since the second inverse undoes the first.

2. Text p160 #2 done on handout.

3. Text p162 #13 (ii) only ← done on handout

4. Text p. 160 #3

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

for $f^{-1}(x)$

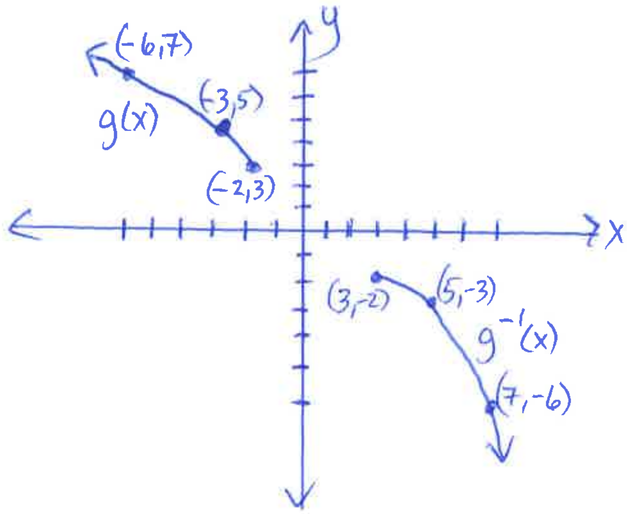
$x = 2y^2 - 1$

$\frac{x+1}{2} = y^2$

$y = \pm\sqrt{\frac{x+1}{2}}$

$\therefore f^{-1}(x) = \pm\sqrt{\frac{x+1}{2}}$ and the inverse is not a function.

5.a) and c)



b) $D: \{x \in R \mid x \leq -2\}$

$R: \{g(x) \in R \mid g(x) \geq 3\}$

d) $D: \{x \in R \mid x \geq 3\}$

$R: \{g^{-1}(x) \mid g^{-1}(x) \leq -2\}$

Incidentally,

$g^{-1}(x) = -\left(\frac{x-3}{2}\right)^2 - 2$

6. a) <u>for $f^{-1}(x)$</u>

$x = \frac{-1}{y+2} - 5$

$x+5 = \frac{-1}{y+2}$

$y+2 = \frac{-1}{x+5}$

$y = \frac{-1}{x+5} - 2$

b) $D: \{x \in R \mid x \neq -5\}$

$R: \{f^{-1}(x) \mid f^{-1}(x) \neq -2\}$