

Homework #3C

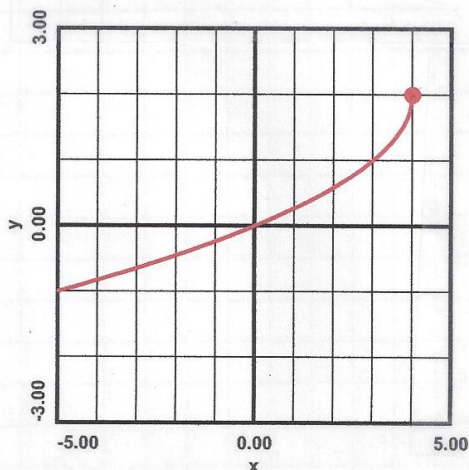
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Lesson 3C.1:

1) $y = f(x) = -\sqrt{-x}$

(a) $y = g(x) = f(x-4) + 2 = -\sqrt{-(x-4)} + 2 = -\sqrt{4-x} + 2$

(c) domain: $-\infty < x \leq 4$ range: $-\infty < y \leq 2$



2) $5x + 8 = 0$, $5x = -8$, $x = -\frac{8}{5} = -1.6$

x	y
-1	15.27
-1.6	17 ← vertex
-2	undef.

(-1.6, 17)

(-1, 15.27)

domain: $-1.6 \leq x < \infty$

range: $-\infty < y \leq 17$

Lesson 3C.2:

3) $y = f(x) = -\sqrt{x}$

(a) $y = g(x) = 4f(x) = -4\sqrt{x}$

(b) $y = h(x) = g(x-5) - 8 = -4\sqrt{x-5} - 8$

4) (a) $y = k(x) = f(x-5) - 2 = -\sqrt{x-5} - 2$

(b) $y = h(x) = 4k(x) = -4\sqrt{x-5} - 8$

5) $y = f(x) = -14 - \sqrt{9-5x}$

(b) $9-5x = 0$, $5x = 9$, $x = \frac{9}{5} = 1.8$

domain: $-\infty < x \leq 1.8$

range: $-\infty < y \leq -14$

x	y = f(x)
1	-16
1.8	-14 ← vertex
2	undef

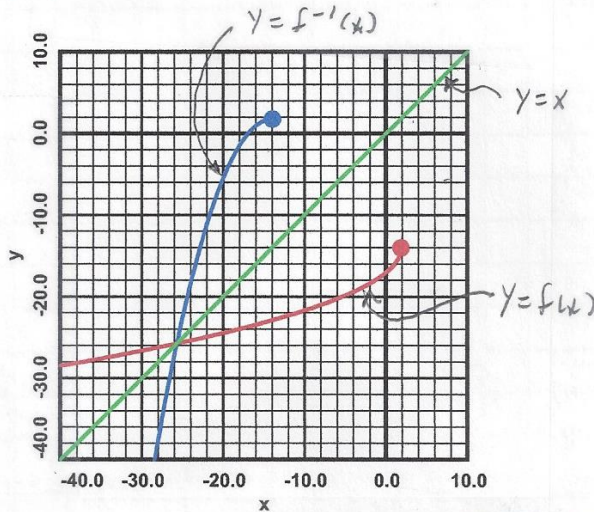
(1.8, -14)

(1, -16)

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(d) $x = -14 - \sqrt{9-5y}$, $-\sqrt{9-5y} = x+14$, $9-5y = (x+14)^2 = x^2 + 28x + 196$,
 $-5y = x^2 + 28x + 187$, $y = f^{-1}(x) = -0.2x^2 - 5.6x - 37.4$ ($-\infty < x \leq -14$)

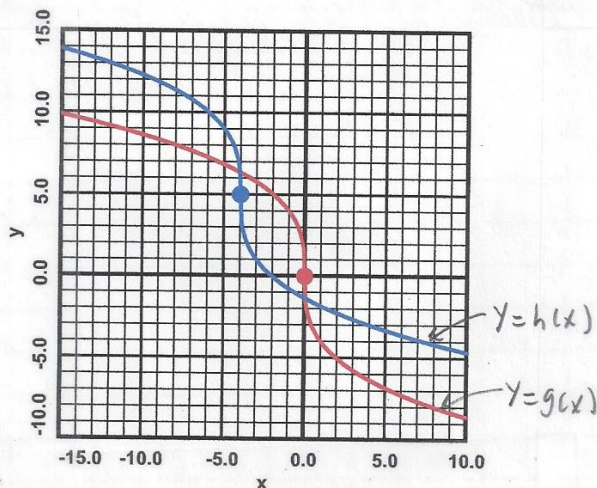


Lesson 3C.3:

6) $y = f(x) = -\sqrt[3]{x}$

(a) $y = g(x) = 4f(x) = -4\sqrt[3]{x}$

(c) $y = h(x) = g(x+4) + 5 =$
 $= -4\sqrt[3]{x+4} + 5$

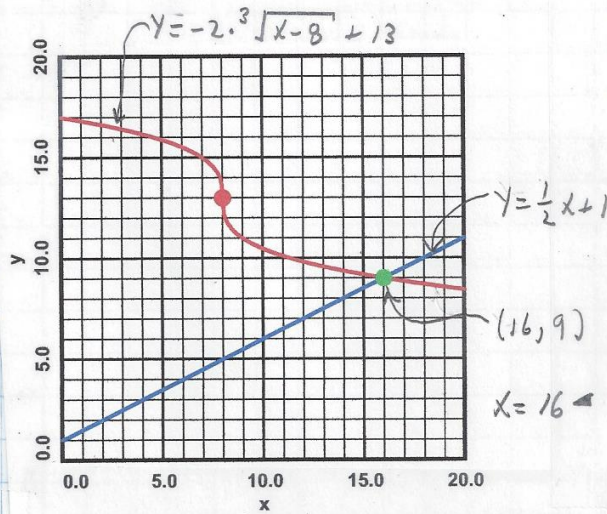


7) $x = 32\sqrt[3]{y-8} + 16$, $32\sqrt[3]{y-8} = x-16$, $\sqrt[3]{y-8} = \frac{1}{32}x - \frac{1}{2}$,
 $y-8 = \left(\frac{1}{32}x - \frac{1}{2}\right)^3$, $y = f^{-1}(x) = \left(\frac{1}{32}x - \frac{1}{2}\right)^3 + 8$

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8)



Lesson 3C.4:

9)

(a) $\sqrt{x+8} = 5$

$x+8 = 25$

$x = 17$ ✓

(b) $\sqrt{x+8} = 3x+1$

$x+8 = (3x+1)^2$

$= 9x^2 + 6x + 1$

$9x^2 + 5x - 7 = 0$

$x = \frac{-5 \pm \sqrt{5^2 - 4(9)(-7)}}{2(9)} =$

$= \frac{-5 \pm \sqrt{277}}{18}$, $x = \frac{1}{18}(-5 - \sqrt{277}) = -1.2024$ ✗

$x = \frac{1}{18}(-5 + \sqrt{277}) = 0.6469$ ✓

(c) $\sqrt{x+8} + \sqrt{x+10} = 10$, $x+8 + 2\sqrt{x+8}\sqrt{x+10} + x+10 = 100$,

$2x+18 + 2\sqrt{(x+8)(x+10)} = 100$, $2\sqrt{x^2+18x+80} = 82-2x$,

$\sqrt{x^2+18x+80} = 41-x$, $x^2+18x+80 = x^2-82x+1681$,

$100x = 1601$, $x = 16.01$ ✓

Lesson 3C.5:

10) (a) $|x-3| = 8$

• $-(x-3) = 8$, $-x+3 = 8$, $x-3 = -8$, $x = -5$ ✓

• $x-3 = 8$, $x = 11$ ✓

(b) $|x-3| = x+1$

• $-(x-3) = x+1$, $-x+3 = x+1$, $2x = 2$, $x = 1$ ✓

• $x-3 = x+1$, $-3 = 1$ ✗

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(c) $|x-3| = -\frac{1}{2}x+2$

- $-(x-3) = -\frac{1}{2}x+2$, $-x+3 = -\frac{1}{2}x+2$, $\frac{1}{2}x=1$, $x=2$ ✓
- $x-3 = -\frac{1}{2}x+2$, $\frac{3}{2}x=5$, $x=\frac{10}{3}$ ✓

(d) $|x-3| = \frac{1}{2}x - \frac{5}{2}$

- $-(x-3) = \frac{1}{2}x - \frac{5}{2}$, $-x+3 = \frac{1}{2}x - \frac{5}{2}$, $\frac{3}{2}x = \frac{11}{2}$, $x = \frac{11}{3}$ ✗
- $x-3 = \frac{1}{2}x - \frac{5}{2}$, $\frac{1}{2}x = \frac{1}{2}$, $x=1$ ✗