

/33K	/9A	/6C	/7T	Total	/55
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Name: Solutions Date: Apr 5/11

MCR3U

Test: Inverse and reciprocal functions

/3
K

1. Determine the equation of the inverse, $f^{-1}(x)$, of the function $f(x) = \frac{3}{4}x + 6$.

$$x = \frac{3}{4}y + 6$$

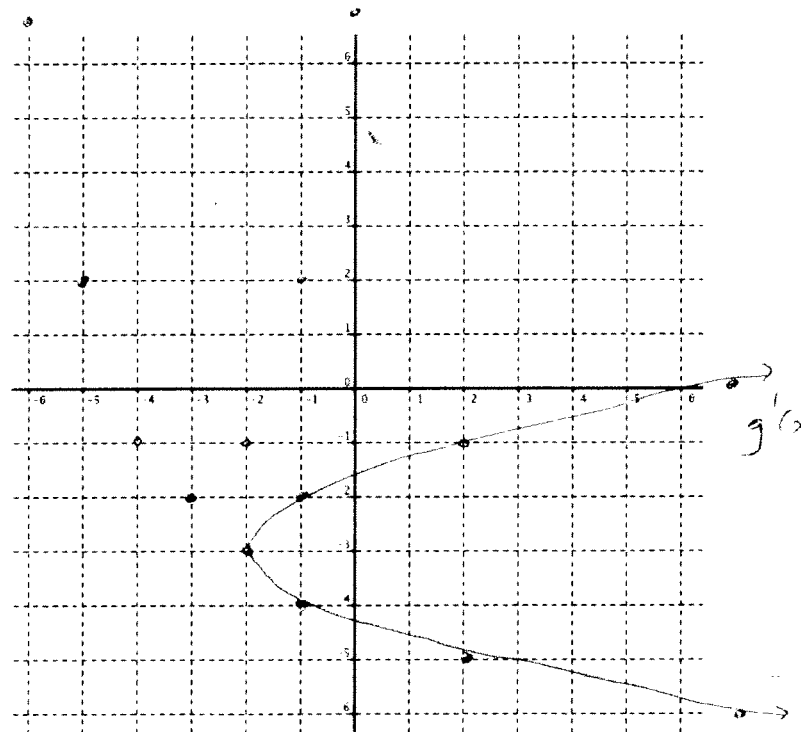
$$x - 6 = \frac{3}{4}y$$

$$4x - 24 = 3y$$

$$\therefore f^{-1}(x) = \frac{4}{3}x - 8$$

/3
K

2. Graph the inverse, $g^{-1}(x)$, of the function $g(x) = (x+3)^2 - 2$.



/2
C

3. Describe how to transform the base graph $f(x) = \sqrt{x}$ in order to graph $n(x) = \sqrt{\frac{1}{4}x} + 3$.

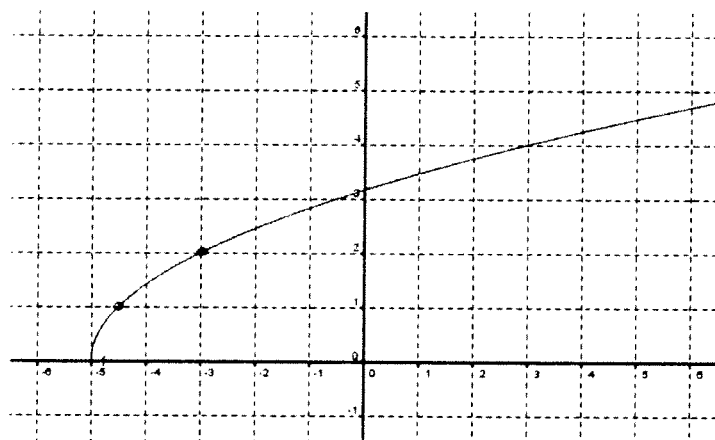
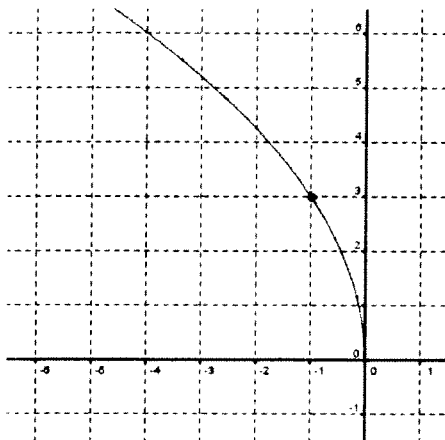
horizontal stretch by a factor of 4

1/4
K

4. Determine equations for the functions shown in the graphs below.

a) $y = 3\sqrt{-x}$

b) $y = \sqrt{2(x+5)}$

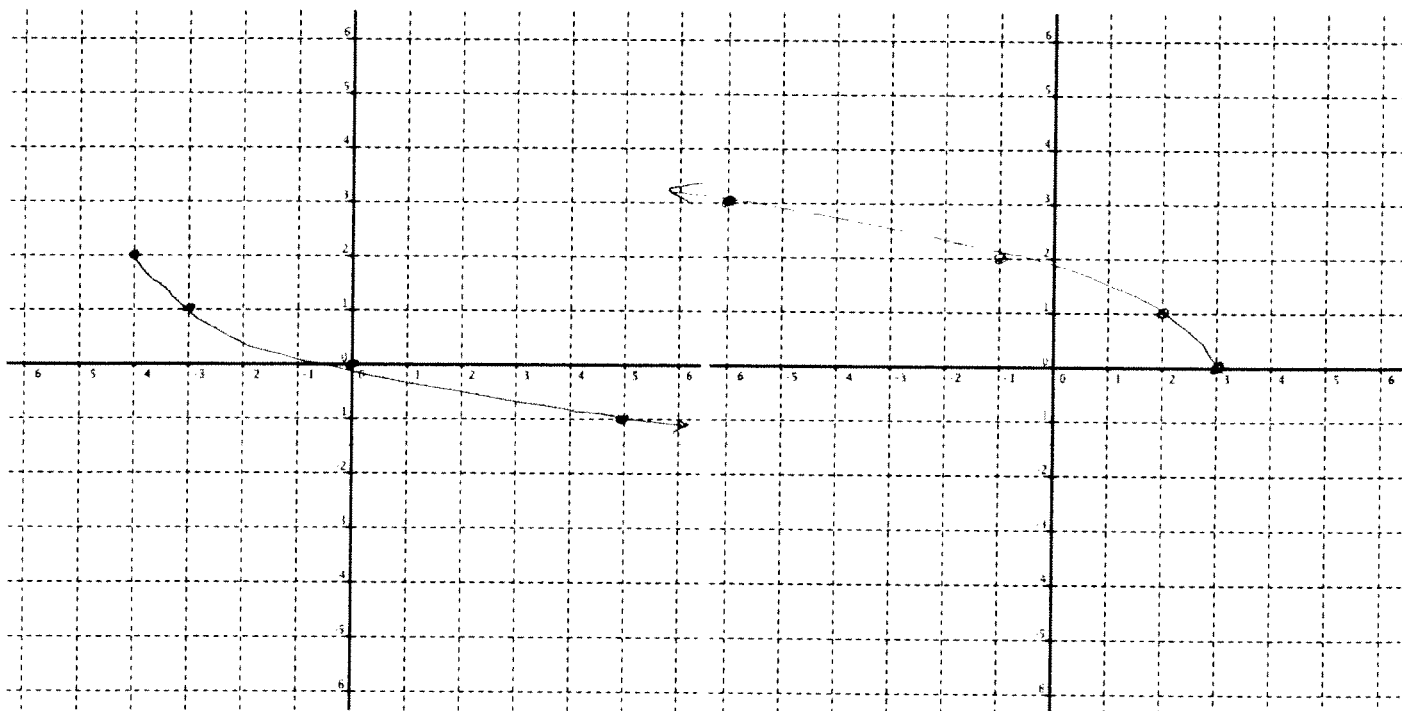


1/3
K

5. Graph each of the following functions. Mark all points in the domain and range of the grids provided.

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

$g(x) = \sqrt{3-x} = \sqrt{-x+3} = \sqrt{-(x-3)}$



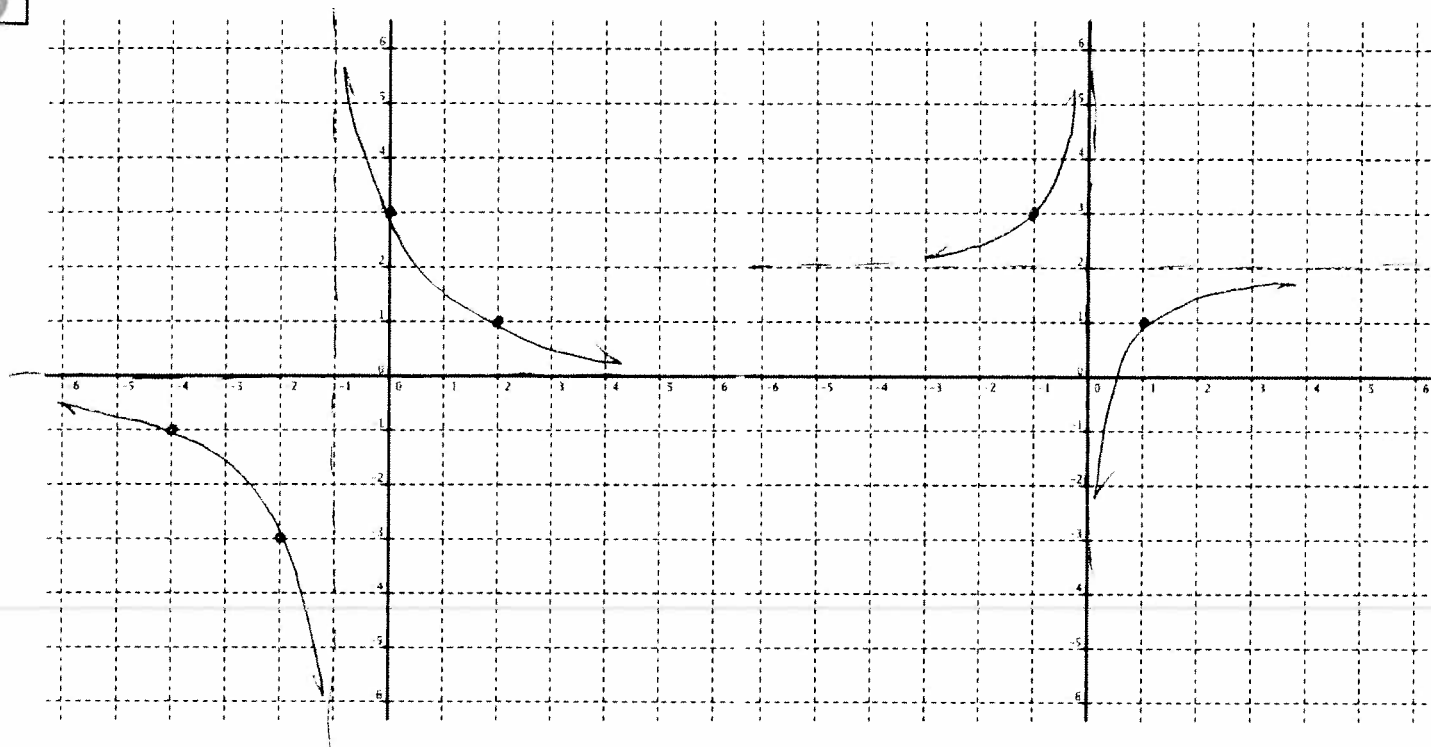
1/2
T

/3
K

6. Graph each of the following functions accurately on the grids provided.

$$h(x) = \frac{3}{x+1}$$

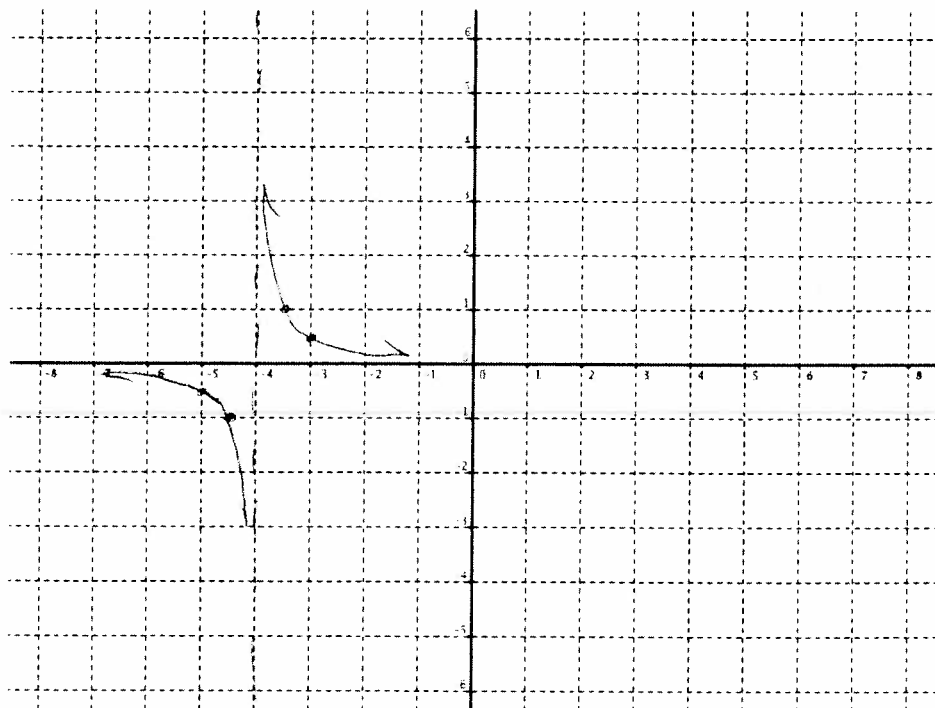
$$k(x) = 2 - \frac{1}{x} = -\frac{1}{x} + 2$$



/3
T

7. Graph the reciprocal of the linear function $y = 2x + 8$.

$$f(x) = \frac{1}{2(x+4)}$$

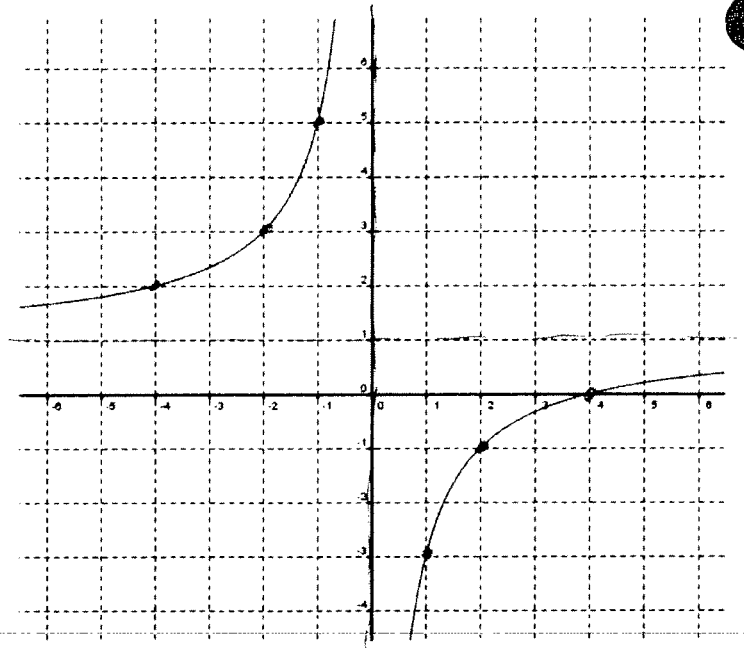
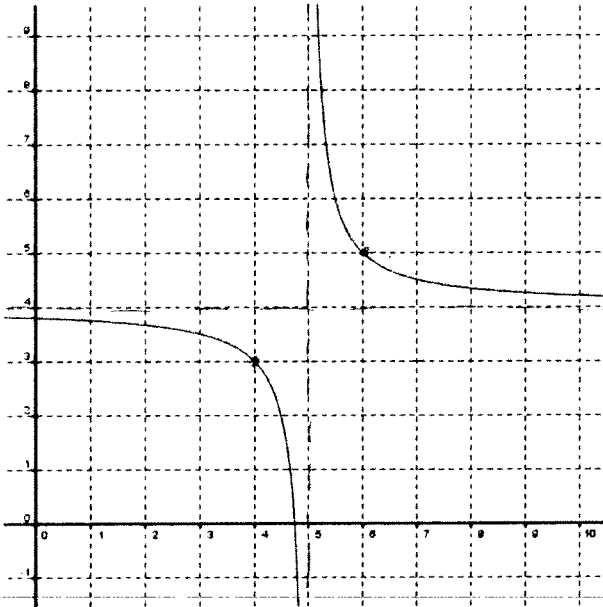


1/5
K

8. Determine equations for the functions shown in the graphs below.

a) $y = \frac{1}{x-5} + 4$

b) $y = \frac{-4}{x} + 1$



1/2
C

9. The inverse of a function is often confused with the reciprocal of a function because they both represent the "opposite of a function." Explain how they are different from one another.

1/6
K

10. Expand and simplify the following radical expression: $(\sqrt{8} + 3)(5 - \sqrt{2})$

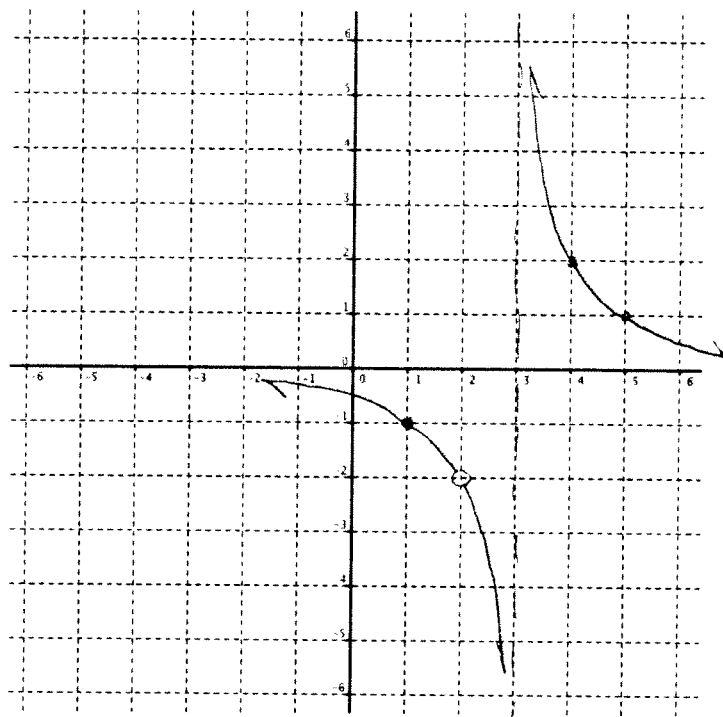
$$\begin{aligned}
 &= 5\sqrt{8} - \sqrt{16} + \cancel{15} - 3\sqrt{2} \\
 &= 5\sqrt{4\sqrt{2}} - 4 + \cancel{15} - 3\sqrt{2} \\
 &= 10\sqrt{2} - 3\sqrt{2} + 15 - 4 \\
 &= 7\sqrt{2} + 11
 \end{aligned}$$

11. Simplify and graph the following functions.

a) $y = \frac{2x-4}{x^2-5x+6}$

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

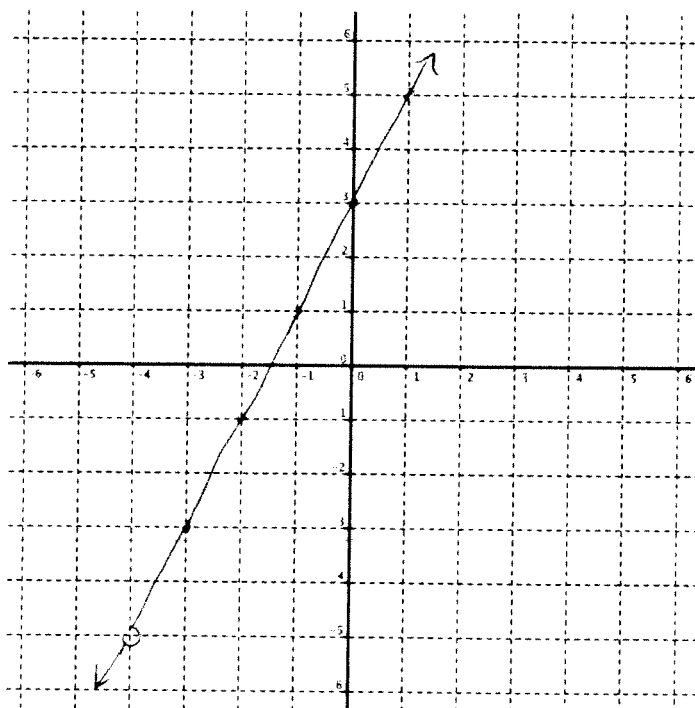
$$y = \frac{2}{x-3} \quad \begin{array}{l} x \neq 2 \\ x \neq 3 \end{array}$$



b) $y = \frac{2x^2+11x+12}{x+4}$

$$y = \frac{(x+4)(2x+3)}{(x+4)}$$

$$= 2x+3 \quad x \neq -4$$



12. Simplify the following rational expressions. State all restrictions.

a) $\frac{x+6}{x^2+2x-24} + \frac{3}{x-4}$

$$= \frac{(x+6)}{(x+6)(x-4)} \times \frac{(x-4)}{3}$$

$$= \frac{1}{3} \quad x \neq -6$$

$$x \neq 4$$

b) $\frac{2}{x+3} - 4$

$$= \frac{2}{x+3} - \frac{4(x+3)}{x+3}$$

$$= \frac{2 - 4x - 12}{x+3}$$

$$= \frac{-4x - 10}{x+3}$$

$$x \neq -3$$

12
C

13. Three math students were trying to simplify the expression $\frac{12+\sqrt{18}}{6}$. One student said that the

answer should be $2+\sqrt{18}$. Another student said that it should be $\frac{4+\sqrt{2}}{3}$. The third student said that it should be $2+\sqrt{3}$. Which of the three students is correct? Justify your answer by explaining why

they are correct, or why the others are incorrect.

$$\frac{12 + \sqrt{9} \sqrt{2}}{6}$$

$$= \frac{12 + 3\sqrt{2}}{6}$$

$$= \frac{4 + \sqrt{2}}{2}$$

The second student was correct because you have to reduce $\sqrt{18}$ to $3\sqrt{2}$ before you can simplify.