Name: _____ Date: _____

PC: Decomposition Ms . Loughran

Do Now: (Odds only for today)

Find two functions f and g such that $(g \circ f)(x) = h(x)$

1. $h(x) = (2x+1)^2$

$f(x) = 2x+1$, $g(x) = x^2$ $\quad \begin{cases} f(x) = 2x \\ g(x) = (x+1)^2 \end{cases}$

2. $h(x) = \sqrt[3]{x^2 - 4}$

3. $h(x) = \dfrac{1}{x+2}$

$f(x) = x+2$

$g(x) = \frac{1}{x}$

4. $h(x) = (1-x)^3$

5. $h(x) = \dfrac{4}{(5x+2)^2}$

$f(x) = 5x+2$, $g(x) = \frac{4}{x^2}$ $\quad \begin{cases} f(x) = (5x+2)^2 \\ g(x) = \frac{4}{x} \end{cases}$

6. $h(x) = \dfrac{-x^2+3}{4-x^2}$

7. $h(x) = \dfrac{27x^3+6x}{10-27x^3} = \dfrac{(3x)^3 + 2(3x)}{10-(3x)^3}$

$f(x) = 3x$

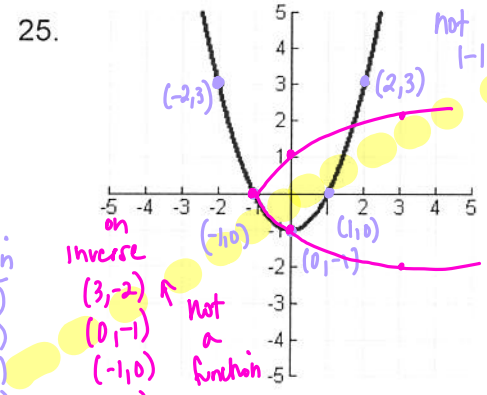
$g(x) = \frac{x^3+2x}{10-x^3}$

Continuing in yesterday's packet…

Graphing Inverses

Graph the inverse for each relation below (put your answer on the same graph).

25.



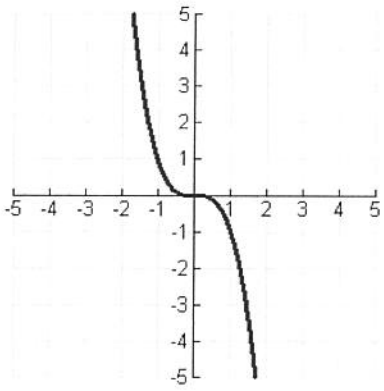
not 1-1

or function:
(-2,3)
(-1,0)
(0,-1)
(1,0)
(2,3)

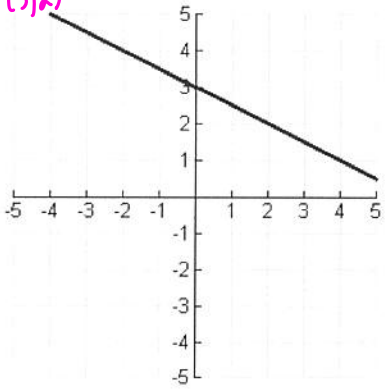
or inverse
(3,-2)
(0,-1)
(-1,0)
(0,1)
(3,2)

not a function

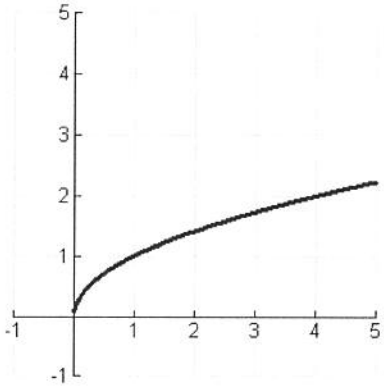
26.



27.



28.



Name:_____ Date:_____

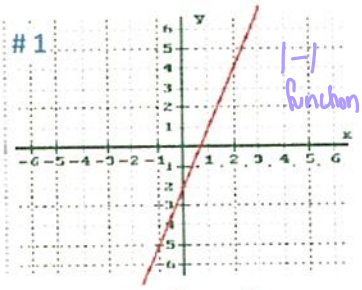
PC: Inverse Functions Ms. Loughran

pass HLT

Which of the following relations are one-to-one functions?

pass the VLT

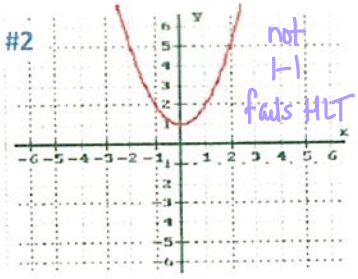
#1



1-1 function

$y = 3x - 2$

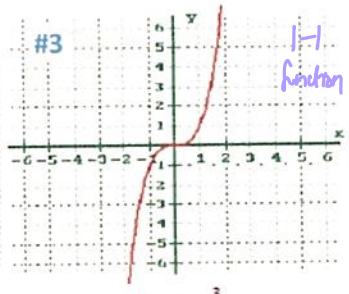
#2



not 1-1 fails HLT

$y = x^2 + 1$

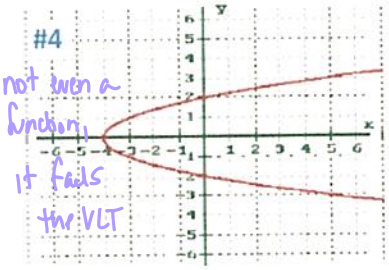
#3



1-1 function

$y = x^3$

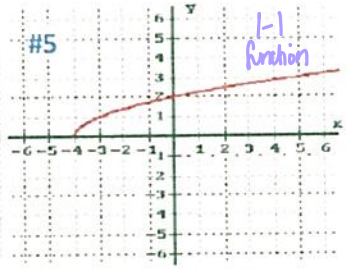
#4



not even a function, it fails the VLT

$x = y^2 - 4$

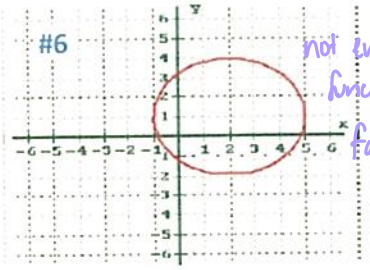
#5



1-1 function

$y = \sqrt{x + 4}$

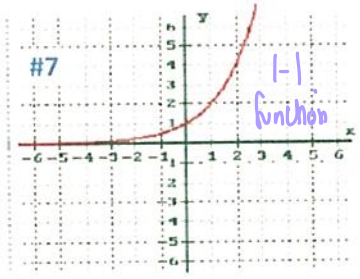
#6



not even a function, fails VLT

$(x - 2)^2 + (y - 1)^2 = 9$

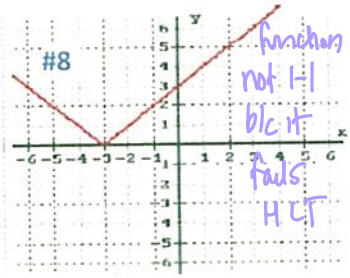
#7



1-1 function

$y = 2^x$

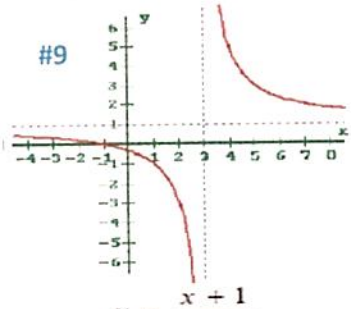
#8



function not 1-1 b/c it fails HLT

$y = |x + 3|$

#9



1-1 function

$y = \dfrac{x + 1}{x - 3}$

Name:_____ Date:_____

PC: Review of Linear Functions Ms. Loughran

A ***linear function*** is a function defined by the equation $f(x)=mx+b$, where "m" is called the slope and "b" is called the y-intercept. This equation is called the slope intercept form of a line. The graph of a linear equation is a straight line.

Formula for slope:

$m = \frac{y_2-y_1}{x_2-x_1} = \frac{\Delta y}{\Delta x} = \frac{\text{rise}}{\text{run}} = \frac{\text{change in } y}{\text{change in } x}$

Other ways to write the equation of a line:

Point slope: $y-y_1=m(x-x_1)$ point (x_1, y_1)

Standard form: $Ax+By=C$, A, B, C can not be fractions

Parallel lines have __same__ slopes. parallel $\rightarrow \parallel$

Perpendicular lines have slopes that are __negative__ __reciprocals__. perpendicular $\rightarrow \perp$

Horizontal lines are in the form $y =$ __constant__. Slope of a horizontal line is __0__.

Vertical lines are in the form $x =$ __constant__. Slope of a vertical line is __undefined__.

Exercises

1. Find the slope of the line passing through each pair of points.

(a) $(-2,0)$ and $(3,1)$ (b) $(-1,2)$ and $(2,2)$ (c) $(0,4)$ and $(1,-1)$

$m = \frac{1-0}{3-(-2)} = \frac{1}{5}$ $m = \frac{2-2}{2-(-1)} = \frac{0}{3} = 0$ $m = \frac{-1-4}{1-0} = \frac{-5}{1} = -5$

2. Find an equation of the line that passes through the point $(1,-2)$ and has a slope of 3 in:

(a) point slope form
(b) slope intercept form
(c) standard form

(x,y)

$y-y_1=m(x-x_1)$

$y=mx+b$

$Ax+By=C$

a) $y-y_1=m(x-x_1)$

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

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

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

$y+2=3x-3$

$y=3x-5$

c) $-3x+y=5$

or

$3x-y=5$

3. Find an equation of the line, in standard form, that passes through the points $(-4,0)$ and $(2,3)$.

$m=\frac{3-0}{2-(-4)}=\frac{3}{6}=\frac{1}{2}$

$(-4,0)$

$y-0=\frac{1}{2}(x+4)$

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

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

$-x+2y=4$

follow the steps

$(2,3)$

$y-3=\frac{1}{2}(x-2)$

$y-3=\frac{1}{2}x-1$

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

Home work 10-18

Inverse Relations

Find the inverse for each relation.

1. { (1, -3), (-2, 3), (5, 1), (6, 4) }

2. { (-5, 7), (-6, -8), (1, -2), (10, 3) }

{(7,-5),(-8,-6),(-2,1),(3,10)}

Finding Inverses

Find an equation for the inverse for each of the following relations.

3. $y = 3x + 2$

4. $y = -5x - 7$

$y = \frac{x+7}{-5} = -\frac{1}{5}x - \frac{7}{5}$

5. $y = 12x - 3$

$x = -8y + 16$

$\frac{x-16}{-8} = \frac{-8y}{-8}$

$y = \frac{x-16}{-8}$

6. $y = -8x + 16$

$y = -\frac{1}{8}x + 2$

7. $y = \frac{2}{3}x - 5$

8. $y = -\frac{3}{4}x + 5$

$y = -\frac{4}{3}x + \frac{20}{3}$

$y = -\frac{4}{3}(x - 5)$

9. $y = -\frac{5}{8}x + 10$

10. $y = \frac{1}{2}x + 8$

$y = 2x - 16$

11. $y = x^2 + 5$

12. $y = x^2 - 4$

$y = \pm\sqrt{x+4}$

13. $y = (x + 3)^2$

14. $y = (x - 6)^2$

$y = 6 \pm \sqrt{x}$

15. $y = \sqrt{x - 2},\ y \geq 0$

16. $y = \sqrt{x + 5},\ y \geq 0$

$y = x^2 - 5,\ x \geq 0$

17. $y = \sqrt{x} + 8,\ y \geq 8$

18. $y = \sqrt{x} - 7,\ y \geq -7$

$y = (x+7)^2,\ x \geq -7$

Verifying Inverses

Verify that *f* and *g* are inverse functions.

$f(g(x)) = g(f(x)) = x$

19. $f(x) = x + 6,\ g(x) = x - 6$

20. $f(x) = 5x + 2,\ g(x) = \frac{x-2}{5}$

$f(g(x)) = f\left(\frac{x-2}{5}\right) = 5\left(\frac{x-2}{5}\right) + 2 = x - 2 + 2 = x$

$g(f(x)) = g(5x+2) = \frac{5x+2-2}{5} = \frac{5x}{5} = x$

21. $f(x) = -3x - 9,\ g(x) = -\frac{1}{3}x - 3$

22. $f(x) = 2x - 7,\ g(x) = \frac{x+7}{2}$

23. $f(x) = -4x + 8,\ g(x) = -\frac{1}{4}x + 2$

24. $f(x) = \frac{1}{2}x - 7,\ g(x) = 2x + 14$