

Name _____

Date _____

Advanced Algebra

Unit 2: Family of Functions Assignment #7

I can find x and y intercepts

Notes:

To find the x intercept of a function you must solve	To find the y intercept of the function you must solve
$0=f(x)$ You must use your algebraic skills to solve this	$F(0)$ So enter the function into your calculator and do VARS(0)

Example problem: Find the x and y intercepts of $y = 3(x-8)^3 - 12$

To find the x intercept you are solving $0=f(x)$	To find the y intercept you are solving $f(0)$
$0=3(x-8)^3 - 12$ $12 = 3(x-8)^3$ I added 12 to both sides $4 = (x-8)^3$ Divided both sides by 3 $1.59 = x-8$ Took the cube root of both sides $9.59 = x$ Added 8 to both sides This is my x intercept (9.59,0)	Enter the function into your calculator Do VARS (0) This gives us -1548 So the y intercept is (0,-1548)

Practice problems. For the following problems, find the x and y intercepts.

1) $f(x) = 2(x-4)^3 + 6$

$2(x-4)^3 + 6 = 0$ (2, 56, 0)
 $(x-4)^3 = -3$ (0, -122)
 $x-4 = -1.44$
 $x = 2.56$

2) $f(x) = 2|x-6| + 8$

$2|x-6| + 8 = 0$
 $|x-6| = -4$

Does not cross
 Impossible, so this means no x intercepts

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

$\frac{1}{2}(x+3)^3 - 2 = 0$
 $(x+3)^3 = 4$ x:intercept
 $x = -1.41$
 (0, 11.5) y:intercept

4) $f(x) = 6x - 2$

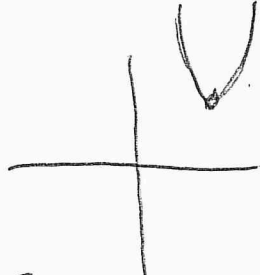
$6x - 2 = 0$
 $x = \frac{2}{6} = \frac{1}{3}$ (1/3, 0) x:intercept
 (0, -2) y:intercept

$(0, 26)$ y-intercept

5) $f(x) = 2(x-3)^2 + 8$

$2(x-3)^2 + 8 = 0$

$(x-3)^2 = -4$ Impossible
 \therefore no x-intercepts



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

$\frac{1}{4}x + 4 = 0$
 $(-16, 0)$

$(0, 4)$

7) $f(x) = 3(x+5)^2 - 4$

$3(x+5)^2 - 4 = 0$

$x+5 = \pm 1.15$

$(-3.85, 0)$ $(0, 71)$
 $(-6.15, 0)$

9) $f(x) = (x-3)^{\frac{1}{3}} - 2$

$(x-3)^{\frac{1}{3}} - 2 = 0$

$x-3 = 8$

$x = 11$

$(0, -3.44)$

8) $f(x) = -(x-2)^2 + 18$

$-(x-2)^2 + 18 = 0$

$-(x-2)^2 = -18$

$(x-2)^2 = 18$

$x-2 = \pm\sqrt{18}$

$x = 2 \pm\sqrt{18}$

2 ± 4.24

$(6.24, 0)$
 $(-2.24, 0)$

$(0, 14)$

For the following problems, find $f(g(x))$ and $g(f(x))$

1) $f(x) = x+1$ and $g(x) = 2x$

2) $f(x) = 2x+1$ and $g(x) = x-3$

3) $f(x) = x^2$ and $g(x) = x-1$

4) $f(x) = x^2-1$ and $g(x) = x+2$

5) $f(x) = x-3$ and $g(x) = x+3$

6) $f(x) = -x^2-1$ and $g(x) = x+5$

7) Find $f(x)$ and $g(x)$ such that $f(g(x)) = (x+1)^2$

$f(x) = x^2$ $g(x) = x+1$

#5 $f(g(x)) = x+3-3$
 (x)

$g(f(x)) = x-3+3$
 (x)

#6 $f(g(x)) = (x+5)^2-1$

$g(f(x)) = -x^2-1+5$
 $(-x^2+4)$

#1) $f(g(x)) = f(2x) = 2x+1$ and $g(f(x)) = g(x+1) = 2(x+1) = 2x+2$

① $f(g(x)) = 2x+1$

$g(f(x)) = 2(x+1)$ $(2x+2)$

② $f(g(x)) = 2(x-3)+1$
 $2x-6+1$
 $(2x-5)$

$g(f(x)) = 2x+1-3$
 $(2x-2)$

③ $f(g(x)) = (x-1)^2$

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

④ $f(g(x)) = (x+2)^2-1$

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