Precalculus Name: _____

Prerequisite Skills Period: _____ Date: _____

Topic 1: Solving

Directions: Solve the following linear equations/inequalities.

1. $12 + 7x = 2x - 5$

   $x = -\frac{17}{5}$

2. $5(2x - 3) + 3(x + 1) = 5x + 2$

   $x = \frac{7}{4}$

3. $\frac{5x-2}{8} = 2 + \frac{x}{4}$

   $x = 6$

4. $-3 < \frac{2x+5}{3} < 5$

   $-7 < x < 5$

5. $3(x - 1) + 2 < 5x + 6$

   $x > -\frac{7}{2}$

6. $\frac{x}{3} + \frac{1}{2} \geq \frac{x}{4} + \frac{1}{3}$

   $x \geq -2$

Directions: Solve each of the following quadratic equations by the indicated method.

7. Quadratic Formula

   a. $3x^2 - 3x = 3x + 5$

   $x = 3 \pm 2\sqrt{6}$

   b. $2x^2 - 10x = -17 - 2x^2$

   $x = \frac{5 \pm i\sqrt{43}}{4}$

   c. $x^2 + 8x - 2 = 0$

   $x = -4 \pm 3\sqrt{2}$

8. Square Root Method

   a. $(2x - 1)^2 - 15 = -6$

   $x = \frac{1 \pm \sqrt{3}}{2}$

   b. $-3(x + 1)^2 - 1 = 80$

   $x = -1 \pm 3i\sqrt{3}$

   c. $x^2 + 12 = 50$

   $x = \pm\sqrt{38}$

9. Factoring

   a. $2x^2 - 3x = 2$

   $x = \frac{-1}{2}$ *or* $x = 2$

   b. $x^2 - 14x + 40 = 0$

   $x = 10$ *or* $x = 4$

   c. $25x^2 - 20x = -4$

   $x = \frac{2}{5}$

10. Completing the square

    a. $x^2 + 6x = 7$

    $x = 1$ *or* $x = -7$

    b. $4 - 2x = x^2$

    $x = -1 \pm \sqrt{5}$

    c. $2x^2 - 20x + 3 = 1$

    $x = 5 \pm 2\sqrt{6}$

Directions: Solve each of the following exponential equations by the indicated method.

11. Rewriting with Common Bases

a. $5^x = 125$

$x = 3$

b. $3^{2x} \cdot 9^{x-1} = 81$

$x = \frac{3}{2}$

12. Rewriting as a Logarithm

a. $56 = 4 \cdot 3^x$

$x = log_3 14 \approx 2.402$

b. $5^{3x-2} + 3 = 93$

$x = \frac{2+log_5 90}{3} \approx 1.599$

c. $3e^{4x} - 10 = 1$

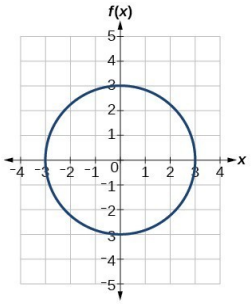
$x = \frac{1}{4} ln\left(\frac{11}{3}\right) \approx .325$

Topic 2: Functions

1. Determine whether each of the following are functions.

X	Y
1	2
2	4
1	5
3	8
4	4
5	10

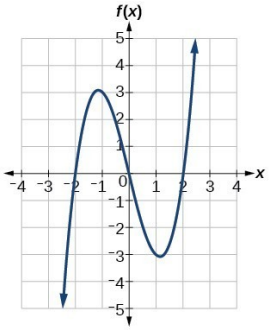
No



No

{(9, 7), (–5, 7), (0, 18)}

Yes



Yes

2. Use the functions below to answer parts a–h.

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

$g(x) = |x - 7|$

$h(x) = 2x + 3$

$k(x)$

x	y
-2	3
-1	2.5
0	2
1	1.5
2	1

a. g(–4) + k(0)

13

b. $f(x) = -30$

$x = \pm 6$

c. $h(k(2))$

5

d. $f(h(x))$

$-4x^2 - 12x - 3$

e. $f(x) \cdot h(x)$

$-2x^3 - 3x^2 + 12x + 18$

f. 3g(15)

24

g. $k(x) = 2$

0

h. $h(x) - f(x)$

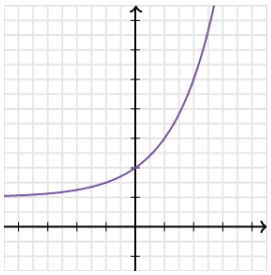
$x^2 + 2x - 3$

3. Determine the domain of each of the following functions.

x	f(x)
-4	9
-2	4
0	-5
3	5
6	-4
7	7
8	-10

$h(x) = \frac{7}{(x-1)(x+5)}$

$g(x) = \sqrt{2x - 9}$



{-4,-2,0,3,6,7,8}

$x \neq 1, \ -5$

$[\frac{9}{2}, \infty)$

$(-\infty, \infty)$

4. Match the function with its equation.

__D__ $y = x - 4$

__G__ $y = 2|x + 5|$

__C__ $y = x^2 + 2x - 7$

__E__ $y = (x - 8)^3 + 1$

__F__ $y = \sqrt{x} + 2$

__A__ $y = \sqrt[3]{x - 1}$

__B__ $y = \frac{1}{x}$

A. Cube Root

B. Rational

C. Quadratic

D. Linear

E. Cubic

F. Square Root

G. Absolute Value

5. How do you determine the *x*-intercept(s) of a function?
Set the function equal to 0 and solve for x

6. How do you determine the *y*-intercepts of a function?
Replace the x-values with zero and evaluate to find y

7. Determine the *x*- and *y*- intercepts of the following functions.

a. $y = \frac{2}{3}x - 8$

(12, 0) (0, -8)

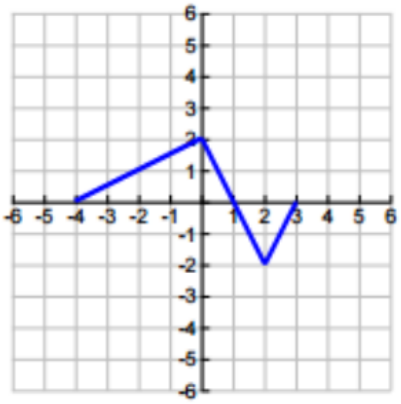
b. $f(x) = 3(x - 1)(11x + 2)$

(1, 0) $(\frac{-2}{11}, 0)$ (0, -6)

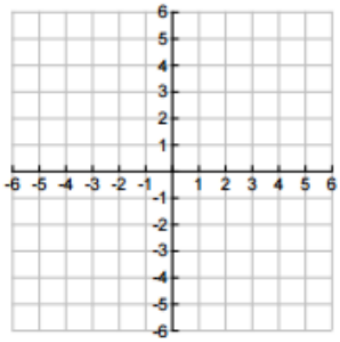
c. $g(x) = 2x^4 - 20x^2 + 18$

(3, 0) (-3, 0) (1, 0) (-1, 0)
(0, 18)

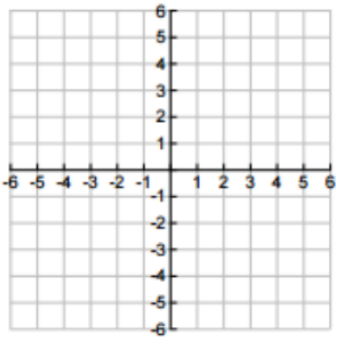
8. Perform the indicated transformations.



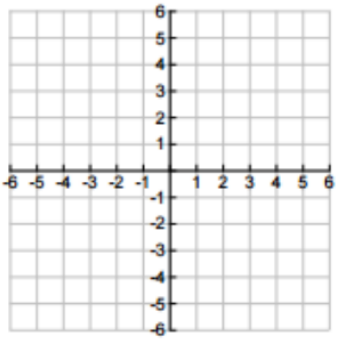
1. $y = 2f(x)$



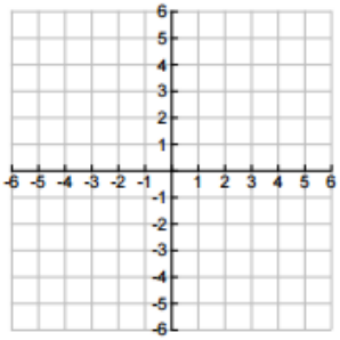
2. $y = -f(x)$



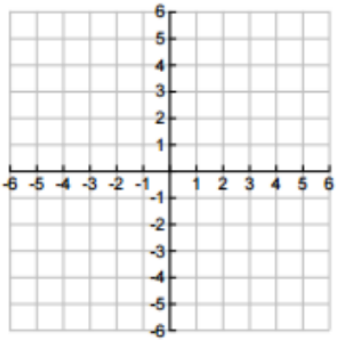
3. $y = f(x-1)$



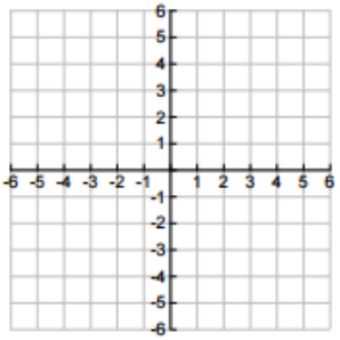
4. $y = f(x)+2$



5. $y = f(-x)$



6. $y = -2f(x+2)+1$



Topic 3: Expressions

1. Perform the indicated operation.

   a. $(x-7)^2$

   $x^2 - 14x + 49$

   b. $(x^3+2)(x^4-5)$

   $x^7 + 2x^4 - 5x^3 - 10$

   c. $-2(x+1)(x-3)(x+4)$

   $-2x^3 + 12x^2 + 22x + 24$

2. Simplify the following radical expressions.

   a. $\sqrt{80}$

   $4\sqrt{5}$

   b. $\sqrt[4]{32}$

   $2\sqrt[4]{2}$

   c. $\sqrt[3]{54x^3}$

   $3x\sqrt[3]{2}$

   d. $\sqrt{\frac{4}{25}}$

   $\frac{2}{5}$

   e. $4\sqrt{3} \cdot \sqrt{21}$

   $12\sqrt{7}$

   f. $\frac{\sqrt{108}}{\sqrt{27}}$

   2

Topic 4: Miscellaneous

1. Give an equation of a horizontal line. x = a

2. Give an equation of a vertical line. y = b

3. How do you find the inverse of a function from a graph? From an equation?

4. Linear Functions: check out the Algebra 2 summer packet and/or Khan Academy for review.