Chapter Review for Final Exam:

Ch.1 → (Inverse Functions)
Ch.2 → (Radical Functions)
Ch.7 → (Exponential Functions) $y = 2^x$
Ch.8 → (Logarithmic Functions) $y = \log_2 x$
Ch.4 → (Trig + Unit Circle)
Ch.5 → (Trig Functions)
Ch.6 → (Trig Identities)

Ch.2: $y = \sqrt{x}$

x	y
0	0
1	1
4	2
9	3

Ch.7: $y = 3^x$

x	y
-2	1/9
-1	1/3
0	1
1	3
2	9

Ch.8: $y = \log_3 x$

x	y
1/9	-2
1/3	-1
1	0
3	1
9	2

Ch.5: $y = \sin x$

x	y
0°	0
90°	1
180°	0
270°	-1
360°	0

$y = \cos x$

x	y
0	1
$\pi/2$	0
π	-1
$3\pi/2$	0
2π	1

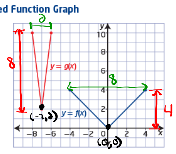
Jun 6-8:33 AM

Chapter 1:

Example 3

Write the Equation of a Transformed Function Graph

The graph of the function $y = g(x)$ represents a transformation of the graph of $y = f(x)$. Determine the equation of $g(x)$ in the form $y = af(b(x - h)) + k$. Explain your answer.



Solution

① Reflection: None

② VSF $= \frac{8}{4} = 2$ $(a = 2)$

③ HSF $= \frac{2}{8} = \frac{1}{4}$ $(b = 4)$

④ HT: $(0,0) \rightarrow (-7,2)$ 7 units left $(h = -7)$

⑤ VT: $(0,0) \rightarrow (-7,2)$ 2 units up $(k = 2)$

⑥ Equation: $\boxed{g(x) = 2f[4(x+7)]+2}$

Jan 15-10:48 AM

Chapter 2 Radical Functions

Solve for x: $(\sqrt{x+8})^2 = (x+6)^2$

$x + 8 = (x+6)(x+6)$

$x + 8 = x^2 + 12x + 36$

$0 = x^2 + 11x + 28$ $4 + 7 = 11$, $4 \times 7 = 28$

$0 = (x+4)(x+7)$

$x + 4 = 0$, $x = -4$ | $x + 7 = 0$, $x = -7$

is a solution

Test $x = -4$

$\sqrt{x+8} = x+6$

$\sqrt{-4+8}$ | $-4+6$

$\sqrt{4}$ | 2 ✓

2 ✓

is not a solution (extraneous)

Test $x = -7$

$\sqrt{x+8} = x+6$

$\sqrt{-7+8}$ | $-7+6$

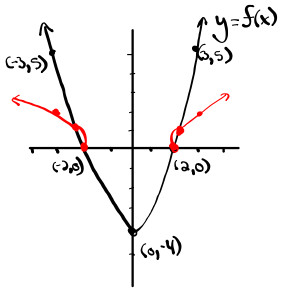
$\sqrt{1}$ | -1 ✗

1

Jan 20-9:07 AM

Ch. 2

③ Using the graph of $y = f(x)$, sketch the graph of $y = \sqrt{f(x)}$. State the domain and range of each.



$y = f(x)$

D: $\{x \mid x \in R\}$ or $(-\infty, \infty)$

R: $\{y \mid y \geq -4, y \in R\}$ or $[-4, \infty)$

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

D: $\{x \mid x \leq -2, x \geq 2, x \in R\}$ or $(-\infty, -2] \cup [2, \infty)$

R: $\{y \mid y \geq 0, y \in R\}$ or $[0, \infty)$

Jun 6-8:32 AM

Chapter 7 → Exponential Functions

6. Solve the following equations (be sure to test your answers).

(a) $2^{2x+2} + 7 = 71$

(b) $9^{2x+1} = 81(27^x)$

a) $2^{2x+2} + 7 = 71$ | b) $9^{2x+1} = 81(27^x)$

Jan 20-9:07 AM

4. Rewrite each expression as a single logarithm.

$3\log_5 x + \frac{1}{2}\log_5(x-1) - \log_5(x^2+1)$

Jan 20-9:20 AM

7. Solve the following equation (be sure to test your answers).

$$\log_{10}(x+2)+\log_{10}(x-1)=1$$

Jan 20-9:30 AM

2. Cobalt-60, which has a half-life of 5.3 years, is used in medical radiology. A sample of 60 mg of the material is present today.

a) Write an equation to express the mass of cobalt-60 (in mg), as a function of time, t in years. [2]

b) What amount will be present in 10.6 years? [2]

c) How long will it take for the amount of cobalt-60 to decay to 12.5% of its initial amount? [3]

Jan 20-9:30 AM

2. Solve for all values of θ in the specified domain.

$\tan^2\theta+\tan\theta=0$, $0\le\theta\le 2\pi$

e. $\cos^2\theta+\frac{1}{2}\cos\theta=0$, $0°\le\theta<360°$

Jan 20-9:07 AM

$$\frac{5\tan^2 5\pi/4}{6\sin 5\pi/6+4\sin 4\pi/3}$$

Jan 22-12:37 PM

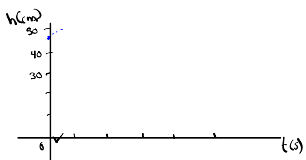
$$\sec 15\pi+\sqrt{2}\sin\frac{39\pi}{4}\sin\frac{21\pi}{2}-\csc^2\frac{100\pi}{3}$$

Jan 22-12:36 PM

2. A weight attached to the end of a spring is bouncing up and down. As it bounces, its distance from the floor varies sinusoidally with time. You start a stopwatch, when the watch reads 0.4 sec, the weight first reaches a high point 50 cm above the floor. The next low point, 30 cm above the floor, occurs at 1.8 sec.

(a) Predict the distance the weight will be from the floor when the stopwatch reads 17.2 sec.

(b) How high was the weight above the floor when the stopwatch was initially started?



Count by $\frac{P}{4}=\frac{2.8}{4}=0.7$

Jan 20-9:06 AM

$$\frac{1}{\sec^2\theta\cot\theta}=\frac{\sin\theta-\sin^3\theta}{\cos\theta}$$

Jun 7-2:52 PM

Pre-Calculus 12A Chapter 1 Exam Review

1. Given the function $y=f(x)$ write the equation of the form $y=af(b(x-h))+k$ that would result from the following transformations:

A horizontal stretch about the y-axis by a factor of $\frac{1}{4}$ and a horizontal reflection in the y-axis. A vertical stretch about the x-axis by a factor of 3, and a translation of 5 units to the right and 2 units up.

$a=3$
$b=-4$
$h=5$
$k=2$

$\boxed{y=3f[-4(x-5)]+2}$

2. Determine the inverse of the function $f(x)=(x-3)^2-2$.

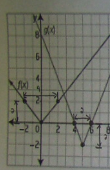
$f(x)=(x-3)^2-2$
$y=(x-3)^2-2$
$x=(y-3)^2-2$
$x+2=(y-3)^2$
$\pm\sqrt{x+2}=y-3$

$3\pm\sqrt{x+2}=y$

$\boxed{y=3\pm\sqrt{x+2}}$

Jan 15-11:26 AM

3. Write the equation for the graph of $g(x)$ as a transformation of the equation for the graph of $f(x)$.



① Reflections: none
② V.S.F. $=\frac{2}{2}=1\rightarrow a=1$
③ H.S.F. $=\frac{2}{4}=\frac{1}{2}\rightarrow b=2$
④ HT: $(0,0)\rightarrow(5,-2)$ $h=5$
⑤ VT: $(0,0)\rightarrow(5,-2)$ $k=-2$
⑥ Equation: $\boxed{g(x)=1f[2(x-5)]-2}$

4. The key point (12, -18) is on the graph of $y=f(x)$. Calculate its image point under the following transformation:

Jan 15-11:29 AM

4. The key point (12, -18) is on the graph of $y=f(x)$. Calculate its image point under the following transformation:

a) $y+3=-\frac{1}{3}f(2x+12)$

$y=-\frac{1}{3}f[2(x+6)]-3$

$a=-\frac{1}{3}$ $b=2$ $h=-6$ $k=-3$

$(x,y)\rightarrow[\frac{1}{2}x-6,-\frac{1}{3}y-3]$

$(12,-18)\rightarrow\boxed{(0,3)}$

b) $2y-4=6f(6x-12)+4$

$2y=6f[6(x-2)]+8$

$y=3f[6(x-2)]+4$

$a=3$ $b=6$ $h=2$ $k=4$

$(x,y)\rightarrow[\frac{1}{6}x+2,3y+4]$

$(12,-18)\rightarrow\boxed{(4,-50)}$

Jan 15-11:30 AM

Radical Functions Exam Review

1. Given that $2y+8=-4\sqrt{-x+3}$, complete the chart shown below. When identifying translations be sure that you indicate both the number of units and direction of the shift.

$y=-2\sqrt{-1(x-3)}-4$

$a=-2$
$b=-1$
$h=3$
$k=-4$

Reflected in x-axis	YES or NO (circle correct solution)
Reflected in y-axis	YES or NO (circle correct solution)
Horizontal translation of...	3 units right
Vertical translation of...	4 units down
Horizontally stretched by a factor of...	1 or (no stretch)
Vertically stretched by a factor of ...	2
Domain	$\{x\mid x\le 3, x\in R\}$
Range	$\{y\mid y\le -4, y\in R\}$

Write a mapping rule and sketch the curve in the space below.

$y=\sqrt{x}$ $(x,y)\rightarrow[-x+3,-2y-4]$

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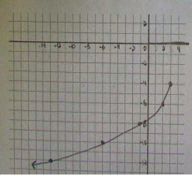
$y=\sqrt{x}$

x	y
0	0
1	1
4	2
9	3
16	4

$(x,y)\rightarrow[-x+3,-2y-4]$

x	y
3	-4
2	-6
-1	-8
-6	-10
-13	-12



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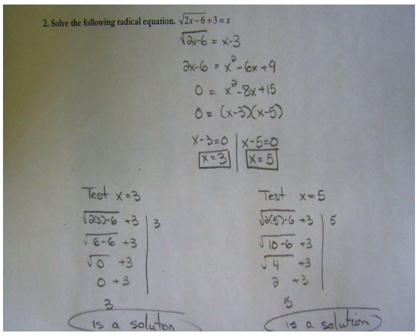

2. Solve the following radical equation. $\sqrt{2x-6}+3=x$

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

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

$0 = x^2-8x+15$

$0 = (x-3)(x-5)$

$x-3=0 \mid x-5=0$

$\boxed{x=3} \mid \boxed{x=5}$

Test $x=3$

$\sqrt{2(3)-6}+3 \mid 3$

$\sqrt{6-6}+3$

$\sqrt{0}+3$

$0+3$

3

is a solution

Test $x=5$

$\sqrt{2(5)-6}+3 \mid 5$

$\sqrt{10-6}+3$

$\sqrt{4}+3$

$2+3$

5

is a solution

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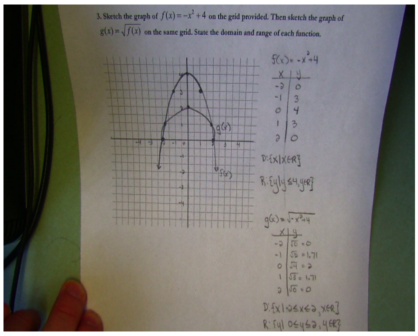

3. Sketch the graph of $f(x) = -x^2+4$ on the grid provided. Then sketch the graph of $g(x) = \sqrt{f(x)}$ on the same grid. State the domain and range of each function.

$f(x) = -x^2+4$

x	y
-2	0
-1	3
0	4
1	3
2	0

D: $\{x \mid x \in R\}$

R: $\{y \mid y \le 4, y \in R\}$

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

x	y
-2	$\sqrt{0} = 0$
-1	$\sqrt{3} = 1.71$
0	$\sqrt{4} = 2$
1	$\sqrt{3} = 1.71$
2	$\sqrt{0} = 0$

D: $\{x \mid -2 \le x \le 2, x \in R\}$

R: $\{y \mid 0 \le y \le 2, y \in R\}$

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Extra questions worked out

Jan 20-8:36 AM

⑫ a) $\sin\theta = \sin\theta\tan\theta$ $0 \le \theta \le 2\pi$

Common Factor

$0 = \sin\theta\tan\theta - \sin\theta$

$0 = (\sin\theta)(\tan\theta - 1)$

$\sin\theta = 0 \mid \tan\theta - 1 = 0$

$\theta = 0, \pi, 2\pi \mid \tan\theta = 1$

$\theta_R = \frac{\pi}{4}$

$\sqrt{2}$, $\frac{\pi}{4}$, $\frac{\pi}{4}$, 1

S | A
T | C

(0,1) (-1,0) (1,0) (0,-1)

Where is $\tan\theta$ positive

Q1	Q3
$\theta = \theta_R$	$\theta = \pi + \theta_R$
$\theta = \frac{\pi}{4}$	$\theta = \pi + \frac{\pi}{4}$
	$\theta = \frac{5\pi}{4}$

Solutions are: $0, \frac{\pi}{4}, \pi, \frac{5\pi}{4}, 2\pi$

⑬ b) $3\sin^2\theta - 2\sin\theta - 1 = 0$ $, 0 \le \theta \le 360°$

$(3\sin^2\theta - 3\sin\theta)(+\sin\theta - 1) = 0$ $-3 \times 1 = -3$ $-3 + 1 = -2$

$3\sin\theta(\sin\theta - 1) + 1(\sin\theta - 1) = 0$

$(3\sin\theta + 1)(\sin\theta - 1) = 0$

$3\sin\theta + 1 = 0 \mid \sin\theta - 1 = 0$

$\sin\theta = -\frac{1}{3} \mid \sin\theta = 1$

$\theta = 90°$ Unit Circle

$\theta_R = \sin^{-1}\left(\frac{1}{3}\right)$

$\theta_R = 19$

Where is sine negative: S | A, T | C

Q3	Q4
$\theta = 180° + \theta_R$	$\theta = 360° - \theta_R$
$\theta = 180° + 19$	$\theta = 360° - 19$
$\theta = 199$	$\theta = 340$

Jun 7-2:31 PM

① Amp = 11   P = 16   min = -4

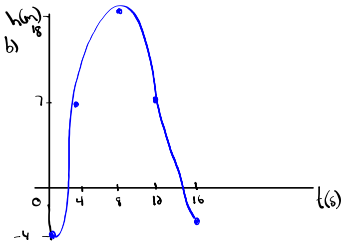
$a = \pm 11$ $b = \frac{360}{16} = 22.5$ max = -4 + 22 = 18

$K = -4 + 11 = 7$

$h = 0$

a) equation: $y = -11\cos[22.5(x)] + 7$

b)



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Jan 19-12:17 PM

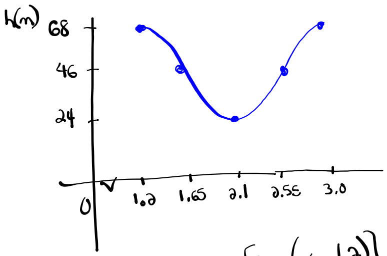
④ max = 68   Amp = 68 - 46 = 22 $P = 2(2.1 - 1.2)$

min = 24 $a = \pm 22$ $P = 1.8$

$K = \frac{68+24}{2} = 46$ $b = \frac{360}{1.8} = 200$

$h = 1.2$

$\frac{P}{4} = \frac{1.8}{4} = 0.45$



$y = 22\cos[200(x - 1.2)] + 46$

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⑤ c) $y = \frac{1}{2}\cos(1\theta + \pi) - 4$

$a = \frac{1}{2}$

$b = 1$

$P = \frac{2\pi}{b} = \frac{2\pi}{1} = 2\pi$

$c = -\pi$

$d = -4$

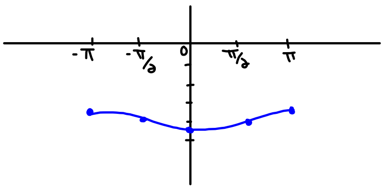
$(x, y) \rightarrow \left(\frac{1}{1}x - \pi, \frac{1}{2}y - 4\right)$

$y = \cos\theta$

x	y
0	1
$\pi/2$	0
π	-1
$3\pi/2$	0
2π	1

$\longrightarrow$

x	y	
$-\pi$	$-7/2$	-3.5
$-\frac{\pi}{2}$	-4	-4
0	$-9/2$	-4.5
$\pi/2$	-4	-4
π	$-7/2$	-3.5



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