Today's Plan:

Learning Target (standard): I will review for the semester exam.

Students will: Complete practice problems over previous concepts at the boards and study for my exam.

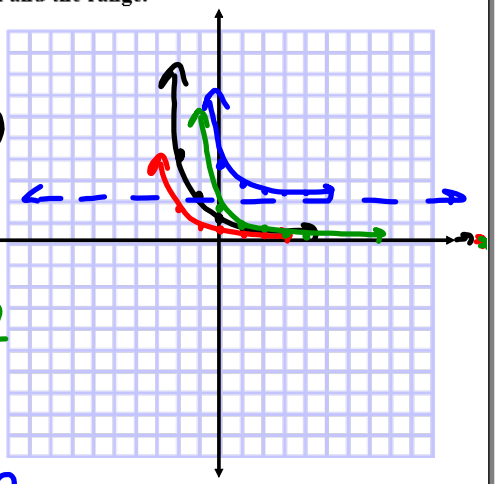
Teacher will: Provide practice problems over previous concepts, check homework problems for accuarcy and provide students feedback, describe and provide examples of exam problems.

Assessment: Board work

Differentiation: Students will work at the board, actively engage in practice review concepts with the aid of other students and the teacher.

Graph using transformations. State the domain and the range.

4) $y = \frac{1}{3} \cdot \left(\frac{1}{2}\right)^{x-2} + 2$



parent: $y = \left(\frac{1}{2}\right)^x$ HA: $y=0$

1) $y = \frac{1}{3} \cdot \left(\frac{1}{2}\right)^x$ V.C. by $\frac{1}{3}$

2) $y = \frac{1}{3} \cdot \left(\frac{1}{2}\right)^{x-2}$ shift right 2

3) $y = \frac{1}{3} \cdot \left(\frac{1}{2}\right)^{x-2} + 2$ shift up 2

HA: $y=2$

X	Y
-2	4
-1	2
0	1
1	$\frac{1}{2}$
2	$\frac{1}{4}$

D: $\mathbb{R}$

R: $\{y \mid y > 2\}$

Graph using transformations. Find the domain, range, and intercepts.

5) $y = \log(2x + 10)$

Change-of-base

$\log_a x = \frac{\log_b x}{\log_b a}$

① $\log_a(xy) = \log_a x + \log_a y$

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

③ $\log_a x^y = y \log_a x$

Expand each logarithm.

6) $\log_3 \frac{x^5}{y^2}$

$= \log_3 x^5 - \log_3 y^2$

$= 5\log_3 x - 2\log_3 y$

7) $\log_2 (ab^6)^5$

$= \log_2(a^5 b^{30})$

$= \log_2 a^5 + \log_2 b^{30}$

$= 5\log_2 a + 30\log_2 b$

Condense each expression to a single logarithm.

8) $\frac{\log_9 u}{3} + \frac{\log_9 v}{3} + \frac{\log_9 w}{3}$

$= \frac{1}{3}\log_9 u + \frac{1}{3}\log_9 v + \frac{1}{3}\log_9 w$

$= \log_9 u^{\frac{1}{3}} + \log_9 v^{\frac{1}{3}} + \log_9 w^{\frac{1}{3}}$

$= \log_9\left(u^{\frac{1}{3}} \cdot v^{\frac{1}{3}} \cdot w^{\frac{1}{3}}\right)$

$= \log_9 (uvw)^{\frac{1}{3}}$

$= \log_9 \sqrt[3]{uvw}$

9) $5\log_9 x - 5\log_9 y$

$= \log_9 x^5 - \log_9 y^5$

$= \log_9 \left(\frac{x^5}{y^5}\right)$

$= \log_9 \left(\frac{x}{y}\right)^5$

Evaluate each expression.

10) $\log_2 64 = x$

$2^x = 64$

$x = 6$

11) $\log_2 \frac{1}{16} = x$

$2^x = \frac{1}{16}$

$x = -4$

Solve each equation.

12) $\log_{14} -3x = \log_{14} 3x$

13) $\log_{11}(-4n + 3) = \log_{11}(n^2 - 29)$

14) $\log_5 (x - 1) + \log_5 4 = 3$

15) $\log_7 2x^2 - \log_7 8 = 4$

16) $125^{3-3x} \cdot 25^{-2x-2} = \frac{1}{25}$

17) $16^{-v} \cdot 64 = \left(\frac{1}{4}\right)^{3v}$

Solve each equation. Round your answers to the nearest ten-thousandth.

18) $-3 \cdot 2^{10n+1} = -56$

$2^{10n+1} = \frac{56}{3}$

$\ln 2^{10n+1} = \ln\left(\frac{56}{3}\right)$

$(10n+1)\ln 2 = \ln\left(\frac{56}{3}\right)$

$10n\ln 2 + \ln 2 = \ln\left(\frac{56}{3}\right)$

$\frac{10n\ln 2}{10\ln 2} = \frac{\ln\left(\frac{56}{3}\right) - \ln 2}{10\ln 2}$

$n = \frac{\ln 56 - \ln 3 - \ln 2}{10\ln 2}$

19) $-5\left[19^{10m-2}\right] - 5 = -97$

$-5 \cdot 19^{10m-2} = -92$

$19^{10m-2} = \frac{92}{5}$

$\ln 19^{10m-2} = \ln\left(\frac{92}{5}\right)$

$(10m-2)\ln 19 = \ln 92 - \ln 5$

$10m\ln 19 - 2\ln 19 = \ln 92 - \ln 5$

$10m\ln 19 = \ln 92 - \ln 5 + 2\ln 19$

$m = \frac{\ln 92 - \ln 5 + 2\ln 19}{10\ln 19}$

Solve each equation.

12) $\log_{14} -3x = \log_{14} 3x$

$-3x = 3x$
$-6x = 0$
$x = 0$
no solution

13) $\log_{11}(-4n+3) = \log_{11}(n^2-29)$

$-4n+3 = n^2-29$
$0 = n^2+4n-32$
$0 = (n+8)(n-4)$
$n = -8, 4$
$n = -8$

14) $\log_5(x-1) + \log_5 4 = 3$

$\log_5 4(x-1) = 3$
$\log_5(4x-4) = 3$
$5^3 = 4x-4$
$125 = 4x-4$
$4x = 129$
$x = \frac{129}{4}$

15) $\log_7 2x^2 - \log_7 8 = 4$

$\log_7\left(\frac{2x^2}{8}\right) = 4$
$7^4 = \frac{2x^2}{8}$
$2401 = \frac{x^2}{4}$
$x^2 = 9604$
$x = 98, -98$

16) $125^{3-3x} \cdot 25^{-2x-2} = \frac{1}{25}$

$(5^3)^{3-3x} \cdot (5^2)^{-2x-2} = 5^{-2}$
$5^{9-9x} \cdot 5^{-4x-4} = 5^{-2}$
$5^{5-13x} = 5^{-2}$
$5-13x = -2$
$-13x = -7$
$x = \frac{7}{13}$

17) $16^{-v} \cdot 64 = \left(\frac{1}{4}\right)^{3v}$

$(4^2)^{-v} \cdot 4^3 = (4^{-1})^{3v}$
$4^{-2v} \cdot 4^3 = 4^{-3v}$
$4^{-2v+3} = 4^{-3v}$
$-2v+3 = -3v$
$v = -3$

Solve each equation. Round your answers to the nearest ten-thousandth.

18) $-3 \cdot 2^{10n+1} = -56$

$2^{10n+1} = \frac{56}{3}$
$\ln 2^{10n+1} = \ln\left(\frac{56}{3}\right)$
$(10n+1)\ln 2 = \ln\left(\frac{56}{3}\right)$
$10n+1 = \frac{\ln\left(\frac{56}{3}\right)}{\ln 2}$
$10n+1 = 4.2224$
$10n = 3.2224$
$n = .3222$

19) $-5 \cdot 19^{10m-2} - 5 = -97$

$-5 \cdot 19^{10m-2} = -92$
$19^{10m-2} = \frac{92}{5}$
$\ln 19^{10m-2} = \ln\left(\frac{92}{5}\right)$
$(10m-2)\ln 19 = \ln\left(\frac{92}{5}\right)$
$10m-2 = \frac{\ln\left(\frac{92}{5}\right)}{\ln 19}$
$10m-2 = .98910$
$10m = 2.98910$
$m = .2989$

Find a positive and a negative coterminal angle for each given angle.

20) $250°$

$250° + 360° = 610°$
$250° - 360° = -110°$

21) $-\frac{7\pi}{45}$

$-\frac{7\pi}{45} + 2\pi$
$-\frac{7\pi}{45} + \frac{90\pi}{45} = \frac{83\pi}{45}$

State the quadrant in which the terminal side of each angle lies.

$-\frac{7\pi}{45} - \frac{90\pi}{45} = -\frac{97\pi}{45}$

22) $-\frac{23\pi}{6}$

QI
$-\frac{23\pi}{6} \cdot \frac{180}{\pi} = -690°$

23) $-\frac{\pi}{6} = -30°$

QIV

Find the measure of each angle.

24)

$5\pi + \frac{\pi}{4}$
$\frac{20\pi + \pi}{4}$
$\frac{-21\pi}{4}$

25)

-4π
or
$-720°$

Draw an angle with the given measure in standard position.

26) $\frac{43\pi}{18}$

$\frac{43\pi}{18} \cdot \frac{180°}{\pi}$
$430°$
$70° \cdot \frac{\pi}{180}$
$\frac{7\pi}{18}$

27) -3π

-3π

Graph using transformations.

$$y=\frac{1}{2}\sin\left(\frac{\theta}{2}+\frac{3\pi}{4}\right)-1$$

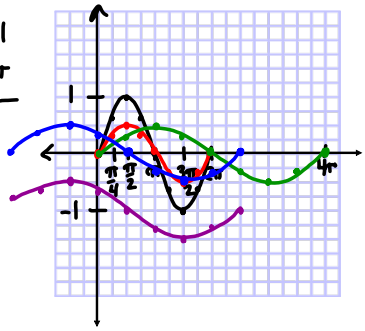
parent: $y=\sin\theta$ amp = 1, $P=2\pi$, P.S. = –

1) $y=\frac{1}{2}\sin\theta$ v.c.by $\frac{1}{2}$ amp = $\frac{1}{2}$

2) $y=\frac{1}{2}\sin\left(\frac{1}{2}\theta\right)$ h.s.by 2, $P=4\pi$

3) $y=\frac{1}{2}\sin\left(\frac{1}{2}\left(\theta+\frac{3\pi}{2}\right)\right)$ shift left $\frac{3\pi}{2}$ P.S. = $-\frac{3\pi}{2}$

4) $y=\frac{1}{2}\sin\left(\frac{\theta}{2}+\frac{3\pi}{4}\right)-1$ shift down 1



θ	y
0	0
$\frac{\pi}{4}$	$\frac{\sqrt{2}}{2}\approx.707$
$\frac{\pi}{2}$	1
$\frac{3\pi}{4}$	$\frac{\sqrt{2}}{2}$
π	0
$\frac{5\pi}{4}$	$-\frac{\sqrt{2}}{2}$
$\frac{3\pi}{2}$	-1
$\frac{7\pi}{4}$	$-\frac{\sqrt{2}}{2}$
2π	0

Graph using transformations.

$$y=\frac{1}{2}\sin\left(\frac{\theta}{2}+\frac{3\pi}{4}\right)-1$$

parent: $y=\sin\theta$ amp = 1, $P=2\pi$, P.S. = –

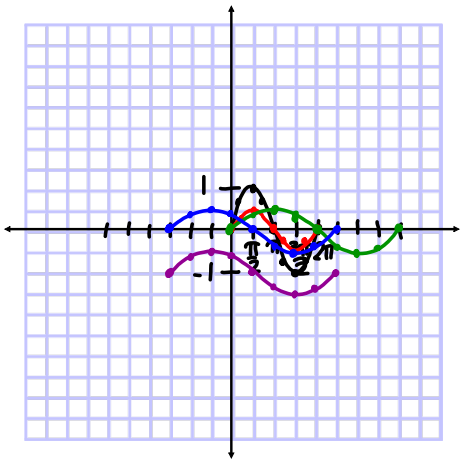
1) $y=\frac{1}{2}\sin\theta$ v.c.by $\frac{1}{2}$ amp = $\frac{1}{2}$

2) $y=\frac{1}{2}\sin\left(\frac{1}{2}\theta\right)$ h.s.by 2 $P=4\pi$

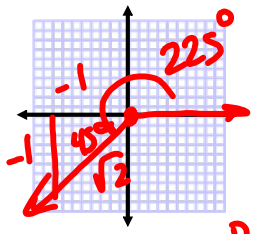
3) $y=\frac{1}{2}\sin\left(\frac{1}{2}\left(\theta+\frac{3\pi}{2}\right)\right)$ shift left $\frac{3\pi}{2}$

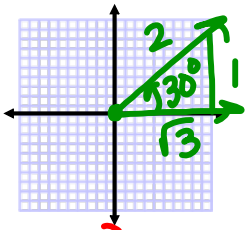
4) $y=\frac{1}{2}\sin\left(\frac{\theta}{2}+\frac{3\pi}{4}\right)-1$ shift down 1 P.S. = $-\frac{3\pi}{2}$

x	y
0	0
$\frac{\pi}{4}$	$\frac{\sqrt{2}}{2}\approx.707$
$\frac{\pi}{2}$	1
$\frac{3\pi}{4}$	$\frac{\sqrt{2}}{2}$
π	0
$\frac{5\pi}{4}$	$-\frac{\sqrt{2}}{2}$
$\frac{3\pi}{2}$	-1
$\frac{7\pi}{4}$	$-\frac{\sqrt{2}}{2}$
2π	0



$\sin 255^\circ$





$= \sin(225^\circ + 30^\circ)$

$= \sin 225^\circ \sin 30^\circ + \cos 225^\circ \cos 30^\circ$

$= \left(-\frac{\sqrt{2}}{2}\right)\left(\frac{1}{2}\right) + \left(-\frac{\sqrt{2}}{2}\right)\left(\frac{\sqrt{3}}{2}\right)$

$= -\frac{\sqrt{2}}{4} - \frac{\sqrt{6}}{4}$

$= -\frac{\sqrt{2}-\sqrt{6}}{4}$