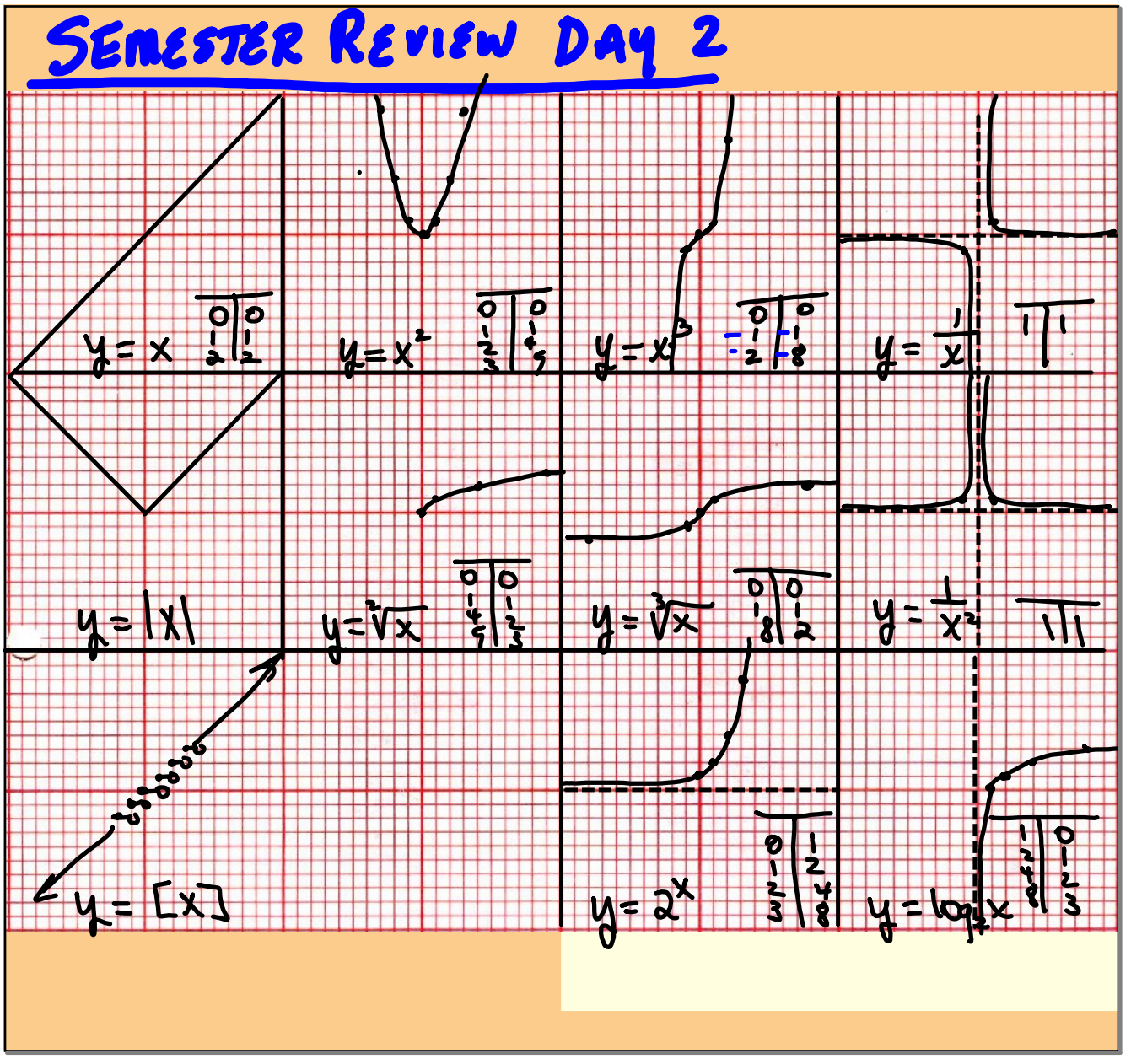
April 26, 2024

Semester Review Day 2



SEM. 2 REVIEW – DAY 2

Can Use:
* Pink sheet
* Normal curve table

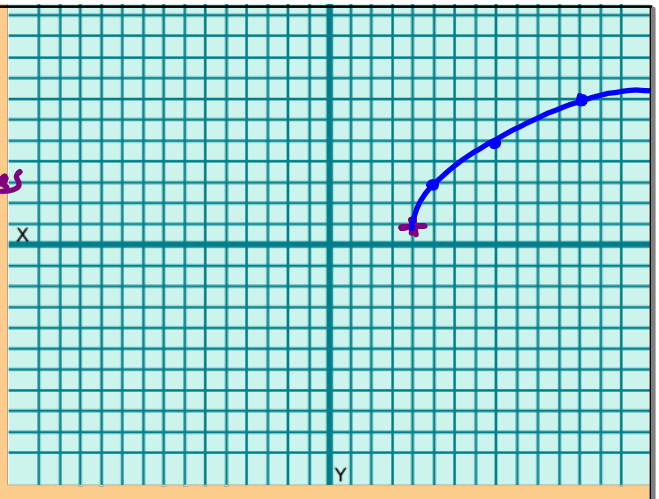
Will give:
Exp/Log formulas
Seq formulas

$y = 2\sqrt[3]{x-4} + 1$

Right 4 Up 1

0	0
1	1
4	2
9	3

0	0
1	2
4	4
9	6



$y = -2\sqrt{x-4} + 1$

0	0
1	-2
4	-4
9	-6

$y = 2\sqrt{9-x} + 1$

$2\sqrt{-(x-9)} + 1$

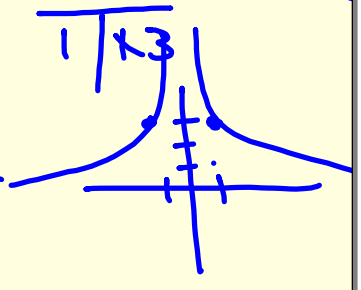
Right 9

0	0
-1	2
-4	4
-9	6

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

$y = 3 \cdot \frac{1}{x^2}$

1	3



$4^{2/3}$

5^{-2}

Rational Functions

Mult/Div ⇐ Factor + Cancel

⇒ Add/Subtract: Make common denoms

* Div - Keep/Change/Flip

$$\frac{2x+3}{x^2-16} + \frac{x+1}{x^2-4x}$$

1) Factor Denoms
2) Make Common Denoms

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23 @ $\left[\frac{1}{3x} - \frac{5}{3x} = \frac{x+4}{3x+1}\right]$ $3x(3x+1)$

$x(3x+1) - 5(3x+1) = 3x(x+4)$

$3x^2 + x - 15x - 5 = 3x^2 + 12x$

$-14x - 5 = 12x$

$\frac{-5}{26} = \frac{26x}{26}$

$-\frac{5}{26} = x$

Check for excluded values

Solve.

Excluded Values

$x \neq 0, -1/3$

Denom = 0 $\quad 3x+1=0$, $3x=-1$, $x=-\frac{1}{3}$

1) Factor Denoms.
2) Multiply by common denom + Cancel all denoms.

D / R = T

	D	R	T
up	20	15 - x	$\frac{20}{15-x}$
down	20	15 + x	$\frac{20}{15+x}$

Boat = 15 mph
Current = ?
Go 20 miles upstream & return in 5 hrs.
x = speed of current

$$\frac{20}{15-x} + \frac{20}{15+x} = 5$$

Upstream took 2 hours longer than downstream.

$$\frac{20}{15-x} - \frac{20}{15+x} = 2$$

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Exponential Functions

21) $y = 2^x$

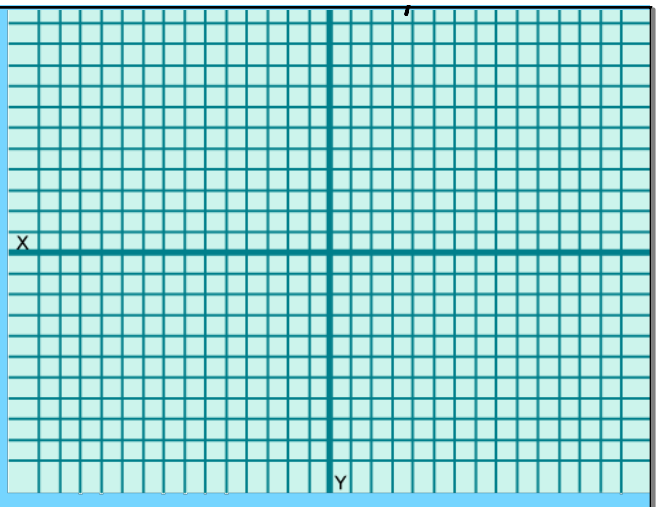
$y = 2^{x-4} - 3$

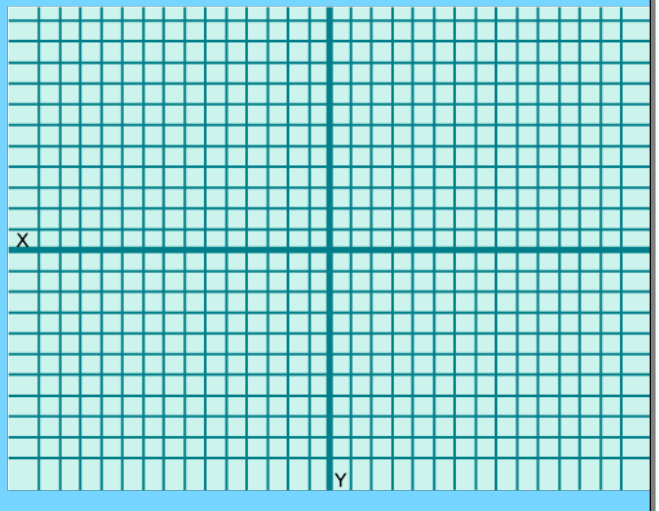
$y = -2^{x-4}$

$y = 2^{-(x-4)}$

Logs

$y = \log_2(x-4)+3$





LOGARITHMS

Like 30a Solve for x.

$\left(\frac{1}{16}\right)^{x-2} = \sqrt[3]{2^x}$

Make common bases!

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

$\left(2^{-4}\right)^{x-2} = 2^{x/3}$

$2^{-4x+8} = 2^{x/3}$

$3\left[-4x+8 = \frac{x}{3}\right]$

$-12x+24 = x$

$24 = 13x$

$x = \frac{24}{13}$

$5^{\log_5 3} = 3$

$\ln x = \log_e x$

$\log x = \log_{10} x$

$\log_5 125 = \log_5 5^3 = 3$

$\log_7 \frac{1}{49} = \log_7 7^{-2} = -2$

$\ln_e \sqrt[3]{e^2} = \ln e^{2/3} = 2/3$

Properties of Logs

$\log_b x + \log_b y = \log_b (xy)$

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

$\log_b x^p = p \cdot \log_b x$

Solve.

$2\log x - \log(x^2-10) = 1$

$\log x^2 - \log(x^2-10) = 1$

$\log\left(\frac{x^2}{x^2-10}\right) = 1$

1) Use properties to get one log on each side.
2) EXPONENTIATE!

$10^{\log_{10}\left(\frac{x^2}{x^2-10}\right)} = 10^1$

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

$x^2 = 10x^2 - 100$

$-10x^2$

$-9x^2 = -100$

$\frac{-9x^2}{-9} = \frac{-100}{-9}$

$\sqrt{x^2} = \sqrt{\frac{100}{9}}$

$x = \pm \frac{10}{3}$

Check for + values in original problem

Pop. of Seneca ≈ 2000
Growing 2.3%
How many years to have pop. of 5000?

$N = N_0(1 \pm r)^t$

$\frac{5000}{2000} = \frac{2000(1+0.023)^t}{2000}$

$2.5 = (1.023)^t$

$\frac{\log 2.5}{\log 1.023} = \frac{t \cdot \log 1.023}{\log 1.023}$

$40.3 = t$

STATS

$\{3, 7, 9, 17\}$

Find st. dev.

1) Find mean = $\frac{36}{4} = 9$
2) Data - mean $(-6)^2 + (-2)^2 + (0)^2 + (8)^2$
3) Square Difference $36 + 4 + 64 = \sqrt{\frac{104}{4}}$
4) Find mean of square
5) Square root

Find Med + Q_1, Q_3 Med = 72, Q_1 = 65, Q_3 = 77

$IQR = Q_3 - Q_1$

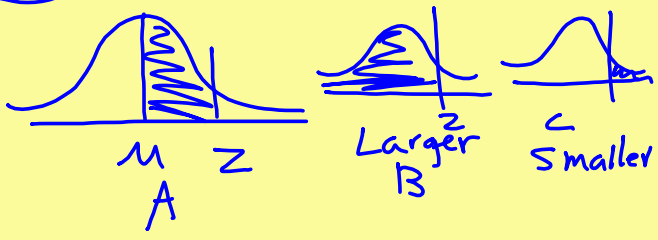
Outliers: $IQR * 1.5 = \#$

lower: $Q_1 - \#$

upper: $Q_3 + \#$

Normal Distribution

$$Z = \frac{\text{Raw score} - \text{Mean}}{\text{St. Dev}} = \frac{x - \mu}{\sigma}$$



500 H.S. 100 m dash competitors

$\mu = 8.0$ sec $\sigma = 0.4$

How many runners below 7 sec?

$$Z = \frac{7 - 8}{0.4} = \frac{1}{0.4} = 2.5$$

0.___ * 500 = ___

Ans.

Permutations

All objects
Part of objects
Alike:

Special positions or repeat:

Combinations:

Conditional Prob.

PROBABILITY = **ODDS=**

Combinations 1)
2)
3)

Order:

Replacement:

Binomial Prob -

AND

OR

At Least/At Most