

No Calculator

Find videos on each [skill] at [www.TonkaMath.com](http://www.TonkaMath.com) Name: \_\_\_\_\_

KEY

Hour: \_\_\_\_\_

CALC 20 Version 1- getting ready for calculus

1. Solve for x:  $rx + 5 = 5x - 2$  [280]

$$rx - 5x = -7$$

$$x(r - 5) = -7$$

$$x = \frac{-7}{r-5}$$

2. Solve  $5x^3 + 11x^2 + 2x = 0$  [281]

$$x(5x^2 + 11x + 2) = 0$$

$$x(5x+1)(x+2) = 0$$

$$x=0 \quad x=-\frac{1}{5} \quad x=-2$$

3. Factor and solve  $3e^{2x} + 5e^x - 2 = 0$  [282]

let  $e^x = u$

$$3u^2 + 5u - 2 = 0$$

$$(3u - 1)(u + 2) = 0$$

$$u = \frac{1}{3} \quad u = -2$$

$$e^x = \frac{1}{3} \quad e^x = -2$$

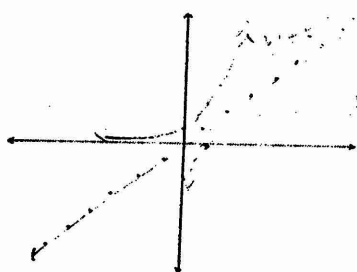
Aka

$$\ln \frac{1}{3} = x \quad \log_e \frac{1}{3} = x$$

$$\log_e -2 = x \quad \text{not}$$

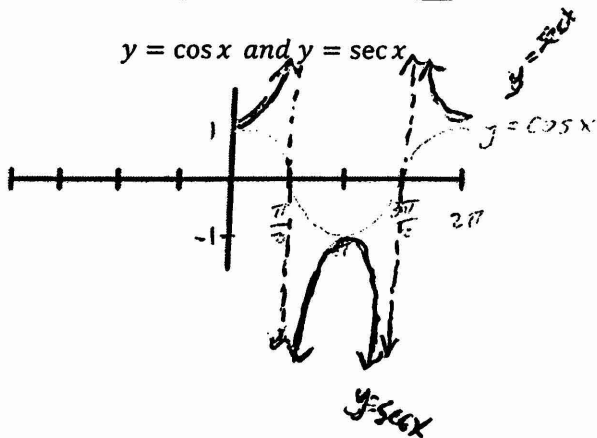
4. Make a rough sketch of each of the following on the same graph: [283]

$y = e^x$  and  $y = \ln x$  and  $y = x$



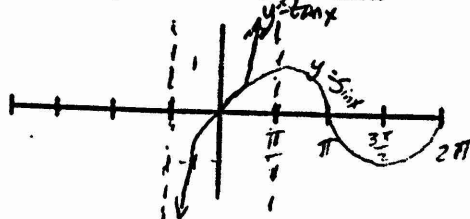
5. Make a rough sketch of each of the following -LABEL both Axes: [284]

$y = \cos x$  and  $y = \sec x$



6. Make a rough sketch of each of the following - LABEL both of the Axes: [285]

$y = \sin x$  and  $y = \tan x$



7. What is the equation for a circle and that equation solved for y=? [286]

$$x^2 + y^2 = r^2$$

$$y^2 = r^2 - x^2$$

$$y = \pm \sqrt{r^2 - x^2}$$

8. Solve for y by knowing what multiplying by negative one really does to subtract:

$$-y = x^2 - \ln 3 \quad [287]$$

$$y = \ln 3 - x^2 \quad \leftarrow \text{note - They switch around}$$

9. Exponentiate from base e to solve for y:

$$\ln y = (x^2 + \ln 3) \quad [288]$$

Since  $e^{\ln y} = e^{\log_e y} = y$

$$y = e^{x^2} \cdot e^{\ln 3} \rightarrow y = e^{x^2} \cdot 3$$

10. Exponentiate from base e to solve for y:

$$\ln |y + 1| = x^2 - e^3 \quad [289]$$

$$|y + 1| = e^{(x^2 - e^3)}$$

$$y + 1 = \pm e^{(x^2 - e^3)}$$

$$y = \pm e^{(x^2 - e^3)} - 1$$

11. Take the log of both sides to solve for x:

$$2^x = 10 \quad [290]$$

I chose to strategically use log base 2

$$\log_2 2^x = \log_2 10$$

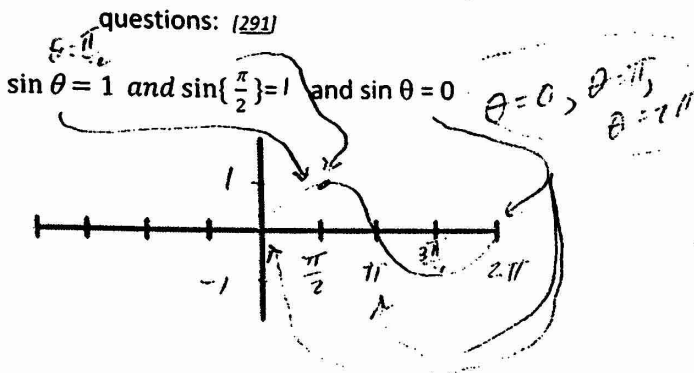
on both sides

$$x = \log_2 10$$

yes... This has the same effect as a

"rewrite into log form"

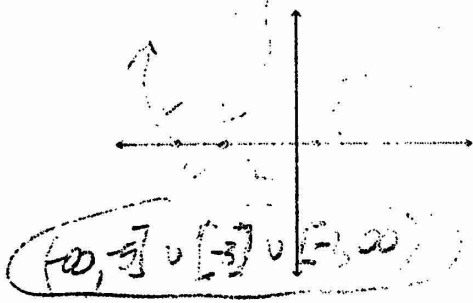
12. Make a detailed graph of one period of  $y = \sin x$  to answer the following



13. Make a detailed graph of the following polynomial to answer the following:

$f(x) = (x+3)^2(x+5)^3(x-1)$  [292]

solve  $f(x) \geq 0$ , answer in interval notation.



14. Use long division to see if  $x = 2$  is a root of  $f(x) = 5x^2 - 13x + 6$  [293]

if  $f(2) = 0$  then it's a root  $5(2)^2 - 13(2) + 6$

or

$$\begin{array}{r} 5x - 3 \\ x-2 \overline{) 5x^2 - 13x + 6} \\ \underline{-5x^2 + 10x} \phantom{+ 6} \\ -3x + 6 \\ \underline{-3x + 6} \\ 0 \end{array}$$

$20 - 26 + 6 = 0$

yes!

even rule  
 $f(-x) = f(x)$

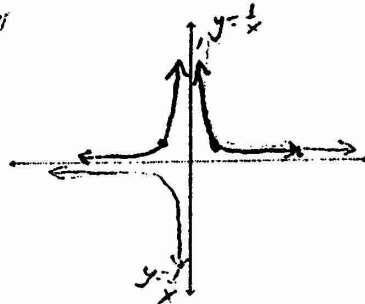
15. Prove that this fn is even or odd: odd rule  
 $f(x) = 5x^2 + 4$  [294]  $f(-x) = -f(x)$

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

so...  
 $f(-x) = f(x)$  ∴ it's even

16. Make a rough sketch of each of the following: [295]

$y = \frac{1}{x}$  and  $y = \frac{1}{x^2}$  make one dashed.



17. Use long division to make  $\frac{x+2}{x-4}$  into 1 plus a fraction [296]

$$\frac{x+2}{x-4} = 1 + \frac{6}{x-4}$$

$1 + \frac{6}{x-4}$

18. Build an inverse of this function:

$y = \frac{2x}{x-7}$  [297]  $x = \frac{2y}{y-7}$

$x(y-7) = 2y$

$xy - 7x = 2y$

$xy - 2y = 7x$

$y(x-2) = 7x$   
 $y = \frac{7x}{x-2}$

19. Solve:  $\frac{\frac{4}{x} + 2}{\frac{1}{x}} = 4$  [298]

mult by x  
 $\frac{4 + 2(x)}{1} = 4$   
 $\frac{1}{x}(x) = 4$

$\frac{4+2x}{1} = 4$

$4+2x = 4$

$2x = 0$

$x = 0$

but this crashes fun so... ext.

NO Solution

20. If  $f(x) = 3x^2 - 5x + 2$ , find and simplify  $f(x+h)$  [299]

$3(x+h)^2 - 5(x+h) + 2$

$3(x^2 + 2hx + h^2) - 5x - 5h + 2$

$3x^2 + 6hx + 3h^2 - 5x - 5h + 2$