No Calculator

Find videos on each *[skill]* at www.TonkaMath.com Name: KEY Hour:

CALC 20 Version 2- getting ready for calculus

1. Solve for x: $-4 + ax = 9x + 7$ [280]

$ax - 9x = 7 + 4$

$x(a-9) = 11$

$x = \frac{11}{a-9}$

2. Solve $4x^3 + 10x^2 - 14x = 0$ [281]

$x(4x^2 + 10x - 14) = 0$

$x(2x-2)(2x+7) = 0$

$x = 0 \quad x = 1 \quad x = -\frac{7}{2}$

3. Factor and solve $5e^{2x} - 13e^x - 6 = 0$ [282]

let $u = e^x$ $5u^2 - 13u - 6 = 0$

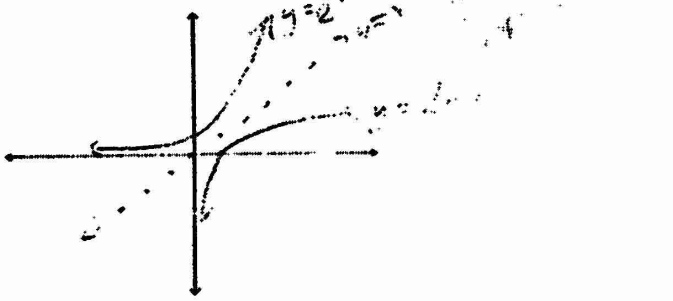
$(5u+2)(u-5) = 0$

$u = -\frac{2}{5} \quad u = 5$

ext - neg alg. $e^x = -\frac{2}{5}$ $e^x = 5$ $x = \ln 5$

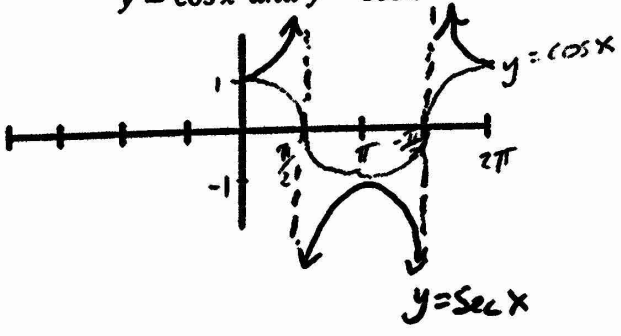
4. Make a rough sketch of each of the following on the same graph: [283]

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



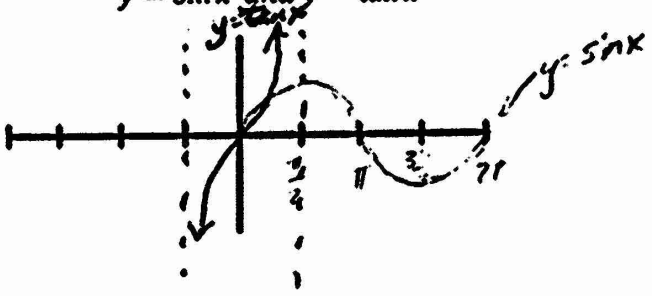
5. Make a rough sketch of each of the following –LABEL both Axes: [284]

$y = \cos x$ *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:

$-2m = r^2 - \ln 5$ [287]

$m = \frac{r^2 - \ln 5}{-2}$ or $\frac{\ln 5 - r^2}{2}$

9. Exponentiate from base 3 to solve for y:

$\log_3 y = 2x + \log_3 4$ [288]

$3^{\log_3 y} = 3^{2x + \log_3 4}$

$y = 3^{2x} \cdot 3^{\log_3 4}$ so... $y = 3^{2x} \cdot 4$

10. Exponentiate from base e to solve for y:

$\ln|y+4| = 2x^2 + e^5$ [289]

$e^{\ln|y+4|} = e^{2x^2 + e^5}$

$|y+4| = e^{2x^2 + e^5}$

$y + 4 = \pm e^{2x^2 + e^5}$

$y = \pm e^{(2x^2 + e^5)} - 4$

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

$8^x = 14$ [290] I chose to use log base 8

$\log_8 8^x = \log_8 14$

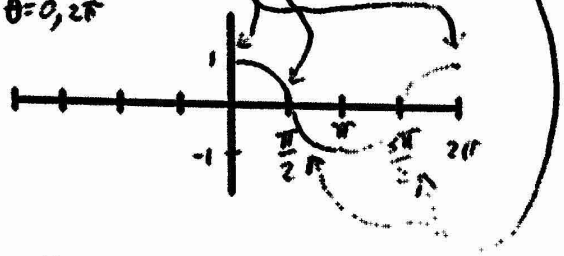
$x = \log_8 14$

12. Make a detailed graph of one period of $y = \cos x$ to answer the following questions: [291]

See how easy that was if you make a sketch!

$\cos\theta = 1$ and $\cos\left(\frac{\pi}{2}\right) = 0$ and $\cos\theta = 0$ $\theta = \frac{\pi}{2}$ and $\frac{3\pi}{2}$

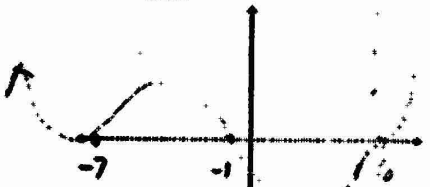
$\theta = 0, 2\pi$



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

$f(x) = (x+7)^2(x-6)^3(x+1)$ [292]

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



$[-7] \cup [-1, 6]$

14. Use long division to see if x = 3 is a root of $f(x) = 5x^2 - 13x - 6$ [293]

$f(3) = 5(3)^2 - 13(3) - 6$

$45 - 39 - 6$

0

Since $f(3) = 0$ it's a zero!

$$x-3 \overline{)\,5x^2 - 13x - 6}$$

$5x + 2$

$-5x^2 + 15x$

$2x - 6$

$-2x + 6$

0

yes!

15. Prove that this fn is even or odd:

$f(x) = x^3 + 8x$ [294]

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

$f(-x) = -f(x)$ for odd

$f(-x) = (-x)^3 + 8(-x)$

$f(-x) = -x^3 - 8x$

$-f(x)$

$-(x^3 + 8x)$

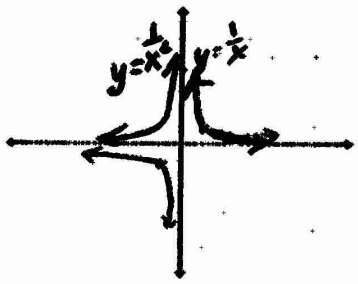
$-x^3 - 8x$

So $f(-x) = -f(x)$

∴ odd

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 $\frac{x-9}{x+2}$ into 1 plus a fraction [296]

$1 + \frac{11}{x-9}$

$$x+2 \overline{)\,x - 9}$$

$1 + \frac{11}{x-9}$

$-x - 9$

11

18. Build an inverse of this function:

$y = \frac{3x}{x+7}$ [297]

$x = \frac{3y}{y+7}$

$x(y+7) = 3y$

$xy + 7x = 3y$

$xy - 3y = -7x$

$y(x-3) = -7x$

$y = \frac{-7x}{x-3}$

19. Solve: $\frac{\frac{4}{2x} + 3}{\frac{1}{2x}} = 5$ [298]

(2x)

$\frac{4 + 6x}{1} = 5$

$6x = 1$

$x = \frac{1}{6}$

20. If $f(x) = -x^2 - 2x + 4$, find and simplify f(x+h) [299]

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

$-(x^2 + 2hx + h^2) - 2x - 2h + 4$

$-x^2 - 2hx - h^2 - 2x - 2h + 4$