Name (printed legibly): Solutions

Directions: The quiz contains 20 problems, and each problem is worth one point. Place your answer in the blank provided. For graphing questions, a set of axes are provided. **Calculators are not allowed.**

For this quiz only, no partial credit will be given.

Please circle your instructor: Leah Berman (10:30-11:30) Jill Faudree (9:15-10:15)

1. Evaluate $9^{-3/2}$.

$\left(\frac{1}{9}\right)^{3/2} = \left[\left(\frac{1}{9}\right)^{\frac{1}{2}}\right]^3 = \left(\frac{1}{3}\right)^3 = \frac{1}{27}$

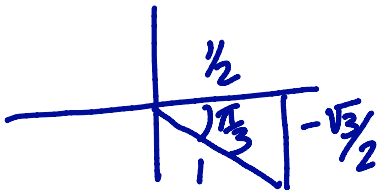
$\frac{1}{27}$

2. Find the exact value of $\log_2\left(\frac{1}{8}\right)$.

$\log_2 \frac{1}{8} = \log_2 2^{-3} = -3$

-3

3. Find the exact value of $\cos\left(\frac{5\pi}{3}\right)$.



$\frac{5\pi}{3} = \frac{6\pi}{3} - \frac{\pi}{3}$

$\frac{1}{2}$

4. Simplify the expression $\left(\frac{5x^2y}{x^5y^{7/2}}\right)^2$. Write your answer without negative exponents.

$\left(\frac{5x^2y}{x^5y^{7/2}}\right)^2 = \left(\frac{5}{x^3y^{5/2}}\right)^2 = \frac{25}{x^6y^5}$

$\frac{25}{x^6y^5}$

5. Write an equation in slope-intercept form $y = mx + b$ for the line that passes through the points $(-7,3)$ and $(-9,-3)$.

$m = \frac{3-(-3)}{-7-(-9)} = \frac{6}{2} = 3$

$y - 3 = 3(x+7) = 3x+21$

$y = 3x+24$

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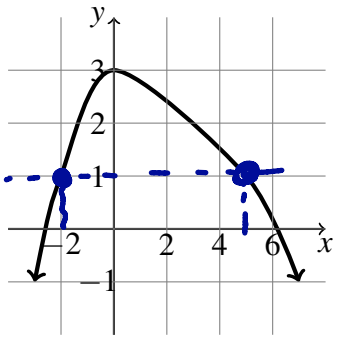
6. Expand and simplify $(5x+1)^2-4(x-7)$.

$25x^2+10x+1-4x+28$

$= 25x^2+6x+29$

$25x^2+6x+29$

7. Use the graph of $f(x)$ below to estimate the value(s) of x such that $f(x)=1$.



$x=-2, 5$

$x=-2,5$

8. For the function $f(x)=\frac{5}{x}$, find the expression $f(12+h)-f(12)$. Simplify your answer and write your answer as a single fraction.

$f(12+h)-f(12)=\frac{5}{12+h}-\frac{5}{12}$

$=\frac{5\cdot 12-5(12+h)}{12(12+h)}=\frac{-5h}{12(12+h)}$

$\frac{-5h}{12(12+h)}$

9. Given the piecewise defined function below, determine the value(s) of x such that $f(x)=-20$.

$$f(x)=\begin{cases}2x+7 & x<0\\ x^3 & x\geq 0\end{cases}.$$

$x<0$: $-20=2x+7$ or $x=-27/2$

$x\geq 0$: $-20=x^3$ or $x=\sqrt[3]{-20}$? but that's negative!

$x=-27/2=-13.5$

10. Solve for x in the equation $x^2+5x=14$.

$x^2+5x-14=0$

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

$x=-7,\ x=2$

11. Solve for x in the equation $e^{4-7x} = \frac{1}{3}$.

$4-7x = \ln(1/3)$

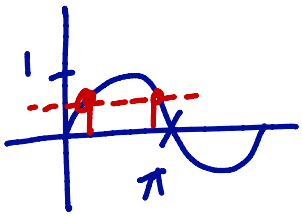
$x = \dfrac{4-\ln(1/3)}{7}$

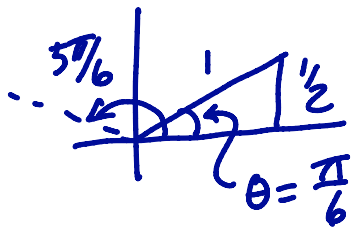
$x = (4-\ln(1/3))/7 = \dfrac{4+\ln 3}{7}$

or $\dfrac{\ln(\frac{1}{3})-4}{-7}$ or $\dfrac{\ln 3 - 4}{-7}$

12. Find all solutions to the equation $2\sin(\theta) = 1$ in the interval $[0, 2\pi]$.

$\sin\theta = 1/2$





$\theta = \pi/6, 5\pi/6$

13. A table of values for the function $f(x)$ is given below. Use the table to determine $f^{-1}(2)$.

x	-2	0	2	4	6	8	10	12	14
$f(x)$	20	8	4	-2	6	10	2	-3	-1/3

$f(10) = 2 \Rightarrow f^{-1}(2) = 10$

$f^{-1}(2) = 10$

14. Solve the inequality $36 - x^2 \leq 0$. Give your answer in interval notation.

$36 - x^2 \leq 0$ or $x^2 \geq 36$

So $x \geq 6$ or $x \leq -6$

$(-\infty, -6] \cup [6, \infty)$

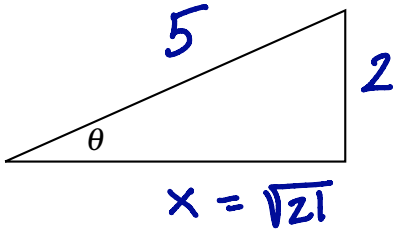
15. Determine the domain of $f(x) = \ln(x+3)$. Give your answer in interval notation.

We need $x+3 > 0$

$x > -3$

$(-3, \infty)$

16. In the triangle below, $\sin\theta = \frac{2}{5}$. Determine $\tan\theta$.

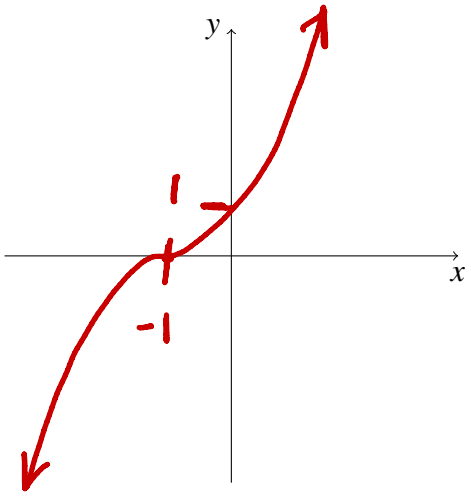


$x^2 = 5^2 - 2^2 = 25 - 4 = 21$

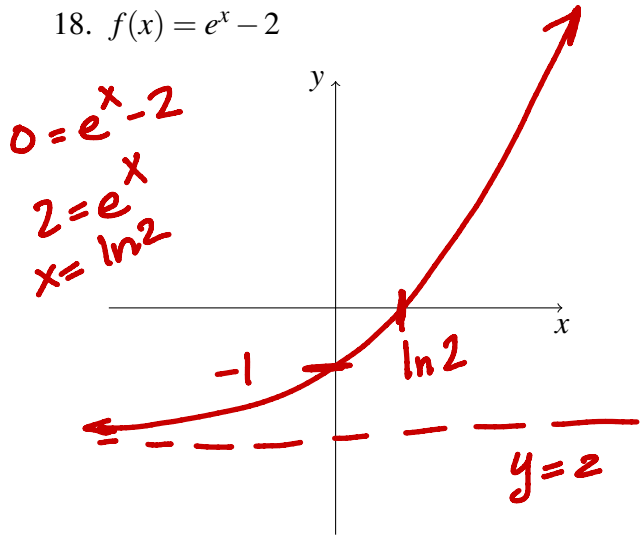
$\tan\theta = \dfrac{2}{\sqrt{21}}$

Sketch graphs of the following functions. Label the x- and y-intercepts, if they exist. Draw in any asymptotes using dashed lines, and write the equation of the asymptote, if it exists.

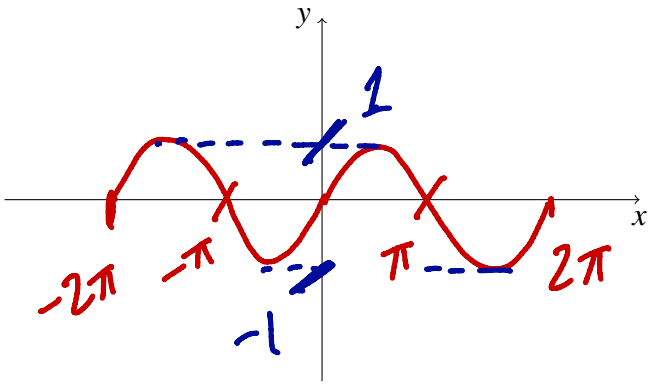
17. $f(x) = (x+1)^3$



18. $f(x) = e^x - 2$



19. $y = \sin(x)$ on the interval $[-2\pi, 2\pi]$



20. Given the graph of $f(x)$ below, draw the graph of $-2f(x)$.