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.

DUE: Friday Sept 13 at the beginning of class.

1. Evaluate $16^{-3/4}$.

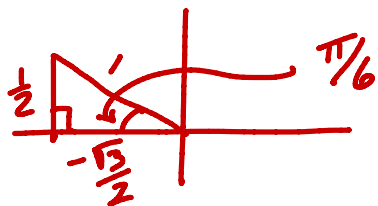$$16^{-3/4} = \frac{1}{16^{3/4}} = \frac{1}{2^3} = \frac{1}{8}$$

$$\underline{\qquad 1/8 \qquad}$$

2. Find the exact value of $\log_5\left(\dfrac{1}{25}\right)$.

$$\log_5 5^{-2} = -2$$

$$\underline{\qquad -2 \qquad}$$

3. Find the exact value of $\tan\left(\dfrac{5\pi}{6}\right)$.

$$\frac{opp}{adj} = \frac{\frac{1}{2}}{-\frac{\sqrt{3}}{2}} = \frac{-1}{\sqrt{3}}$$

$$\underline{\qquad -\frac{1}{\sqrt{3}} \qquad}$$

4. Simplify the expression $\left(\dfrac{x^4y}{3x^6y^{4/5}}\right)^2$. Write your answer without negative exponents.

$$\left(\frac{y^{1/5}}{3x^2}\right)^2 = \frac{y^{2/5}}{9x^4}$$

$$\underline{\qquad \frac{y^{2/5}}{9x^4} \qquad}$$

5. Write an equation in slope-intercept form $y = mx + b$ for the line that passes through the points $(10, -2)$ and $(-4, 6)$.

$$m = \frac{6 - (-2)}{-4 - 10} = \frac{8}{-14} = \frac{-4}{7}$$

$$\underline{\qquad y = \frac{-4}{7}x + \frac{26}{7} \qquad}$$

$$y - 6 = \frac{-4}{7}(x+4) = \frac{4}{7}x - \frac{16}{7}. \quad \text{So } y = \frac{-4}{7}x - \frac{16}{7} + \frac{42}{7} = \frac{-4}{7}x + \frac{26}{7}$$
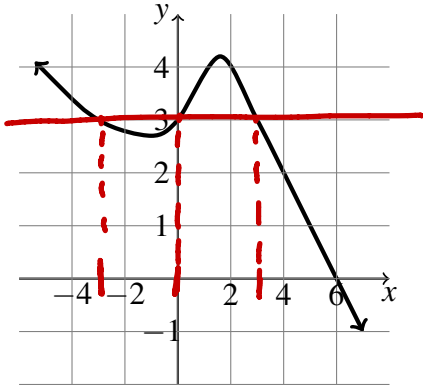
1

6. Expand and simplify $x(4+2x) - (3-x)^2$.

$4x + 2x^2 - (9 - 6x + x^2)$

$= 4x + 2x^2 - 9 + 6x - x^2$

$= x^2 + 10x - 9$

$\underline{\qquad x^2 + 10x - 9 \qquad}$

7. Use the graph of $f(x)$ below to estimate the value(s) of x such that $f(x) = 3$.

$\underline{\qquad X = -3, 0, 3 \qquad}$

8. For the function $f(x) = \frac{8}{x}$, find the expression $f(4+h) - f(4)$. Simplify your answer and **write your answer as a single fraction**.

$f(4+h) - f(4) = \dfrac{8}{4+h} - \dfrac{8}{4} = \dfrac{8 \cdot 4 - 8(4+h)}{4(4+h)}$

$= \dfrac{-8h}{4(4+h)}$

$\dfrac{-8h}{4(4+h)} = \dfrac{-8h}{16+4h}$

$= \dfrac{-2}{4+h}$

9. Given the piecewise defined function below, determine the value(s) of x such that $f(x) = 12$.

$f(x) = \begin{cases} 3x+1 & x < 0 \\ x^5 & x \geq 0 \end{cases}$.

$X < 0:$ $3x + 1 = 12$ or $x = \frac{11}{3}$ ← _Not negative._

$X \geq 0,$ $x^5 = 12$ or $X = (12)^{1/5}$ ok ✓

$\underline{\qquad X = (12)^{1/5} = \sqrt[5]{12} \qquad}$

10. Solve for x in the equation $2x^2 = 15 - 7x$.

$2x^2 + 7x - 15 = 0$

$(2x - 3)(x + 5) = 0$

$x = \frac{3}{2}$ or $X = -5$

$\underline{\qquad X = \frac{3}{2} \text{ or } x = -5 \qquad}$

2

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

$e^{1-x} = \frac{4}{3}$

$1-x = \ln\left(\frac{4}{3}\right)$

So $x = 1 - \ln\left(\frac{4}{3}\right)$

$= 1 + \ln\left(\frac{3}{4}\right)$

$= 1 + \ln 3 - \ln 4$

$\underline{x = 1 - \ln\left(\frac{4}{3}\right)}$

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

$1 + 2\sin\theta = 0$ or

$\sin\theta = -\frac{1}{2}$

$\pi + \frac{\pi}{6} = \frac{7\pi}{6}$

$2\pi - \frac{\pi}{6} = \frac{11\pi}{6}$

$\underline{\theta = \frac{7\pi}{6} \text{ or } \theta = \frac{11\pi}{6}}$

13. A table of values for the function $f(x)$ is given below. Use the table to determine $f^{-1}(4)$.

x	-2	0	2	4	6	8	10	12	14
$f(x)$	1	2	2.5	3	3.9	4	5	7	11

$\underline{\quad\quad 8 \quad\quad}$

If $f(8) = 4$, then $f^{-1}(4) = 8$

14. Solve the inequality $x^2 - 81 \leq 0$. Give your answer in interval notation.

$x^2 \leq 81$

$-9 \leq x \leq 9$

$\underline{[-9, 9]}$

15. Determine the domain of $f(x) = \ln(2x+1)$. Give your answer in interval notation.

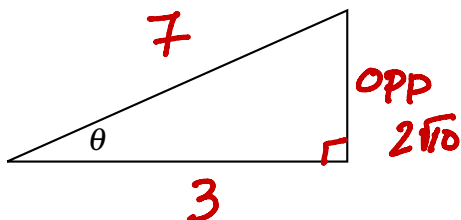We need

$2x + 1 > 0$

So $x > -\frac{1}{2}$

$\underline{\left(-\frac{1}{2}, \infty\right)}$

16. In the triangle below, $\cos\theta = \frac{3}{7}$. Determine $\sin\theta$.
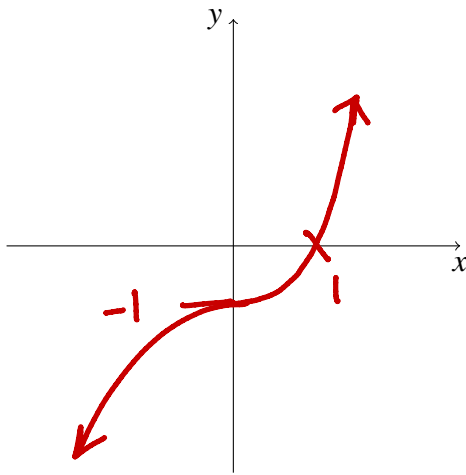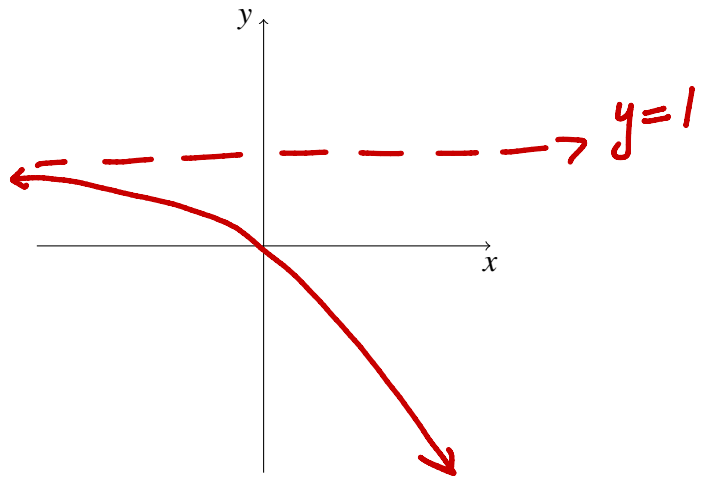
$opp = \sqrt{49-9}$

$= \sqrt{40}$

$= 2\sqrt{10}$

$\underline{\sin\theta = \frac{2\sqrt{10}}{7}}$

OPP $2\sqrt{10}$

7

3

θ

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.**
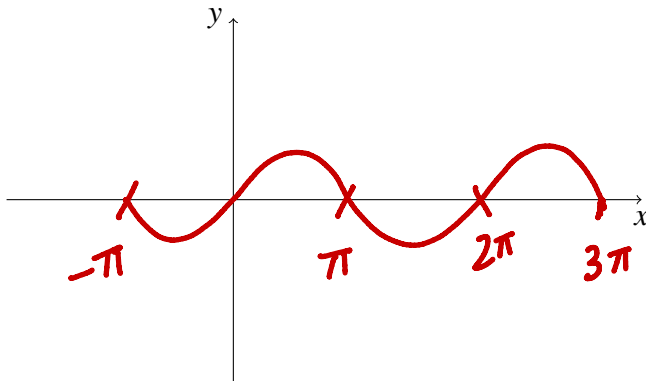
17. $f(x) = x^3 - 1$

18. $f(x) = 1 - e^x$

$y = 1$

19. $y = \sin(x)$ on the interval $[-\pi, 3\pi]$

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

$f(x)$