Name ____ MTH 1000 - Precalculus

PRACTICE ADVANCED STANDING EXAM

1. Find the x and y-intercepts for the following:

$$x^2 = 1000 - y^3$$

x-int: y-int:

2. Find the equation of the line (in $y = mx + b$ form) that passes through the following points: $(2,1)$ and $(4,-5)$

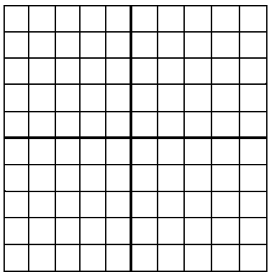
3. Give the domain of the following functions:

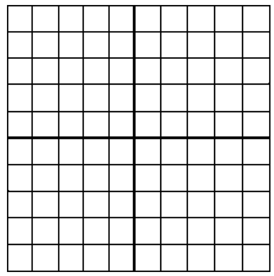
$f(x) = \frac{x-9}{x^2-x-12}$

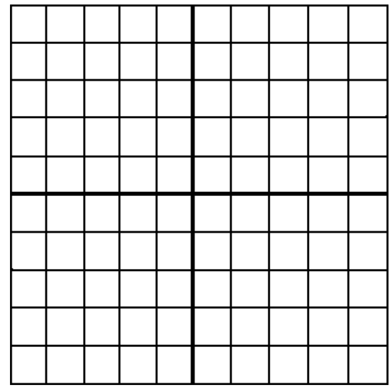
$g(x) = \sqrt{200-40x}$

4. Graph the following piecewise function: $f(x)=\begin{cases} x^2 & \text{if } x \le 2 \\ -\frac{3}{2}x+4 & \text{if } x > 2 \end{cases}$

(Hint: It may help to graph the pieces separately first.)







5. Find the coordinates of the vertex:

$f(x)=4(x+3)^2+5$

$f(x)=5x^2-10x+7$

6. Divide the following polynomials and find a Quotient and a Remainder:

$(2x^3+7x^2-10x-1)\div(2x-1)$

7. Identify the vertical and horizontal asymptotes:

$$f(x) = \frac{x-3}{x^2-4} \qquad\qquad f(x) = \frac{2x^2-3}{x^2-12x+35}$$

8. Solve the following Inequality:

$$\frac{2}{x+2} \geq \frac{1}{x-1}$$

9. Perform the indicated function compositions using the following formulas:

$$f(x) = x+1 \qquad\qquad g(x) = x^2-5$$

$(g \circ f)(x) =$

$(g \circ f \circ f)(0) =$

10. Find the inverse of the following function:
[Be sure to indicate if there are any restrictions on the domain of the inverse.]

$f(x) = \sqrt{x-2}$ $\qquad$ $f^{-1}(x) =$

Domain:

11. Solve the following equations:

$2^{x+2} = 32$

$\ln(x-4) = 2$

Solve for *x*:

12. $\log(x-3) + \log x = 1$

13. Convert the following into the specified units:

20 degrees = _______ radians

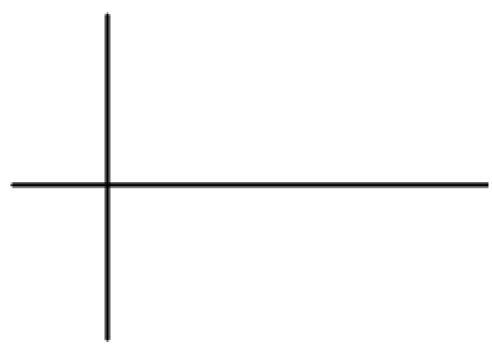
$\frac{\pi}{18}$ radians = _______degrees

14. Find the exact value of the following:
[Note: The angles are in radians.]

$\sec\frac{3\pi}{4} =$ $\cot\frac{7\pi}{3} =$ $\sin(4\pi) =$

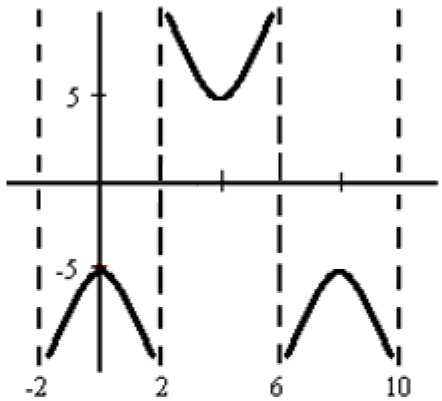
15. Graph the following trig function:
Be sure to label your axes appropriately. [Note: The angles are in radians.]

$f(x) = 3\sin\left(\frac{1}{40}x\right)$



Amp:

Period:

16. 

Write an equation that describes the above graph:
[Note: The angles are in radians and there is no phase shift.]

17. Find the exact value of the given trig function:
(Note: The angles are measured in radians.)

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

$\cos^{-1}\left[\cos\left(\frac{4\pi}{3}\right)\right]=$

$\cos\left[\tan^{-1}\left(-\frac{2}{3}\right)\right]=$

18. Prove the following trigonometric identity:

$\cot\theta+\frac{\sin\theta}{1+\cos\theta}=\csc\theta$

Find the exact value of the following:

19. $\sin\left(\cos^{-1}\left[\frac{4}{5}\right] + \tan^{-1}\left[\frac{2}{3}\right]\right) =$

Use the following formulas to help answer the question above:

Angle Sum & Difference Formulas:

$$\sin(A+B) = \sin A \cos B + \cos A \sin B$$
$$\sin(A-B) = \sin A \cos B - \cos A \sin B$$

$$\cos(A+B) = \cos A \cos B - \sin A \sin B$$
$$\cos(A-B) = \cos A \cos B + \sin A \sin B$$

20. Find all solutions in the interval $0 \le \theta < 2\pi$:
[Note: The angles are measured in radians.]

$$2\sin^2\theta + 5\sin\theta - 3 = 0$$

21. Find the value of θ [in radians] in the First Quadrant where $\cos\theta = \frac{1}{2}$, then find the values of the other five trig functions for that same angle θ.

$\cos\theta = \frac{1}{2}$ $\theta =$

$\sin\theta =$

$\tan\theta =$

$\sec\theta =$

$\csc\theta =$

$\cot\theta =$