What do you remember from Pre-Calculus 12?

Name: _____ ____ / 28

No calculator. Formulas:

- $\sin 2\theta = 2\sin\theta\cos\theta$
- $\cos 2\theta = \cos^2\theta - \sin^2\theta = 2\cos^2\theta - 1 = 1 - 2\sin^2\theta$
- $\sin(A \pm B) = \sin A\cos B \pm \cos A\sin B$

1. Simplify $\log_8 16$

2. $f(x) = \sqrt{2x-1} + 1$
   a. Find the equation of $g(x) = f^{-1}(x)$.

   b. Find the range of $g(x)$.

3. $x^2 + y^2 = 1$
   a. Sketch this graph

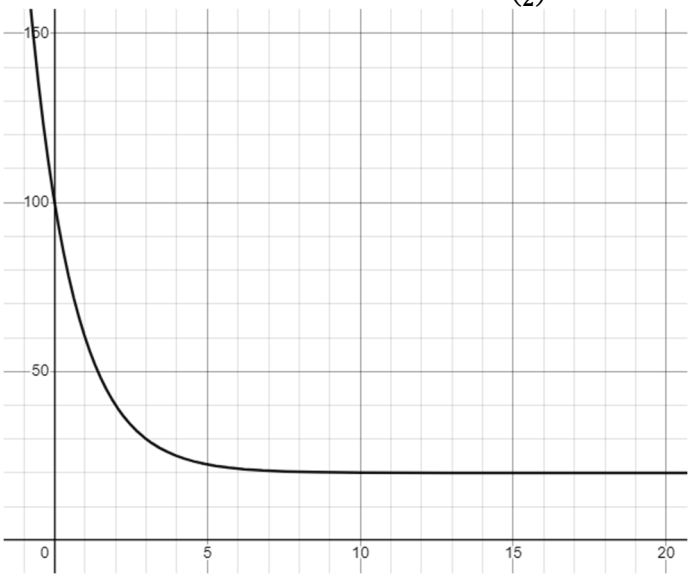
   b. Find the range of $y = \sqrt{1 - x^2}$

4. $y = 2^{1-x} + 3$
   a. Find the y-intercept.

   b. Find the equation of the horizontal asymptote.

   c. Sketch this graph.

5. See the temperature graph below $C = A\left(\frac{1}{2}\right)^t + B$:



a. Find B, the ambient room temperature

b. Find A

6. $y = \ln(-2x)$. If possible, sketch this graph and label the x-intercept.

7. Solve $2^{3x-1} = 3^{2x}$. Express your answer in the form $x = \log_a b$, $a \in \mathbb{Q}, b \in \mathbb{Z}$.

8. Solve $\log_6(x+2) + \log_6(x-3) = 1$

9. Factor:
   a. $6x^2 + 10x - 4$

   b. $x^3 - 2x^2 + 5x - 10$

   c. $x^3 - 3x^2 + 4$

10. Sketch $f(x) = x(x-2)^2(x+4)^3$

11. $f(x) = \frac{x^2-2x}{x^3-4x}$. How many vertical asymptotes does $f(x)$ have?

12. $f(x) = \frac{x+1}{x^2-1}$

a. Sketch.

b. Domain?

c. Range?

13. $f(x) = \frac{2x+3}{x-2}$

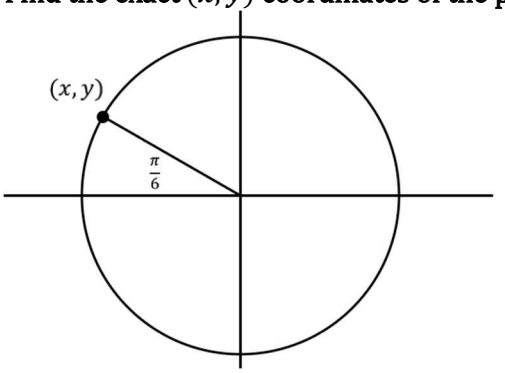
a. Find the (x, y) coordinates of where the asymptotes meet.

b. Solve $f(x) \geq 0$

14. Evaluate $\tan^2\left(\frac{4\pi}{3}\right)$

15. Given $\cos\theta = -\frac{3}{4}$ and $\sin\theta < 0$, find $\tan\theta$.

16. Find the exact (x, y) coordinates of the point below on the unit circle.



17. Solve $\tan\left(\frac{\pi x}{2}\right) - 1 = 0, x \in [0, 5]$

18. Solve the exact value of $\sin 15°$.