

Precal Semester 2 Quiz

Name: _____

Complete without a calculator.

1. Draw and label the inverse trig "rainbow" of ranges.

2. Evaluate.

a. $\sin^{-1}\left(\frac{\sqrt{3}}{2}\right) =$	b. $\tan^{-1}(-1) =$	c. $\cos^{-1}\left(\frac{\sqrt{2}}{2}\right) =$
d. $\operatorname{arcsec}(2) =$	e. $\operatorname{csc}^{-1}(-\sqrt{2}) =$	f. $\cot^{-1}\left(\frac{\sqrt{3}}{3}\right) =$

Verify the Trig Identities

3. $\cos\theta(\csc\theta - \sec\theta) = \cot\theta - 1$	4. $\frac{\sec\theta}{\csc^2\theta} = \sec\theta - \cos\theta$
5. $\cot\theta \csc\theta \tan^2\theta = \sec\theta$	6. $\cos^2 y - \sin^2 y = 1 - 2\sin^2 y$

Verify the Trig Identities.

$$7. \quad \frac{1 + \cos(x)}{\sin(x)} + \frac{\sin(x)}{\cos(x)} = \frac{\cos(x) + 1}{\sin(x)\cos(x)}$$

$$8. \quad \frac{1 + \sin\theta}{\cos\theta} = \frac{\cos\theta}{1 - \sin\theta}$$

$$9. \quad \frac{\cos^2 x}{\sec x} + \frac{\tan^2 x \cdot \cos x}{1 + \tan^2 x} = \cos x$$

$$10. \quad \frac{\sec\theta + \tan\theta}{\cos\theta + \cot\theta} = \sin\theta \sec^2\theta$$

Solve the trig equations.

11. $\sin^2 \theta - 1 = 0$

12. $\cot x = \sqrt{3}$

13. $\sin(2\theta) + \cos \theta = 0$

14. $\cos(2\theta) = 2 - 2\sin^2 \theta$

Solve the trig equations.

15. $2\sin\theta + \sqrt{3} = 0$

16. $\cos^3 x = 4\cos x$

17. $2\cos^2\theta - 5\cos\theta = -2$

18. $\cos(4x) + \sin(4x)\tan(4x) = 2$

Solve the triangles.

19. $\beta = 70^\circ$, $\gamma = 10^\circ$, $b = 5$

20. $a = 3$, $b = 4$, $\gamma = 40^\circ$

21. $\alpha = 40^\circ$, $a = 6$, $b = 8$

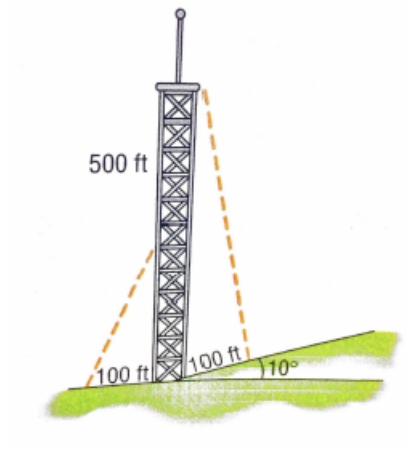
22. $a = 2$, $c = 1$, $\gamma = 100^\circ$

Applications.

23. A ship, off-shore from a vertical cliff known to be 100 feet in height, takes a sighting of the top of the cliff. If the angle of elevation is found to be 25° , how far offshore is the ship?

24. The height of a radio tower is 500 feet, and the ground on one side of the tower slopes upward at an angle of 10° .

How long should a guy wire be if it is to connect to the top of the tower and be secured at a point on the sloped side 100 feet from the base of the tower?



Convert logarithmic and exponential form.

25. $\log_{1/4} 16 = -2$	26. $3^{-3} = \frac{1}{27}$
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Evaluate.

27. $\log_{15} 15 =$	28. $\log_{16} \frac{1}{4} =$
29. $\log_8 512 =$	30. $\log_9 1 =$

Expand or Condense.

31. $\log_3 \left(\frac{2x}{\sqrt{yz}} \right)$	32. $\ln \sqrt[3]{ex}$
33. $4\log_b x - \log_b y + 3\log_b c$	34. $12\log_3 \sqrt[3]{x} + \log_3 (16x^2) - \log_3 2$

Find the inverse function.

35. $y = 4^{x-1} - 5$	36. $y = -\frac{1}{3}\ln(x+4) - 2$
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Solve the log equations.

37. $\log_6(x - 1) = 2$

38. $2\log_3(x) = \log_3(-6x + 7)$

39. $\log_{64}x = \frac{2}{3}$

40. $\log_2(x + 1) = \log_8 3x$

41. $\log_4(-x) + \log_4(x + 10) = 2$

42. $\log_2 x + \log_2(x - 2) = 3$

Solve the exponential equations.

43. $4^x = \frac{1}{64}$

44. $8^{x-1} = 32^{3x-2}$

45. $36^{5x+2} = \left(\frac{1}{6}\right)^{11-x}$

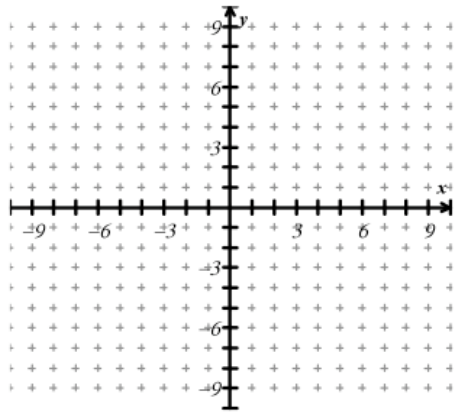
46. $3^{x+4} = 6^{2x-5}$

Conic Sections.

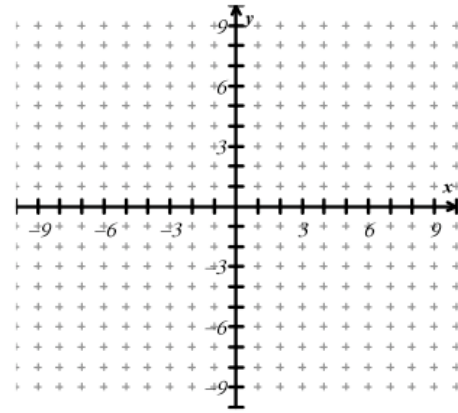
<p>47. Find the center (h, k) and radius r.</p> $x^2 + y^2 + 4x - 4y - 1 = 0$	<p>48. Write the equation of the parabola with a vertex at $(-1, -2)$ and a focus at $(0, -2)$.</p>
<p>49. Find the vertex, directrix, and focus.</p> $(x - 3)^2 = -(y + 1)$	<p>50. Discuss the ellipse (find the center, foci, and vertices).</p> $2x^2 - 8x + 3y^2 + 6y + 5 = 0$
<p>51. Find the equation of the ellipse with vertices at $(4, 3)$ and $(4, 9)$ and a focus at $(4, 8)$.</p>	<p>52. Find the center, transverse axis, vertices, foci, and asymptotes.</p> $x^2 - y^2 - 2x - 2y - 1 = 0$

Graph. Find the domain, range, and asymptote.

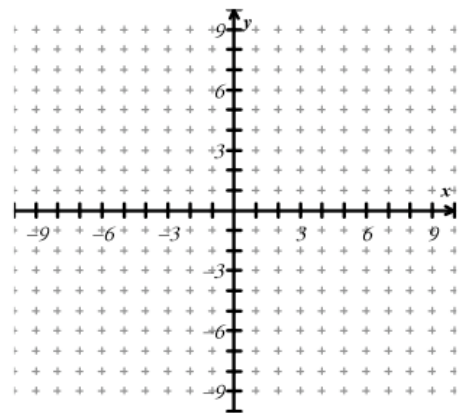
53. $y = 3\left(\frac{1}{2}\right)^x$



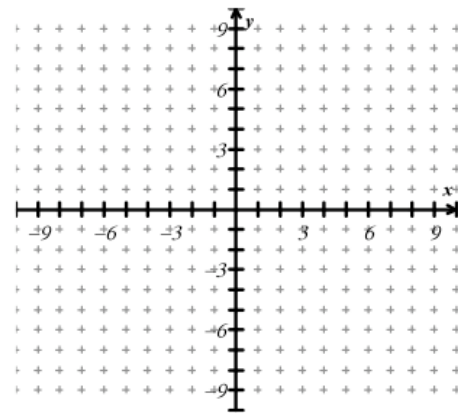
54. $y = 2 \cdot 3^{x+1} - 6$



55. $f(x) = \log_3 x + 4$

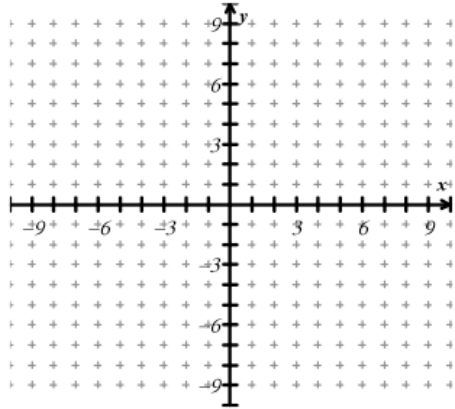


56. $f(x) = \log_4(x+2) - 1$

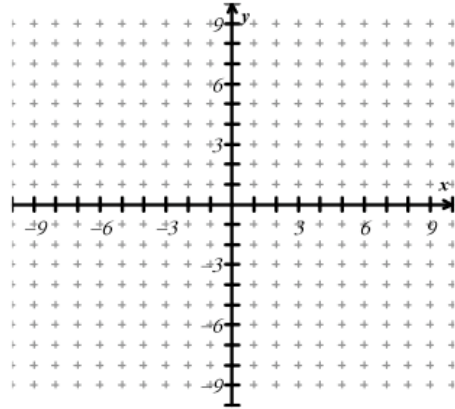


Graph.

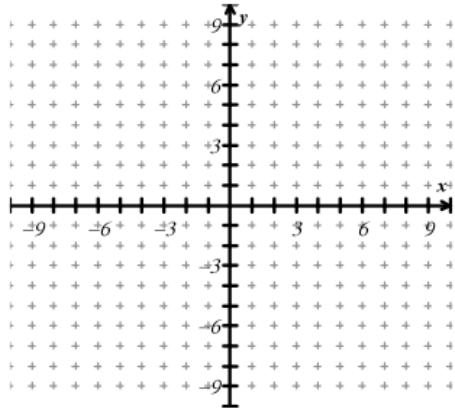
57. $3(x+1)^2 + 3(y-5)^2 = 27$



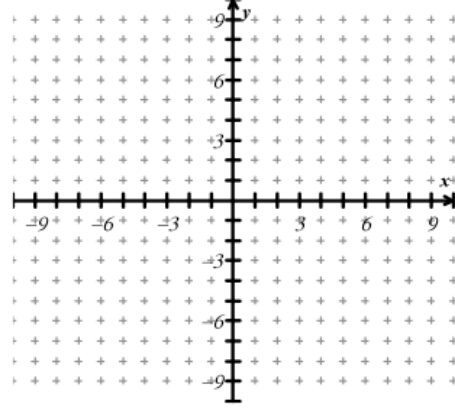
58. $(y+3)^2 = 8(x-2)$



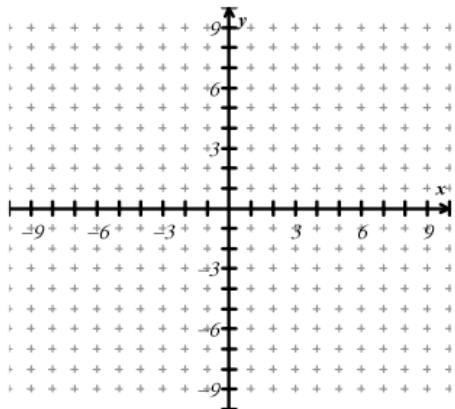
59. $y^2 - 4y + 4x + 4 = 0$



60. $\frac{(x-3)^2}{4} + \frac{(y+1)^2}{9} = 1$



61. $\frac{x^2}{25} - \frac{y^2}{9} = 1$



62. $(y-2)^2 - 4(x+2)^2 = 4$

