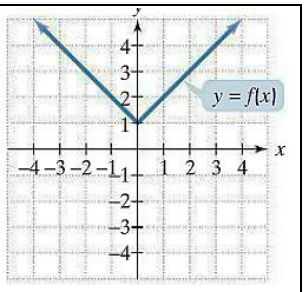
Honors Precalculus

Name:_____ Per: ____

Semester 1 PRACTICE TEST ***Use an extra sheet to show work if you run out of room.***

1. Given $f(x)$ is linear, $f(2) = 6$, and the graph for $f(x)$ is perpendicular to $g(x) = \frac{1}{4}x - 7$, find the equation for $f(x)$.

2. Given the graph $f(x)$, fill in the blanks.



a) $f(3) =$ _____

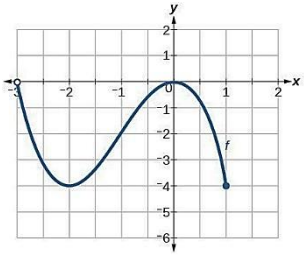
b) *f(___) = 1*

3. State the domain and range for each.

$h(x) = \sqrt{x-5}$

Domain:

Range:

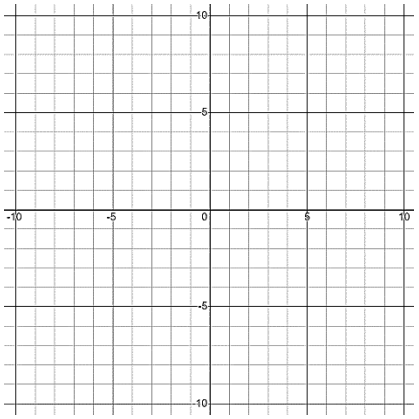


Domain:

Range:

4. Graph.

$$y = \begin{cases} \frac{1}{2}x + 4, & x \le -2 \\ -\frac{1}{3}x - 5, & x > -2 \end{cases}$$



Simplify the complex expressions.

5. Given the table for $f(x)$, fill in the table for $g(x)$ if $g(x) = 2f(x-4) + 5$.

x	*0*	*1*	*2*
f(x)	*3*	*7*	*-5*

x			
g(x)			

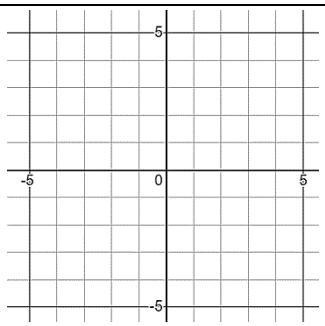
6. Let $f(x) = x^2 + 3x$ and $g(x) = -2x - 6$. Find:

$f - g$	f/g
fg	

7. Let $f(x) = x^2 + 5x$ and $g(x) = x - 4$. Find:

$f(g(1))$	$g(f(1))$	$f(g(x))$

8. Find the inverse function of $f(x) = 3x + 2$ and graph both.



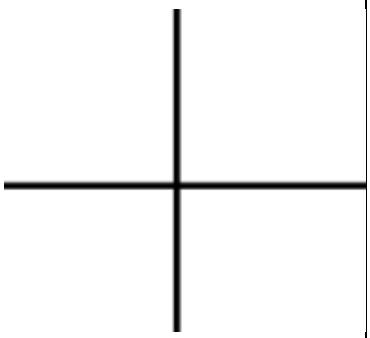
9. Write the equation, in vertex form $f(x) = a(x-h)^2 + k$, for the parabola that has a vertex of (-6, 2) and a y-intercept of 14.

10. Circle the correct end-behavior for each.

$f(x) = x^3 - 4x^2$	$f(x) = -x^4(x+2)$	$f(x) = x^2 + 4$	$f(x) = -x^3(x-1)^3$
a) ↙ ↗ b) ↖ ↗ c) ↖ ↘ d) ↙ ↘	a) ↙ ↗ b) ↖ ↗ c) ↖ ↘ d) ↙ ↘	a) ↙ ↗ b) ↖ ↗ c) ↖ ↘ d) ↙ ↘	a) ↙ ↗ b) ↖ ↗ c) ↖ ↘ d) ↙ ↘

11. Sketch the graph of the polynomial and clearly mark key points.

$y = -1.5(x+1)^2(x-2)$



y -intercept: (,)

12. Use long or synthetic division to divide and then find all the other factors.

$(2x^3 + x^2 - 25x + 12) \div (x - 3)$

13. Use the Rational Root/Zero Test to state all possible roots for $f(x) = x^3 + 3x^2 - 6x - 8$

14. Find one that is actually a root (and how you know) from Problem 13.

15. Simplify $(11 - i) - (-2 + 5i)$

16. Simplify $\frac{4-5i}{2+3i}$

17. Solve $4x^2 + 10 = -26$ using complex numbers.

18. Find a fourth-degree polynomial that has zeros 2, 3, and -5 (-5 has multiplicity 2) and $f(0) = 50$

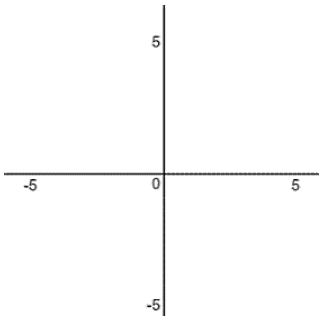
19. State the vertical and horizontal asymptote(s) of each function.

$y = \frac{-2}{x+6}$ VA: HA:	$y = \frac{2x^2}{x^2+7x+12}$ VA: HA:

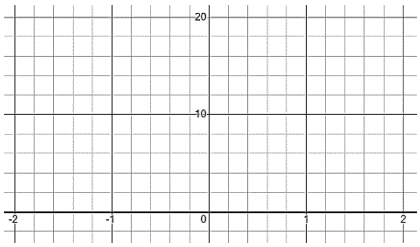
20. Put all this together and sketch a graph of the rational function $f(x) = \frac{x-1}{x^2+x-6}$

HA: VA:

Zero(s): Y-int:



21. Make a table and graph $f(x) = 4(0.5)^x + 2$



22. Find the value of an investment of \$40,000 for 5 years at an interest rate of 3% if the money is compounded:

a) monthly

b) continuously

23. Evaluate each and justify by writing in exponential form.

$ln(\sqrt{e}) =$ _____ since

$log(1000) =$ _____ since

$log\left(\frac{1}{100}\right) =$ _____ since

$log_4(64) =$ _____ since

24. In 1970, the US population was 203 million. By, 2010 it was 308 million. Use these to find the exponential equation ($A = A_0e^{kt}$) for the US population, in millions, t years after 1970.

25. Solve for x.

a) $\ln(x-4) - 5 = -3$

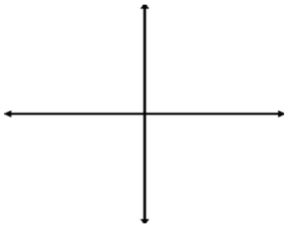
b) $16^x - 8 = 56$

26. How long will it take for the continuous investment in Problem 22 to double?

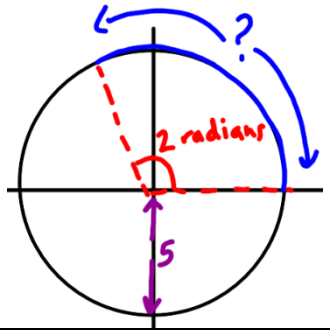
27. Sketch in each of the angles and mark them on the graph.

a) $\frac{5\pi}{3}$

b) $-\frac{7\pi}{6}$



28. If an angle of 2 radians on a circle of radius 5 is shown, what is the length of the arc?



29. Convert between radians and degrees and vice versa.

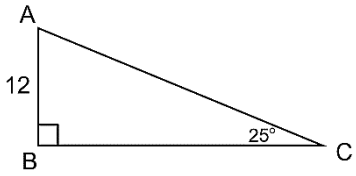
$\frac{\pi}{8} =$ _____ °

$\frac{13\pi}{12} =$ _____ °

$150° =$ _____

$240° =$ _____

30. For the triangle shown, find the following.



$m\angle A =$ $BC =$ $AC =$

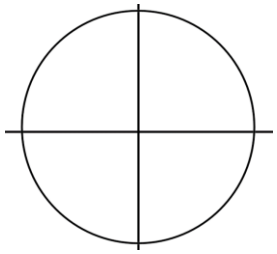
31. Use basic trig identities to prove the following.

a) $\cot\theta \cdot \sin\theta = \cos\theta$

b) $(1 + \cos\theta)(1 - \cos\theta) = \sin^2\theta$

32. Find the coordinates (x, y) on the unit circle for the given radian measure. *Circle provided if needed.

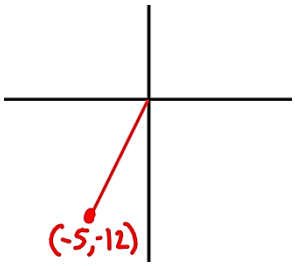
$\theta = -\frac{5\pi}{4}$ (,)



33. For each, find the indicated trig value in the specified quadrant. ***Write answers as fractions!***

Function	**Quadrant**	**Value Desired**
$\sin(\theta) = -8/17$	IV	$\tan(\theta) =$
$\cot(\theta) = 3/4$	III	$\sin(\theta) =$

34. Given the coordinates of the point are on the terminal side of an angle in standard position, find all six trig function values.



$\sin\theta =$ $\cos\theta =$ $\tan\theta =$

$\csc\theta =$ $\sec\theta =$ $\cot\theta =$