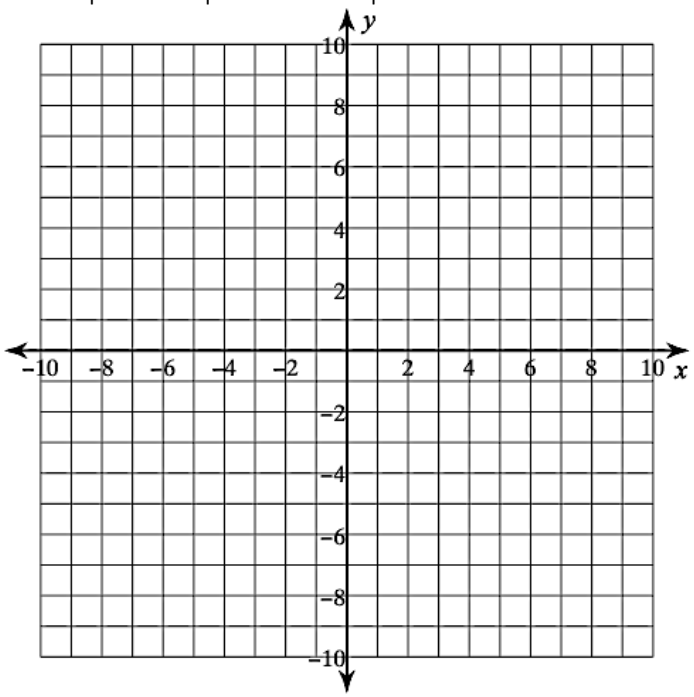
Name: _____

Monroe Township High School
Honors Calculus Summer Preparation Packet 2026-2027

- Answers are at the end of the document for you to check your work. Make corrections to your work and answers, if necessary.
- You are expected to know how to graph, state domain, and find exact values of trigonometric functions without the use of a calculator.
- There will be an assessment on the prerequisite material included in this document at the start of the school year.

1. Write the equation of the line with slope $-\frac{3}{4}$ that passes through $(-1,4)$ in **point-slope form**.

2. Graph the equation from problem 1 below.



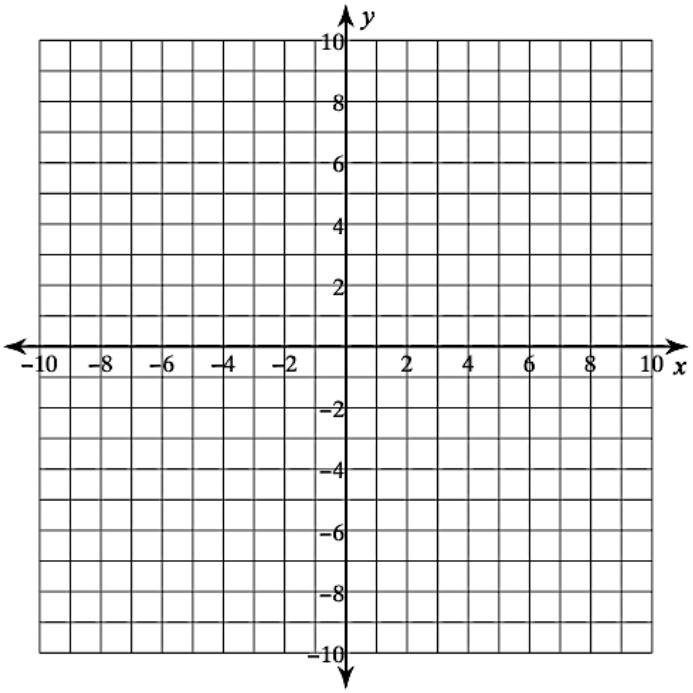
3. Write the equation of the line in **point-slope form** that passes through $(4,2)$ and is perpendicular to the line passing through $(3,4)$ and $(6,2)$.

Graph. State the vertex. Write the domain and range in interval notation.

4. $f(x) = \frac{1}{2}(x-1)^2 - 6$

vertex: _____

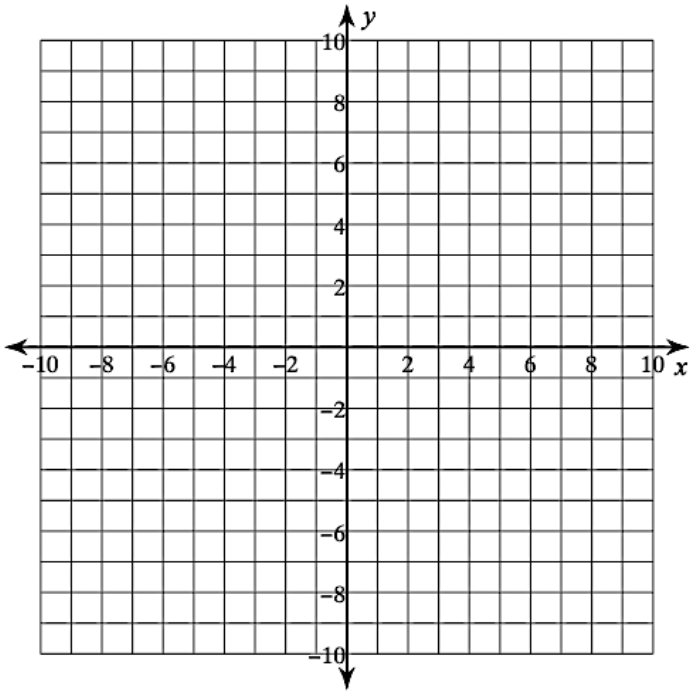
domain: _____ range: _____



5. $g(x) = -2x^2 + 8x - 7$

vertex: _____

domain: _____ range: _____



Solve by factoring completely.

6. $27x^3 - 125 = 0$

Solve by factoring completely.

7. $2x^4 + 15x^2 + 18 = 0$

8. $16x^3 = 81x$

9. $5x^4 + 2x^3 - 5x^2 - 2x = 0$

10. $-16x^2 + 6 = 4x$

Write the domain in interval notation.

11. $f(x) = 5\sqrt{7-x} + 2$

domain: _____

12. $g(x) = \frac{x-6}{x^3+3x^2+9x+27}$

domain: _____

13. $h(x) = \frac{1}{2} log_5(x+4) - 3$

domain: _____

14. $k(x) = lnx + 1$

domain: _____

Given $\boldsymbol{f(x) = 2x - 1}$, $\boldsymbol{g(x) = 3x}$, $\boldsymbol{h(x) = x^2 + 1}$, *and* $\boldsymbol{k(x) = 3\sqrt{x+2}}$, *find each of the following.*

15. $g(f(h(-2)))$

16. $(h \circ k)(x)$

17. $f(x+h) - f(x)$

18. $f(h(x))$

Evaluate.

19. $log_3 3$

20. lne^{tanx}

21. $4^{log_4 13}$

22. $log_5 1$

Condense.

23. $3log_5(x-1) - 2log_5(x+1)$

24. $\frac{3}{4}lnw + \frac{1}{2}lnx - 2lny - 8lnz$

Expand.

25. $log_8 \frac{64x^3 \cdot \sqrt{y}}{3z}$

26. $log \frac{(2x-3)}{(x+5)}$

Solve. No decimals.

27. $9^{2-x} = 81^{7x}$

28. $log_2(2-2x) + log_2(1-x) = 5$

Solve. Round to the nearest thousandth, if necessary.

29. $6(8^{-2-x}) + 15 = 2601$

30. $log_4 x - log_4(x-1) = \frac{1}{2}$

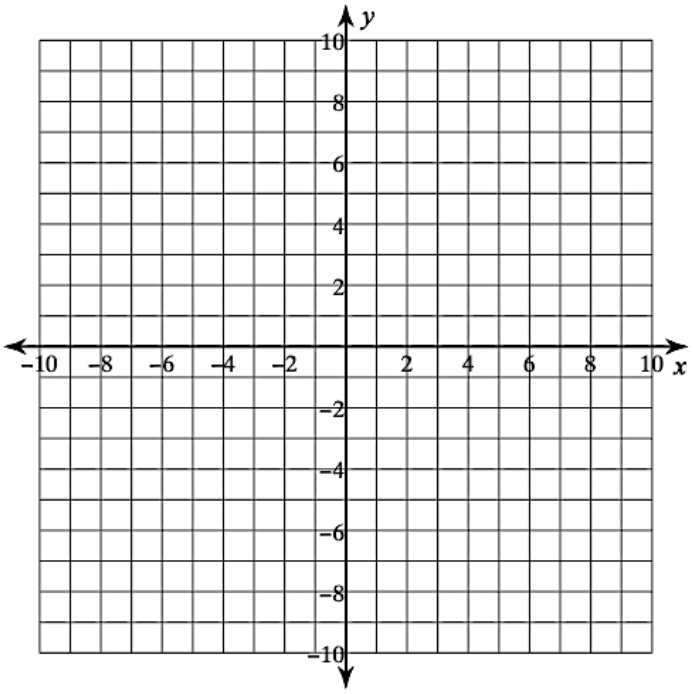
31. $ln(x+1) - ln(x-2) = lnx$

32. Write the equation of the circle with center $(-5,3)$ and radius 9.

Graph.

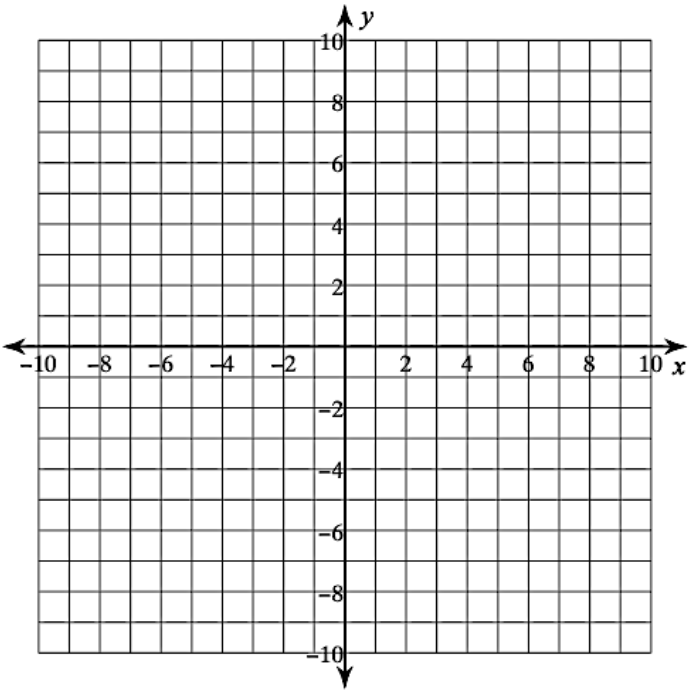
33.

$$g(x) = \begin{cases} 5 - 3x, & x > 1 \\ 3, & x = 1 \\ 2, & x < 1 \end{cases}$$

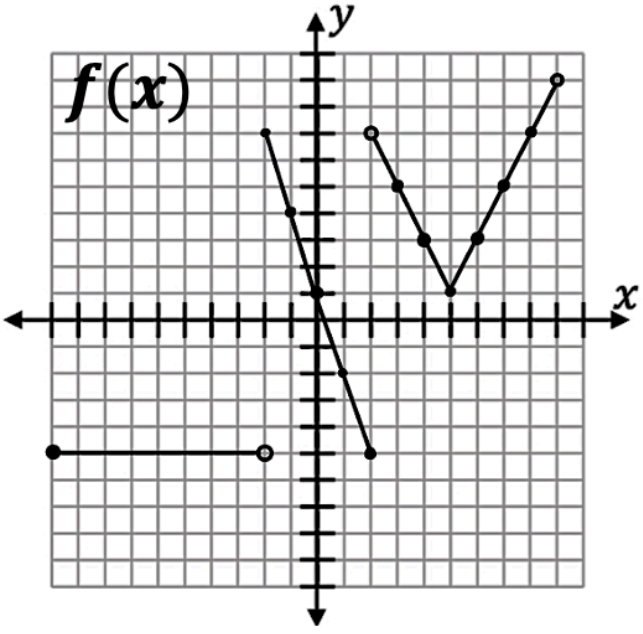


34.

$$h(x) = \begin{cases} -x - 5, & x \leq -3 \\ x + 1, & x > -3 \end{cases}$$



35. Write a formula for the piecewise function $f(x)$.



Convert from radians to degrees. Show the conversion factor.

36. $\frac{2\pi}{3}$	37. $-\frac{3\pi}{2}$	38. 4.52

Convert from degrees to radians in terms of $\boldsymbol{\pi}$. Show the conversion factor.

39. 150°	40. 42°	41. -120°

Find the exact values for sine, cosine, tangent, cosecant, secant, and cotangent of each angle.

42. $\theta = -\frac{\pi}{6}$

$sin\theta =$	$cos\theta =$	$tan\theta =$
$csc\theta =$	$sec\theta =$	$cot\theta =$

43. $\theta = \frac{4\pi}{3}$

$sin\theta =$	$cos\theta =$	$tan\theta =$
$csc\theta =$	$sec\theta =$	$cot\theta =$

44. $\theta = \frac{\pi}{2}$

$sin\theta =$	$cos\theta =$	$tan\theta =$
$csc\theta =$	$sec\theta =$	$cot\theta =$

Use the graph of $f(x)$ to answer each of the following.

45. $\lim_{x \to 2^-} f(x) =$

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46. $\lim_{x \to 2^+} f(x) =$

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47. $\lim_{x \to 2} f(x) =$

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48. $f(2) =$

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49. $\lim_{x \to 0^+} f(x) =$

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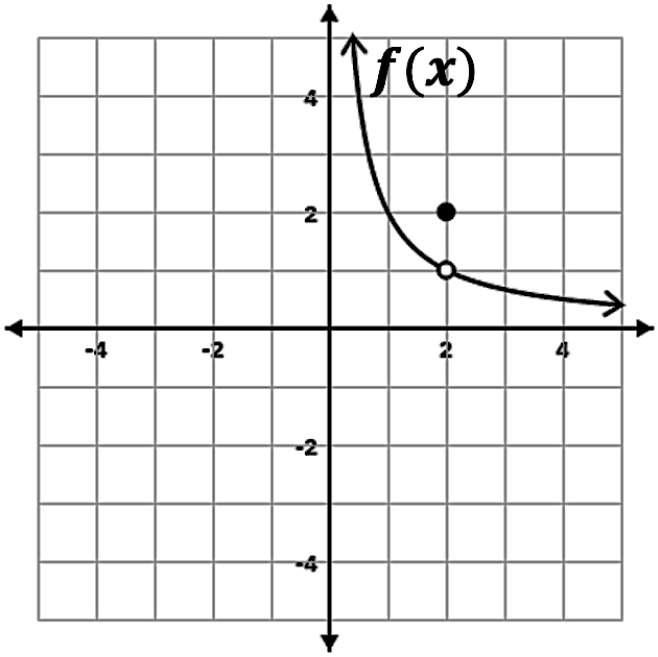
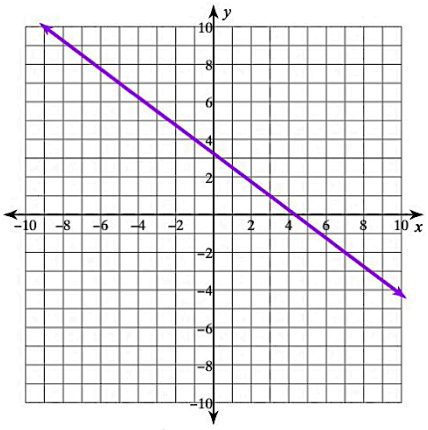
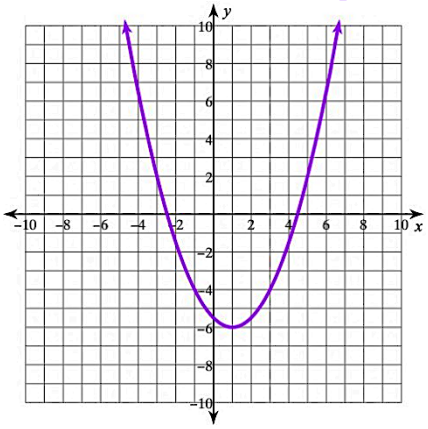
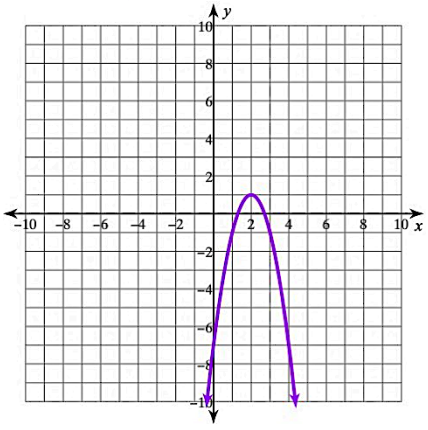
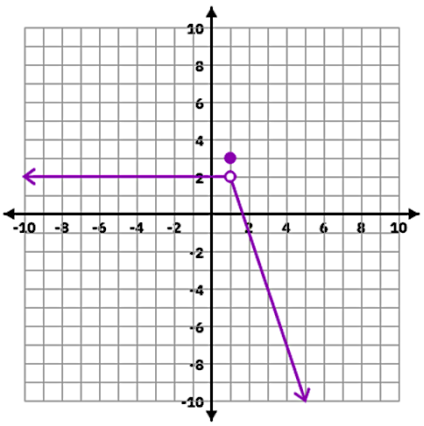
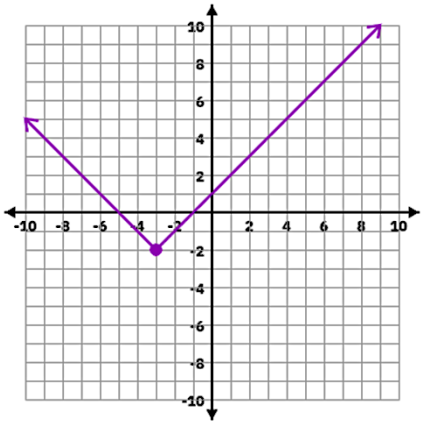
50. $\lim_{x \to \infty} f(x) =$



answers

1. $y-4=-\frac{3}{4}(x+1)$
2. 
3. $y-2=\frac{3}{2}(x-4)$
4. vertex: $(1,-6)$,
domain: $(-\infty,\infty)$, range: $[-6,\infty)$

5. vertex: $(2,1)$,
domain: $(-\infty,\infty)$, range: $(-\infty,1]$

6. complete factorization:
$(3x-5)(9x^2+15x+25)=0$,
$x=\frac{5}{3},-\frac{5}{6}\pm\frac{5\sqrt{3}}{6}i$
7. complete factorization:
$(2x^2+3)(x^2+6)=0$,
$x=\pm i\frac{\sqrt{6}}{2},\pm i\sqrt{6}$
8. complete factorization:
$x(4x+9)(4x-9)=0$,
$x=0,\pm\frac{9}{4}$
9. complete factorization:
$x(5x+2)(x+1)(x-1)=0$,
$x=-\frac{2}{5},0,\pm1$
10. complete factorization:
$-2(4x+3)(2x-1)=0$,
$x=-\frac{3}{4},\frac{1}{2}$
11. $(-\infty,7]$
12. $(-\infty,-3)\cup(-3,\infty)$
13. $(-4,\infty)$
14. $(0,\infty)$
15. 27
16. $9x+19$
17. $2h$
18. $2x^2+1$
19. 1
20. $tanx$
21. 13
22. 0
23. $log_5\frac{(x-1)^3}{(x+1)^2}$
24. $ln\frac{\sqrt[4]{w^3}\sqrt{x}}{y^2z^8}$
25. $2+3log_8x+\frac{1}{2}log_8y-log_83-log_8z$
26. $log(2x-3)-log(x+5)$
27. $x=\frac{2}{15}$
28. $x=-3$
$(x=5\ is\ extraneous)$
29. $x\approx-4.917$
30. $x=2$
31. $x=\frac{3+\sqrt{13}}{2}\approx3.303$
$(x=\frac{3-\sqrt{13}}{2}\approx-0.303\ is\ extraneous)$
32. $(x+5)^2+(y-3)^2=81$
33. 
34. 
35. $f(x)=\begin{cases}-5, & -10\le x<-2\\ -3x+1, & -2\le x\le 2\\ 2|x-5|+1, & 2<x<9\end{cases}$
36. 120°
37. -270°
38. 259.11° (decimal radians, use 3.14 instead of π)
39. $\frac{5\pi}{6}$
40. $\frac{7\pi}{30}$
41. $-\frac{2\pi}{3}$
42. $sin\theta=-\frac{1}{2},cos\theta=\frac{\sqrt{3}}{2},$
$tan\theta=-\frac{\sqrt{3}}{3},csc\theta=-2,$
$sec\theta=\frac{2\sqrt{3}}{3},cot\theta=-\sqrt{3}$
43. $sin\theta=-\frac{\sqrt{3}}{2},cos\theta=-\frac{1}{2},$
$tan\theta=\sqrt{3},csc\theta=-\frac{2\sqrt{3}}{3},$
$sec\theta=-2,cot\theta=\frac{\sqrt{3}}{3}$
44. $sin\theta=1,cos\theta=0,$
$tan\theta\ is\ undefined,csc\theta=1,$
$sec\theta\ is\ undefined,cot\theta=0$
45. 1
46. 1
47. 1
48. 2
49. ∞ (or DNE unbounded)
50. 0