

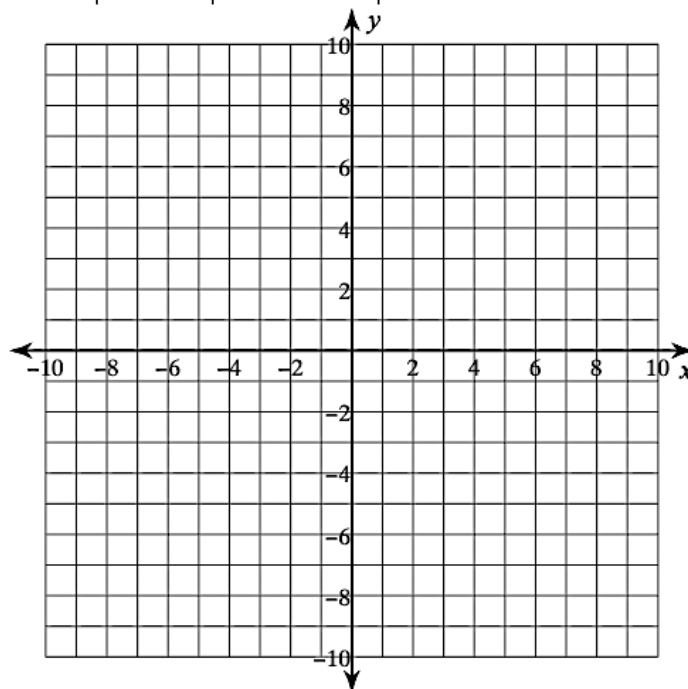
Name: _____

Monroe Township High School Honors Calculus Summer Preparation Packet 2025-2026

- 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.



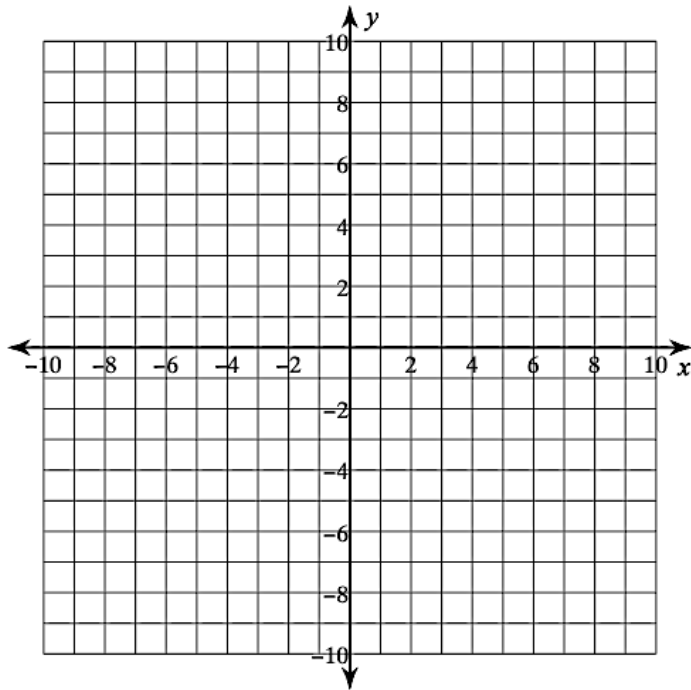
3. Write the equation of the line in **point-slope form** that passes through $(4,2)$ and is perpendicular to the line passing through $(3,4)$ and $(6,2)$.

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

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

vertex: _____

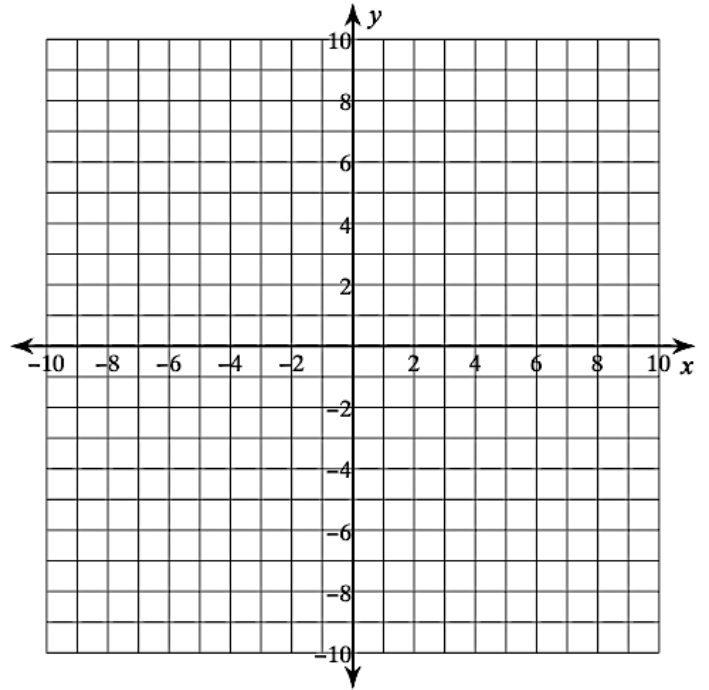
domain: _____ range: _____



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. $k(x) = \ln x + 1$

domain: _____

Given $f(x) = 2x - 1$, $g(x) = 3x$, $h(x) = x^2 + 1$, and $k(x) = 3\sqrt{x+2}$, 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. $\ln e^{\tan x}$

21. $4^{\log_4 13}$

22. $\log_5 1$

Condense.

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

24. $\frac{3}{4}\ln w + \frac{1}{2}\ln x - 2\ln y - 8\ln z$

Expand.

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

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

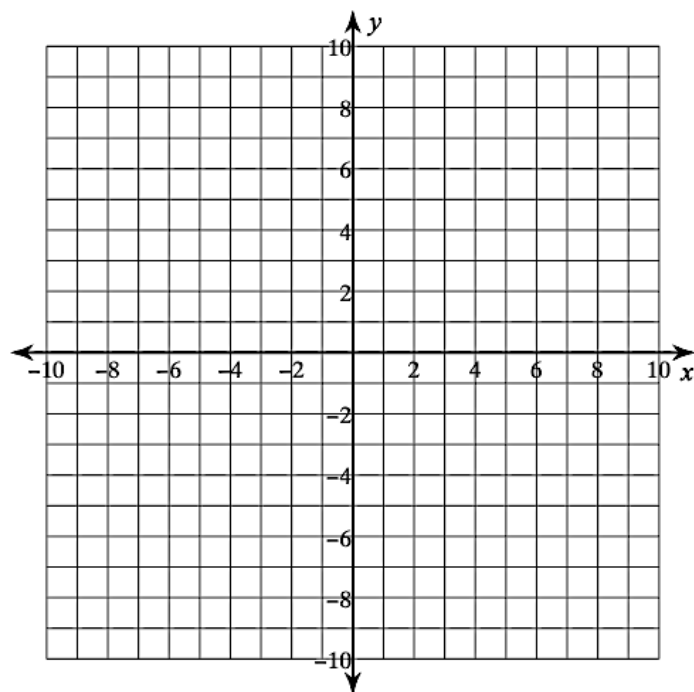
31. $\ln(x + 1) - \ln(x - 2) = \ln x$

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

Graph.

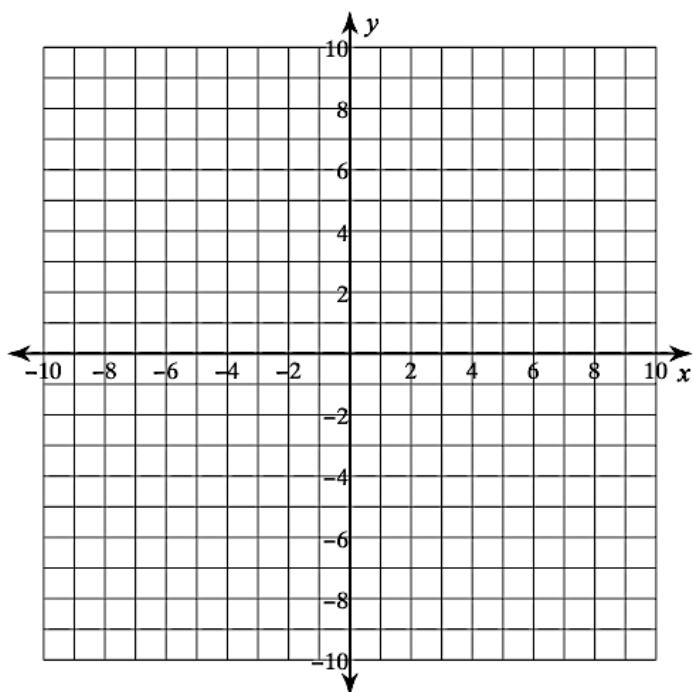
33.

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

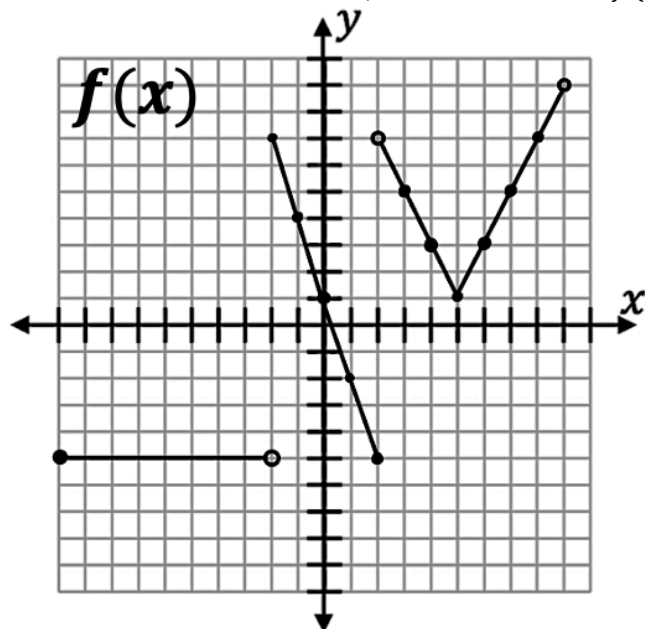


34.

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



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 π . 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. $\lim_{x \rightarrow 2^-} f(x) =$

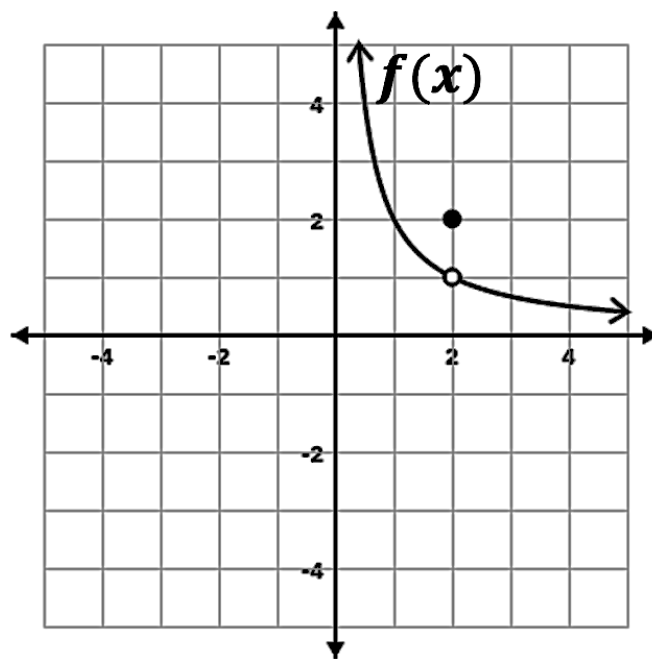
46. $\lim_{x \rightarrow 2^+} f(x) =$

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

48. $f(2) =$

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

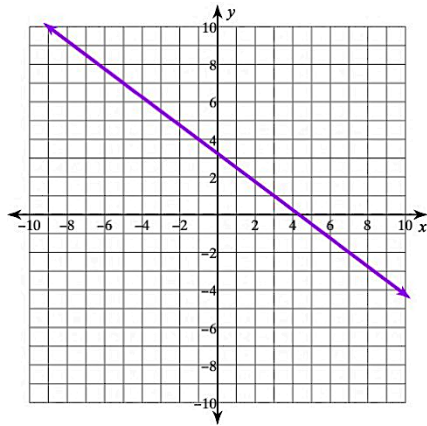
50. $\lim_{x \rightarrow \infty} f(x) =$



answers

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

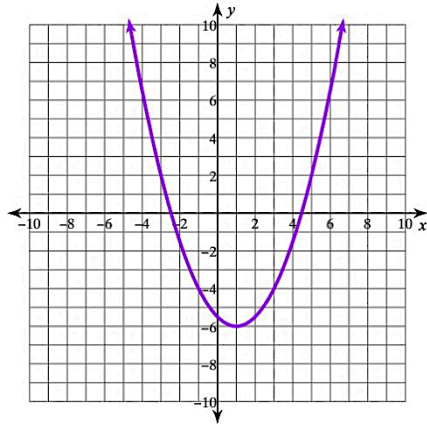
2.



3. $y - 2 = \frac{3}{2}(x - 4)$

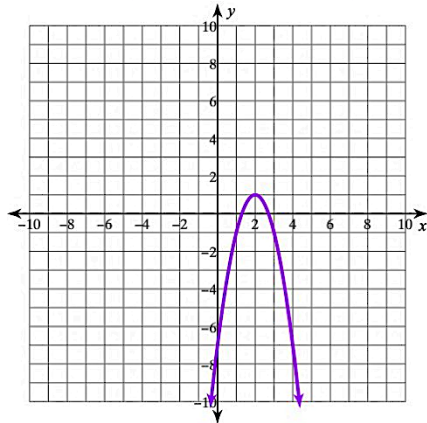
4. vertex: $(1, -6)$,

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:

$$x(5x + 2)(x + 1)(x - 1) = 0,$$

$$x = -\frac{2}{5}, 0, \pm 1$$

10. complete factorization:

$$-2(4x + 3)(2x - 1) = 0,$$

$$x = -\frac{3}{4}, \frac{1}{2}$$

$$11. (-\infty, 7]$$

$$12. (-\infty, -3) \cup (-3, \infty)$$

$$13. (-4, \infty)$$

$$14. (0, \infty)$$

$$15. 27$$

$$16. 9x + 19$$

$$17. 2h$$

$$18. 2x^2 + 1$$

$$19. 1$$

$$20. \tan x$$

$$21. 13$$

$$22. 0$$

$$23. \log_5 \frac{(x-1)^3}{(x+1)^2}$$

$$24. \ln \frac{\sqrt[4]{w^3} \sqrt{x}}{y^2 z^8}$$

$$25. 2 + 3\log_8 x + \frac{1}{2}\log_8 y - \log_8 3 - \log_8 z$$

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

$$27. x = \frac{2}{15}$$

$$28. x = -3$$

$(x = 5 \text{ is extraneous})$

$$29. x \approx -4.917$$

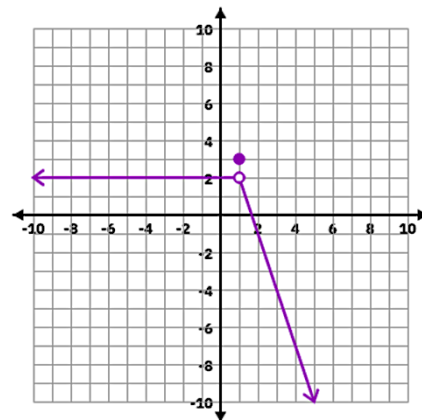
$$30. x = 2$$

$$31. x = \frac{3+\sqrt{13}}{2} \approx 3.303$$

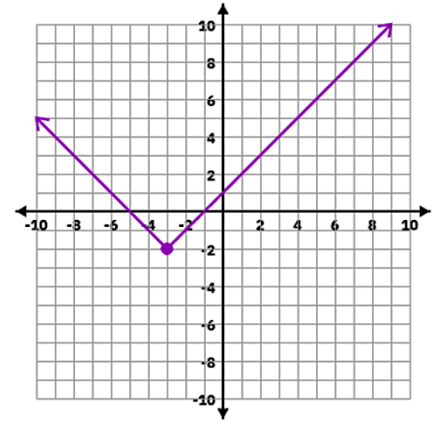
$$(x = \frac{3-\sqrt{13}}{2} \approx -0.303 \text{ is extraneous})$$

$$32. (x + 5)^2 + (y - 3)^2 = 81$$

33.



34.



$$35. f(x) = \begin{cases} -5, & -10 \leq x < -2 \\ -3x + 1, & -2 \leq x \leq 2 \\ 2|x - 5| + 1, & 2 < x < 9 \end{cases}$$

$$36. 120^\circ$$

$$37. -270^\circ$$

$$38. 259.11^\circ \text{ (decimal radians, use } 3.14 \text{ instead of } \pi)$$

$$39. \frac{5\pi}{6}$$

$$40. \frac{7\pi}{30}$$

$$41. -\frac{2\pi}{3}$$

$$42. \sin \theta = -\frac{1}{2}, \cos \theta = \frac{\sqrt{3}}{2},$$

$$\tan \theta = -\frac{\sqrt{3}}{3}, \csc \theta = -2,$$

$$\sec \theta = \frac{2\sqrt{3}}{3}, \cot \theta = -\sqrt{3}$$

$$43. \sin \theta = -\frac{\sqrt{3}}{2}, \cos \theta = -\frac{1}{2},$$

$$\tan \theta = \sqrt{3}, \csc \theta = -\frac{2\sqrt{3}}{3},$$

$$\sec \theta = -2, \cot \theta = \frac{\sqrt{3}}{3}$$

$$44. \sin \theta = 1, \cos \theta = 0,$$

$$\tan \theta \text{ is undefined, } \csc \theta = 1,$$

$$\sec \theta \text{ is undefined, } \cot \theta = 0$$

$$45. 1$$

$$46. 1$$

$$47. 1$$

$$48. 2$$

$$49. \infty \text{ (or DNE unbounded)}$$

$$50. 0$$