

HONORS PRECALCULUS

2020 SUMMER PREP PACKET

Please bring your completed work with you to class at the start of the year. Do your best. Know that you will have an opportunity to ask questions if there are problems that you don't know how to do or don't remember fully. There will be a diagnostic assessment in the first few weeks of class, so that your teacher can assess your understanding. The answers are at the end of the document, so check as you go.

1. Find the slope, midpoint, and length of the segment joining the points $(2, -5)$ and $(6, 1)$.
2. Find the x -intercept and y -intercept of the line $4x - 9y = 12$.
3. A line has a slope of $-\frac{5}{6}$ and contains the points $(2, -7)$ and $(x, 4)$. Find the value of x .
4. Write the equation of the line with a slope of $\frac{2}{5}$ and passing through $(-10, 3)$.
5. Write the equation of the line containing points $(3, 7)$ and $(11, -5)$.

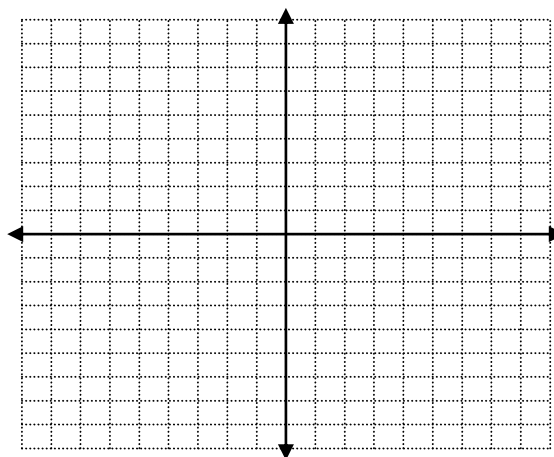
6. Write the equation of the line with zero slope containing the point $(4, -3)$.

7. Write the equation of the line parallel to the y -axis containing the point $(-8, -3)$.

8. Solve the system of equations:
$$\begin{cases} -2x - 3y = -16 \\ 6x + 4y = 23 \end{cases}$$

9. Solve the system of equations:
$$\begin{cases} 2x + 3y = -6 \\ 3x + 4y = -7 \end{cases}$$

10. Graph $3x + 4y = -12$.



11. Factor each of the following polynomials:

a. $y^2 - 6y - 40$

b. $3a^2 + 14a + 8$

c. $5x^2 - 45$

d. $3uw^2 + 24uw + 45u$

e. $2x^3 + 10x^2 - 7x - 35$

12. Solve by factoring:

a. $x^2 + 13x = 30$

b. $2x^3 - 9x^2 = 0$

13. Solve $x^2 + 10x - 7 = 0$ by completing the square.

14. Solve $2x^2 - 2x - 5 = 0$ using the quadratic formula.

15. Simplify:

a. $2\sqrt{7} - 3\sqrt{5} + 4\sqrt{7} - \sqrt{5}$

b. $\sqrt{27} + 5\sqrt{12}$

c. $\sqrt{12} \cdot 5\sqrt{3}$

d. $(6\sqrt{5})^2$

e. $\frac{14}{\sqrt{2}}$

16. Simplify:

a. $\sqrt{-25}$

b. $\sqrt{-18}$

c. $(4 + 3i)(2 - 5i)$

d. $(-3 + 7i)^2$

e. $\frac{4}{5+6i}$

17. State the domain of each function:

a. $f(x) = 2x^2 - 5x + 11$

b. $y = \frac{4x-1}{x^2-3x-10}$

c. $g(x) = \sqrt{x-8}$

18. Given the functions below, evaluate each of the following.

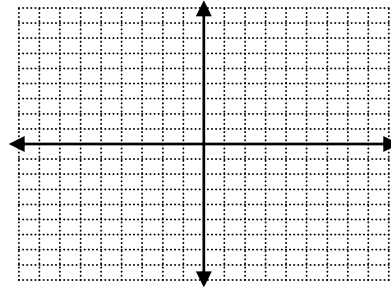
$$f(x) = 2x^2 - 3 \quad g(x) = 4x + 7 \quad h(x) = \frac{6}{x+3}$$

a. $f(-3)$

b. $g(h(-1))$

c. $h(f(g(2)))$

19. Given the function $y = x^2 - 8x + 12$, find the vertex, y -intercept, and x -intercepts and then sketch the graph of the parabola.



20. For each of the following functions, identify the shape of the graph. Also identify any transformations, including shifts and reflections.

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

b. $y = (x - 4)^2 + 5$

21. Simplify each expression.

a. $\frac{3y}{4-y^2} \cdot \frac{2y^2+y-3}{y^2-1} \div \frac{2y^3+3y^2}{y^2-3y+2}$

b. $\frac{8}{3x+6} + \frac{5x}{x^2-4}$

c. $\frac{10x}{x^2-3x-4} - \frac{2}{x+1}$

22. Simplify.

a. $\log_3 27$

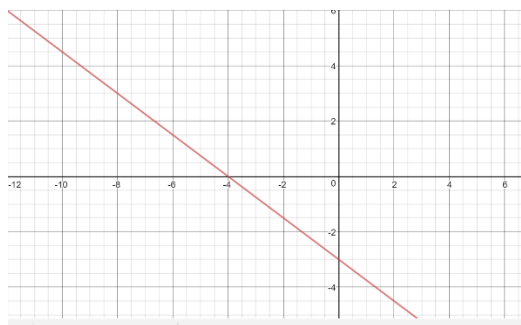
b. $\log_2 \frac{1}{16}$

c. $\log_{49} 7$

Answers:

1. Slope: $m = \frac{3}{2}$
Midpoint: $(4, -2)$
Length: $2\sqrt{13}$
2. x-intercept: 3
y-intercept: $-\frac{4}{3}$
3. $x = -\frac{56}{5}$
4. $y - 3 = \frac{2}{5}(x + 10)$ **or** $y = \frac{2}{5}x + 7$
5. $y - 7 = -\frac{3}{2}(x - 3)$ **or** $y = -\frac{3}{2}x + \frac{23}{2}$
6. $y = -3$
7. $x = -8$
8. $(\frac{1}{2}, 5)$
9. $(3, -4)$

10.



11.

- a. $(y - 10)(y + 4)$
- b. $(3a + 2)(a + 4)$
- c. $5(x - 3)(x + 3)$
- d. $3u(w + 3)(w + 5)$
- e. $(2x^2 - 7)(x + 5)$

12.

- a. $x = -15$ **or** 2
- b. $x = 0$ **or** $\frac{9}{2}$

13. $x = -5 \pm 4\sqrt{2}$

14. $\frac{1 \pm \sqrt{11}}{2}$

15.

- a. $6\sqrt{7} - 4\sqrt{5}$
- b. $13\sqrt{3}$
- c. 30
- d. 180
- e. $7\sqrt{2}$

16.

- a. $5i$
- b. $3i\sqrt{2}$
- c. $23 - 14i$
- d. $-40 - 42i$
- e. $\frac{20-24i}{61}$

17.

- a. All real numbers
- b. $x \neq 5$ or -2
- c. $x \geq 8$

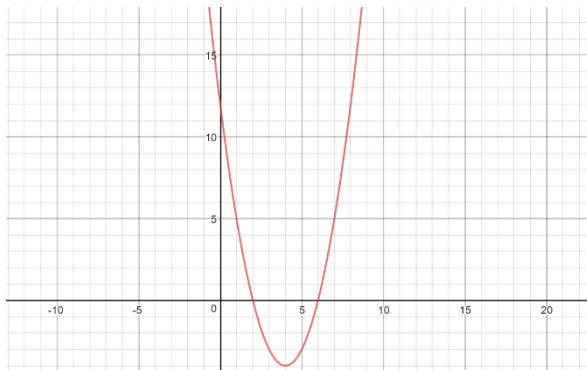
18.

- a. 15
- b. 19
- c. $\frac{1}{75}$

19. Vertex: $(4, -4)$

y-intercept: 12

x-intercepts: 6 and 2



20.

- a. Parabola – shifted left 3 and reflected over the x-axis
- b. Parabola—shifted right 4 and up 5

21.

- a. $\frac{-3(y-1)}{(2+y)(y+1)}$
- b. $\frac{23x-16}{3(x-2)(x+2)}$
- c. $\frac{8}{x-4}$

22.

- a. 3
- b. -4
- c. $\frac{1}{2}$