

**PreCalculus - L1 Summer Math**

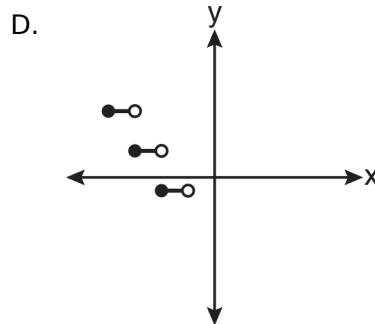
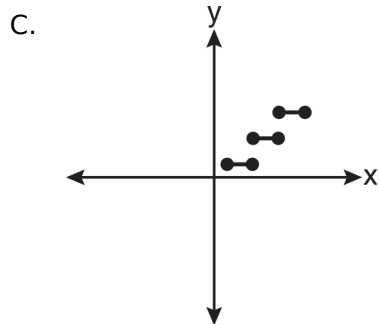
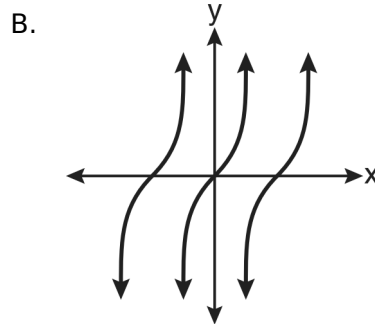
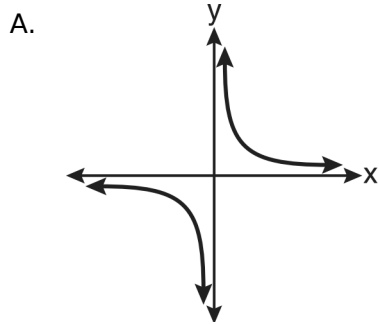
**Name:** \_\_\_\_\_

**Date:** \_\_\_\_\_

Show ALL work on separate loose leaf paper.

1. Which graph represents a relation that is *not* a function?

1.



2. The sum of  $\sqrt{-18}$  and  $\sqrt{-72}$  is

2.

- F.  $6i$                       G.  $36i$                       H.  $3\sqrt{10}$                       J.  $9i\sqrt{2}$

3. Expressed in simplest form,  $\frac{\sqrt{-36}}{-\sqrt{4}}$  is equivalent to

3.

- A.  $3i$                       B.  $-3i$                       C.  $3$                       D.  $-3$

4. What is the product of  $5 + \sqrt{-36}$  and  $1 - \sqrt{-49}$ , expressed in a simplest  $a + bi$  form?

4.

- F.  $-37 + 41i$                       G.  $5 - 71i$                       H.  $47 + 41i$                       J.  $47 - 29i$

5. What is the sum of  $2 - \sqrt{-4}$  and  $-3 + \sqrt{-16}$  expressed in  $a + bi$  form?

5.

- A.  $-1 + 2i$                       B.  $-1 + i\sqrt{20}$                       C.  $-1 + 12i$                       D.  $-14 + i$

6. Express the product  $(3 + 2i)(1 - 3i)$  in  $a + bi$  form.

6.

7. Express the product  $(2 + i)(4 - 3i)$  in the form  $a + bi$ .

7.

8. Express  $3i(1 - i)$  in  $a + bi$  form.

8.

9. Express the sum of  $4 + \sqrt{-36}$  and  $-2 - \sqrt{-49}$  in  $a + bi$  form.

9.

10. The expression  $\frac{3}{2 + 3i}$  is equivalent to

10.

F.  $\frac{-6 + 9i}{13}$

G.  $\frac{6 + 9i}{13}$

H.  $\frac{-6 - 9i}{13}$

J.  $\frac{6 - 9i}{13}$

11. Express  $\frac{5}{2 - i}$  in simplest  $a + bi$  form.

11.

12. In the accompanying diagram of the graph of the parabola  $y = ax^2 + bx + c$ , which must be one root of the equation  $ax^2 + bx + c = 0$ ?

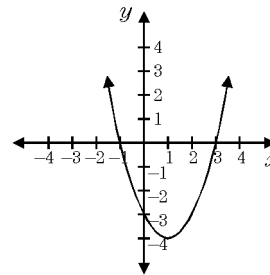
12.

F. 1

G. -3

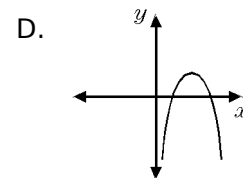
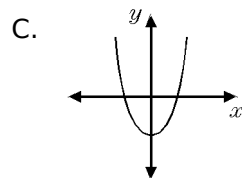
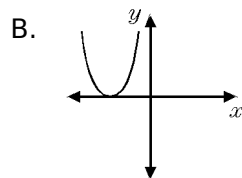
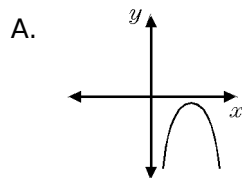
H. 3

J. -4



13. Which graph represents a parabola whose corresponding quadratic equation has imaginary roots?

13.



14. If one root of the equation  $x^2 + kx - 15 = 0$  is  $-3$ , what is the other root?

14.

F. -2

G. 2

H. 3

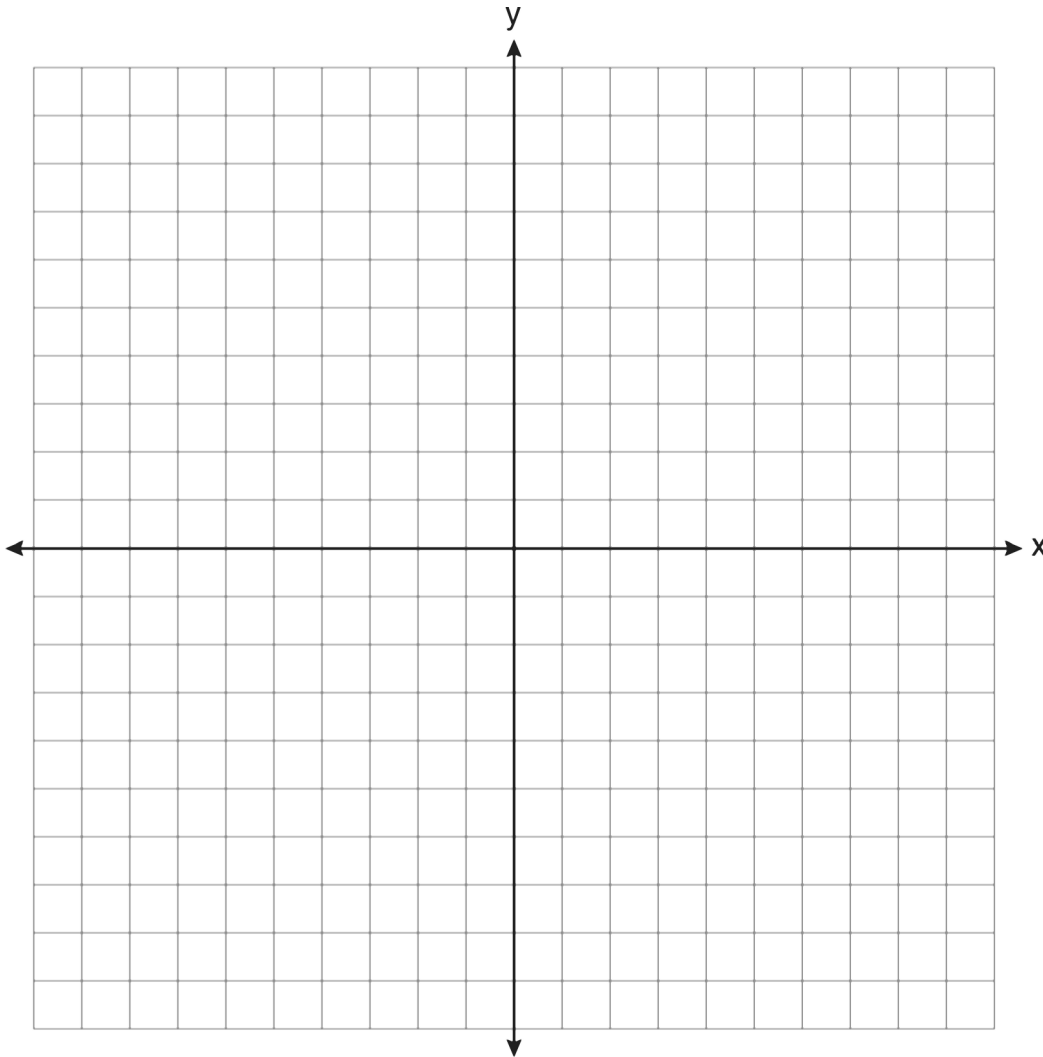
J. 5

15. The roots of the equation  $9x^2 + 3x - 4 = 0$  are 15.
- A. imaginary B. real, rational, and equal  
 C. real, rational, and unequal D. real, irrational, and unequal
16. The discriminant of a quadratic equation is 24. The roots are 16.
- F. imaginary G. real, rational, and equal  
 H. real, rational, and unequal J. real, irrational, and unequal
17. Which quadratic equation has roots of  $(1 + 3i)$  and  $(1 - 3i)$ ? 17.
- A.  $x^2 + 2x - 10 = 0$  B.  $x^2 - 2x + 10 = 0$   
 C.  $x^2 + 2x - 8 = 0$  D.  $x^2 - 2x - 8 = 0$
18. What are the roots of the equation  $x^2 - x + 1 = 0$ ? 18.
- F.  $\frac{1 \pm \sqrt{3}}{2}$  G.  $\frac{1 \pm \sqrt{5}}{2}$  H.  $\frac{1 \pm i\sqrt{3}}{2}$  J.  $\frac{1 \pm i\sqrt{5}}{2}$
19. What is the solution of the equation  $x^2 + 9 = 0$ ? 19.
- A.  $\{3i\}$  B.  $\{-3i\}$  C.  $\{\}$  D.  $\{3i, -3i\}$
20. Which equation has roots of  $5 - 2i$  and  $5 + 2i$ ? 20.
- F.  $x^2 - 10x + 29 = 0$  G.  $x^2 - 10x - 21 = 0$   
 H.  $x^2 + 10x - 21 = 0$  J.  $x^2 + 10x + 29 = 0$
21. Which equation has roots of  $-3$  and  $5$ ? 21.
- A.  $x^2 + 2x - 15 = 0$  B.  $x^2 - 2x - 15 = 0$   
 C.  $x^2 + 2x + 15 = 0$  D.  $x^2 - 2x + 15 = 0$

22. On the set of axes below, graph the equation  $y = x^2 + 2x - 8$ .

22.

Using the graph, determine and state the roots of the equation  $x^2 + 2x - 8 = 0$ .



23. For what value of  $x$  is the function  $f(x) = \frac{2}{2x-1}$  undefined?

23.

24. If  $f(x) = \sqrt{x^2 - 9}$ , then  $f(4)$  is

24.

F. imaginary

G. real and rational

H. real and irrational

J. undefined

25. If  $f(x) = 3x^2 + 3x^{\frac{1}{2}} + 3x$ , then  $f(-9)$  is equal to

25.

A.  $-270 + 9i$

B.  $216 + 9i$

C.  $246\frac{1}{27}$

D.  $216\frac{1}{27}$

26. Answer both *a* and *b* for all values of *x* for which these expressions are defined.

26.

a) Express the quotient in simplest form:

$$\frac{x^2 - 36}{x^2 + 3x - 18} \div \frac{x^2 - 12x + 36}{x^2 - 6x}$$

b) Solve algebraically for *x* and check:

$$\frac{4}{x} - 1 = \frac{x + 2}{x}$$

27. Answer both *a* and *b* for all values of *x* for which these expressions are defined.

27.

a) Express the product in simplest form:  $\frac{x^2 - 9}{x^2 - x - 20} \cdot \frac{4x^2 - 20x}{4x^2 - 12x}$

b) Solve for *x*:  $\frac{x - 3}{2} = \frac{6}{x + 8}$

28. For all values of *x* for which these expressions are defined, perform the indicated operation and express in simplest form.

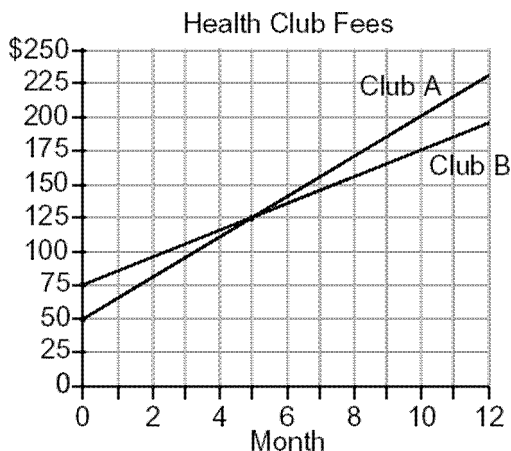
28.

a)  $\frac{3x + 1}{x^2 - 1} - \frac{1}{x + 1}$

b)  $\frac{x^2 - 3x}{x^2 + 2x} \div \frac{x^2 - 5x + 6}{x^2 - 4}$

29. Two health clubs offer different membership plans. The graph below represents the total cost of belonging to Club A and Club B for one year.

29.



a) If the yearly cost includes a membership fee plus a monthly charge, what is the membership fee for Club A?

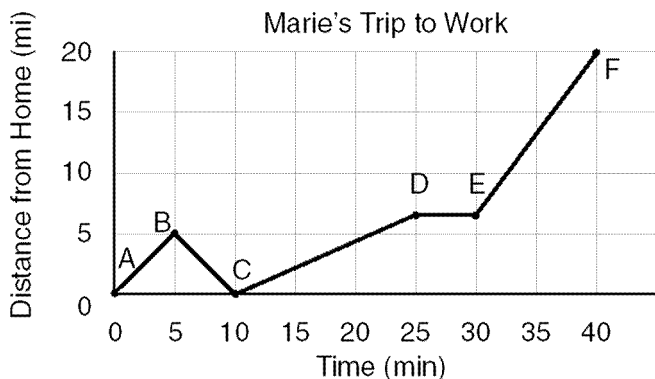
b) (1) What is the number of the month when the total cost is the same for both clubs?

(2) What is the total cost for Club A when both plans are the same?

c) What is the monthly charge for Club B?

30. The accompanying graph shows Marie's distance from home (A) to work (F) at various times during her drive.

30.



- a) Marie left her briefcase at home and had to return to get it. State which point represents when she turned back around to go home and explain how you arrived at that conclusion.
- b) Marie also had to wait at the railroad tracks for a train to pass. How long did she wait?

31. There were 100 more balcony tickets than main-floor tickets sold for a concert. The balcony tickets sold for \$4 and the main-floor tickets sold for \$12. The total amount of sales for both types of tickets was \$3,056.

31.

- a) Write an equation or a system of equations that describes the given situation. Define the variables.
- b) Find the number of balcony tickets that were sold.

32. Shanaya graphed the line represented by the equation  $y = x - 6$ .

32.

Write an equation for a line that is parallel to the given line.

Write an equation for a line that is perpendicular to the given line.

Write an equation for a line that is identical to the given line but has different coefficients.

33. A contractor needs 54 square feet of brick to construct a rectangular walkway. The length of the walkway is 15 feet more than the width.

33.

Write an equation that could be used to determine the dimensions of the walkway. Solve this equation to find the length and width, in feet, of the walkway.

34. The table below shows the number of prom tickets sold over a ten-day period.

34.

**Prom Ticket Sales**

<b>Day (<math>x</math>)</b>	1	2	5	7	10
<b>Number of Prom Tickets Sold (<math>y</math>)</b>	30	35	55	60	70

Plot these data points on the coordinate grid below. Use a consistent and appropriate scale. Draw a reasonable line of best fit and write its equation.

