

- The equation $s = 3\sqrt{10x}$ can be used to determine the speed, s , of a car in miles per hour, given the length in feet, x , of the tire marks it leaves on the ground. A car traveling 72 miles per hour came to a sudden stop. According to the equation, how long would the tire marks be for this car?
- Two different rockets are launched. The first rocket can be modeled by the equation $f(x) = -10t^2 + 20t + 2$ and the second rocket can be modeled by the quadratic function $g(x)$ which contains the values below.

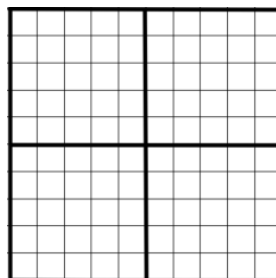
x	$f(x)$
-1	-16
0	4
1	8
2	-4
3	-32

What is the difference in the maximum heights achieved by the two projectiles?

- A school map is placed on a coordinate grid. The front office is located at the point $O(3, 7)$, the library is located at the point $L(7, 4)$, and the cafeteria is located at the point $C(5, 8)$. What is the ratio of the length of \overline{OC} to the length of \overline{LC} ?
- Thirty-eight students are enrolled in math, science, or both for this semester.
 - Twenty students are enrolled in math
 - Twenty-two students are enrolled in science
 How many students are enrolled in both math and science this semester?
- Events M and N have probabilities such that $P(M) = .7$, $P(N) = .25$, $P(M \cup N) = .82$, and $P(M \cap N) = .19$. Are event M and event N dependent or independent? Explain.

6. Simplify: $(5x^5 - 2x^2 + x - 12) - (3x^4 - x^2 + 9)$

- Graph the function $f(x) = (4x + 3)(x - 5)$



- The sum of two numbers is 37. The sum of the squares of the two numbers is 709. What is the product of the two numbers?

9. Determine the number and type of solutions for each quadratic. Show your work!

- $4x^2 - 12x - 9 = 0$
- $4x^2 + 12x + 9 = 0$
- $4x^2 - 6x - 9 = 0$
- $4x^2 + 6x + 9 = 0$

10. On the blueprint for a local theme park, the carousel is modeled by the equation $x^2 + y^2 = 17$. A walkway through the carousel is modeled by a segment of the equation $y + x = -3$. What are the coordinates of the points where the walkway meets the edge of the carousel?

11. The length of a violin string varies inversely as the frequency of its vibrations. A violin string 14 inches long vibrates at a frequency of 450 cycles per second. Find the frequency of a 12-inch violin string.

12. A company manufactures file cabinets.

- The company spent \$130,000 to develop its process for manufacturing the file cabinets.
- The company spends an additional \$12.10 to manufacture each file cabinet.

Write a function to represent the average total cost per file cabinet, y , for the company to manufacture x total file cabinets.

13. With a standard deck of 52 playing cards:

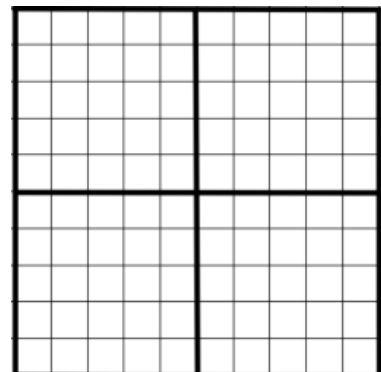
- Joe and his friends take turns randomly selecting one card from the deck.
- The person who draws a face card is deemed the winner.
- After each turn, the card is replaced.
- Joe has drawn four number cards in a row.

What are Joe's chances of picking a face card on his next turn?

14. A plane intersects a hexagonal prism. The plane is parallel to one of the lateral sides of the prism. What type of polygon is formed at the intersection?

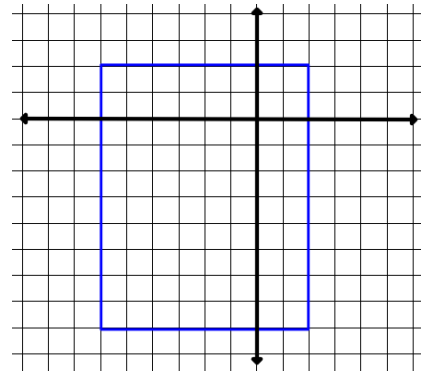
15. The population of a certain bacteria can be modeled by the function $G(t) = -5t^2 + 12t + 3$, where t is the amount of time (in minutes), the bacteria is observed. What is the **approximate** domain of time when the bacteria will be more than 7?

16. Graph the sine function: Label the domain and the range.



17. Name 2 reflections and one rotation that will carry the rectangle onto itself.

- Reflection: _____
- Reflection: _____
- Rotation: _____



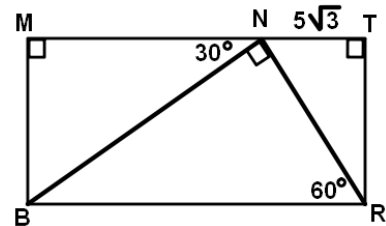
18. What is the relationship between a midsegment of a triangle and the base it's parallel to?

19. The graph of $h(x) = x^2$ will be translated 4 units up and 7 units left. What is the equation of the new function? Write your answer in general form $(ax^2 + bx + c)$ and vertex form $(a(x - h)^2 + k)$.

20. The function below represents a certain account at the local bank at the end of each year. Based on this information, how much did the account start with? How does it grow each year?

$$A_n = 1.045A_{n-1} + 300, A_0 = 5000$$

21. What is the approximate length of \overline{MN} if $\overline{NT} = 5\sqrt{3}$? Leave your answer as a simplified radical (not a decimal)!



22. If angles F and G are complementary angles, what's the relationship between $\sin(F)$ and $\cos(G)$?

23. Identify the binomial factors if r is an unknown constant: $3k^2 - 15k + 2kr - 10r$

24. The value, V , of a home can be modeled by the function $V(t) = 50,000(1.08)^t$, where t is the number of years since the home was purchased. To the nearest hundredth of a percent, what is the quarterly rate of appreciation?

25. Simplify: $\left(\frac{8x^{\frac{3}{4}}y^{-\frac{5}{2}}}{x^{-\frac{9}{5}}y^{\frac{3}{5}}} \right)^{\frac{2}{3}}$