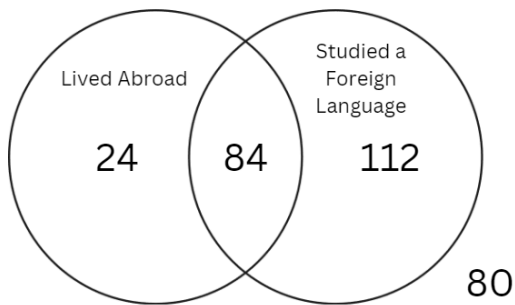


Materials Allowed: Calculator & Reference Sheet

Topic #1: Probability

1. A bag contains 30 green balls and 10 red balls. What is the probability of selecting a red ball?

2. A survey was given to college students about whether they studied foreign languages and whether they lived abroad (outside the U.S.).



- How many people both lived abroad and studied a foreign language?
- How many total people were surveyed?
- How many people lived abroad?
- What does the 80 in the diagram represent?
- What is the probability that a randomly selected person studied a foreign language?
- What is the probability that a randomly selected person either studied a foreign language or lived abroad?

3. The table below shows some information about the juniors and seniors at a small high school and whether or not they made the honor roll at their school.

	Honor Roll	No Honor Roll	Total
Senior	25	25	50
Junior	35	25	60
Total	60	50	110

- a. If you select someone at random, what is the probability that they made honor roll?
- b. If you select someone at random, what is the probability that they made honor roll under the condition that you select a senior?
- c. Are grade level and honor roll independent of each other? Explain.

Topic #2: Functions and Function Transformations

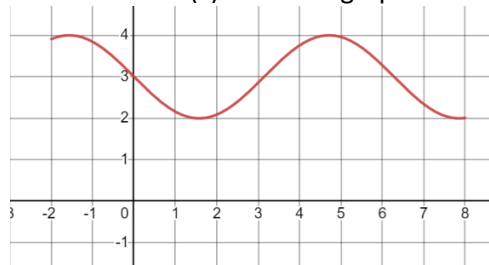
Suppose we have the two functions given below. Evaluate each of the following.

$$f(x) = x^2 + 4x$$

$$g(x) = x + 9$$

4. What is the value of $f(2)$?
5. What is the value of $f(3) + g(3)$?
6. What is the value of $g(10) - f(1)$?

7. The function $h(x)$ has been graphed in the diagram.



- a. What is the **domain** of $h(x)$? b. What is the **range** of $h(x)$?
- c. Estimate the minimum and maximum of $h(x)$.

Topic #3: Quadratic Functions and Equations

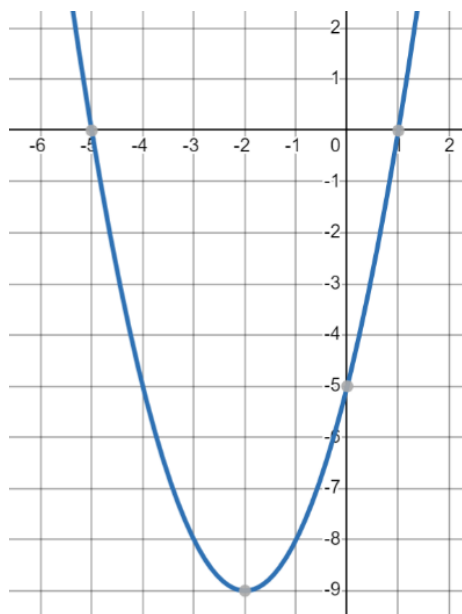
8. Convert from Factored Form to Standard Form: $y=(x+8)(3x-7)$

9. Convert from Standard Form to Factored Form: $y=x^2-18x+80$

10. For the equation below, find the correct pair of solutions.

$$0=(3x-12)(2x+9)$$

11. Identify the equation that best represents the graph in the diagram.



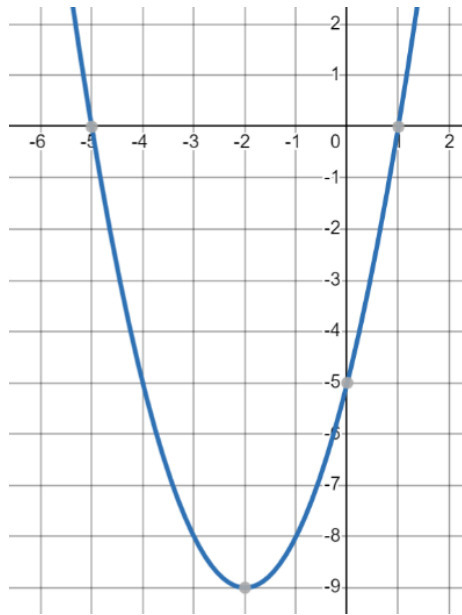
a. $y=-(x+5)(x-1)$

b. $y=(x+5)(x-1)$

c. $y=-(x-5)(x+1)$

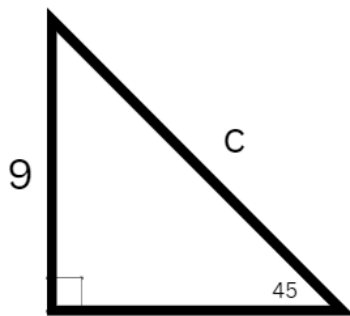
d. $y=(x-5)(x+1)$

12. Identify the coordinate of the **vertex**, **y-intercept**, and **x-intercepts** of the graph below.



Topic #4: Similarity

13. Below is a **special right triangle**. What is the length of side c ?



14. In a 30-60-90 triangle, the length of the shortest side is 12. What is the length of the hypotenuse?
Draw a diagram and show work.

15. Suppose that the sides of triangle ABC have lengths 5 in, 7 in, and 11 in. Which set of numbers below represents the sides of a triangle that is **similar to** triangle ABC? Explain how you know.

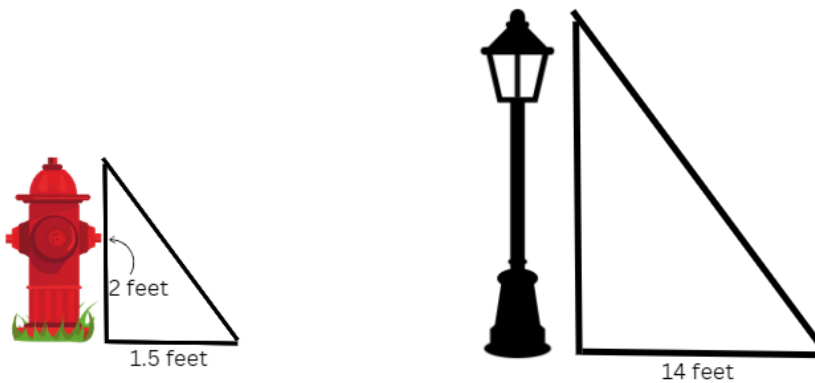
a. 3 in, 4 in, 5 in

b. 10 in, 14 in, 24 in

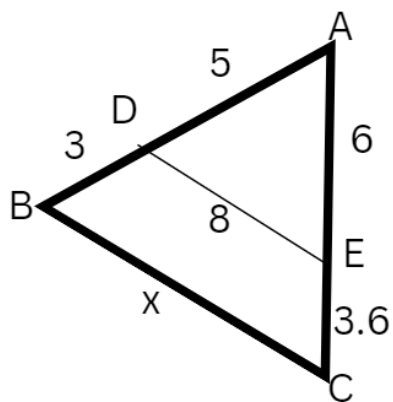
c. 15 in, 21 in, 33 in

d. 2 in, 3 in, 4 in

16. The shadow cast by a 2 foot tall fire hydrant is 1.5 feet long. At the same time, the shadow cast by a nearby lamppost is 14 feet. How tall is the lamppost? Show work.

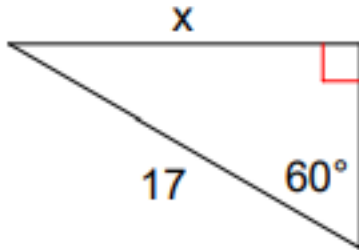


17. In the figure, triangle ADE is similar to triangle ABC. What is the value of x ?

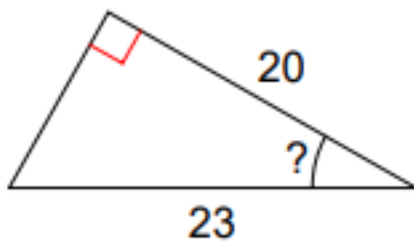


Topic #5: Trigonometry

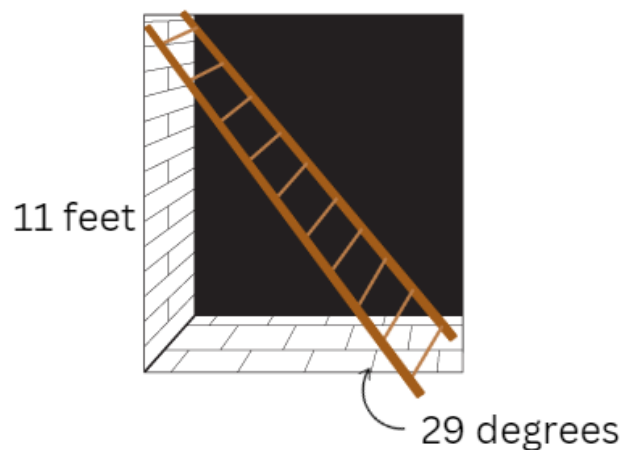
18. Find the value of x in the diagram below using Sine, Cosine, or Tangent.



19. Find the value of $?$ in the diagram below using Sine, Cosine, or Tangent.



20. A ladder is leaning against the top of an 11-foot high wall. The angle formed by the ladder and the ground is 29° .



a. How long the ladder?

b. How far is the bottom of the ladder from the bottom of the wall?