

- 1) What is wrong with the following “proof”? Let $x = y$, Then

$$x^2 = xy$$

$$x^2 - y^2 = xy - y^2$$

$$(x + y)(x - y) = y(x - y)$$

$$x + y = y$$

$$2y = y$$

$$2 = 1$$

- 2) Expand and find the value of $\sum_{k=5}^{11} 3k - 1$. Note: Expand means to show the terms you are adding.

3)

Let $S = \{ a_1, a_2, a_3, \dots, a_n, \dots \}$ be a sequence of numbers. Recall from previous work that S is called an arithmetic sequence if $a_n = a_{n-1} + d$, where d , the “common difference”, is constant.

Give the next two terms in each of the following arithmetic sequences:

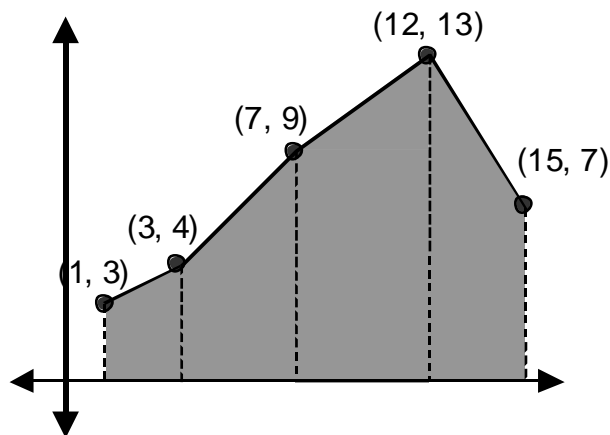
a. 2, 9, 16, 23, ...

b. -1.7, -0.6, 0.5, 1.6, ...

c. $\frac{1}{12}, \frac{1}{4}, \frac{5}{12}, \dots$

4)

Find the area under the graph shown at the right. Show your calculations.



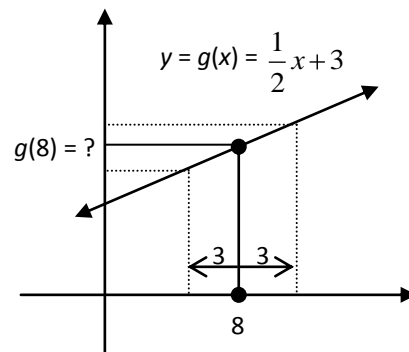
- 5) $x^2 + y^2 = 625$ contains the point $(-24, 7)$.

- Find the equation of the line that contains the point and the center of the circle.
- Find the equation of the tangent to the circle at the point $(-24, 7)$.
- Find the distance from $(30, 12)$ to the circle. Give two decimal places.

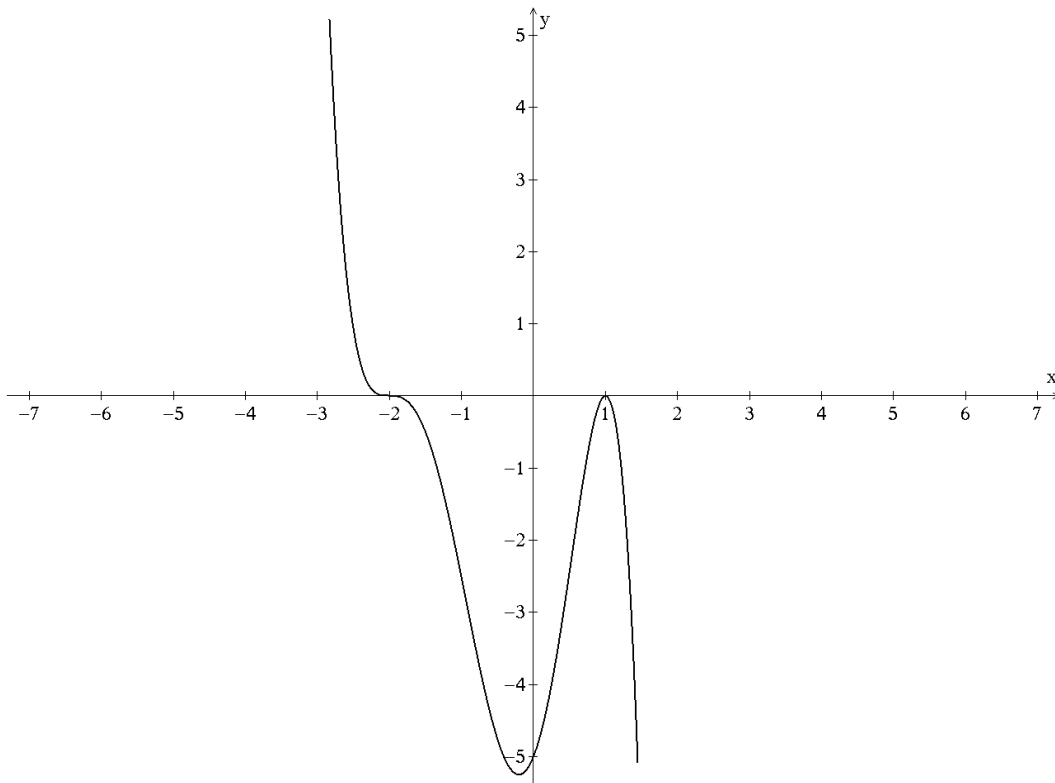
- 6) Let $Q(x) = \frac{x^2 - 5x + 6}{3x - 9}$
- Find all x -values so that $Q(x)$ does not exist.
 - Find all x -values so that $Q(x) = 0$.
 - Draw the graph of $y = Q(x)$.
- 7) Consider the function $g(x) = \frac{x^3 + 4x^2 - 2x + 6}{x^2 - 4}$
- State the domain of g .
 - Divide (long division please) $x^3 + 4x^2 - 2x + 6$ by $x^2 - 4$
 - On the same grid, sketch the of graph $g(x)$ and $y = x + 4$.
Hint: The window $[-30, 30] \times [-22, 22]$ works well.
 - Make a conjecture to explain how your answer to (b) relates to your graph. Justify your conjecture.
- 8) What value does each function approach as x gets very large?
- $f(x) = \frac{3x - 2}{x + 4}$
 - $g(x) = \frac{1}{x^2 - 16}$
- 9) **NC** Solve for x : $\frac{1}{\log_3 x} + \frac{1}{\log_6 x} + \frac{1}{\log_8 x} + \frac{1}{\log_{12} x} = 3$
- 10) Sam rides a Ferris wheel that is 12 meters in diameter and its center is 8 meters above the ground. Each revolution of the wheel takes 30 seconds. Being 10 meters above the ground causes Sam to suffer an anxiety attack. For how many seconds of each revolution does Sam feel uncomfortable? (PEA)
- 11) Robin's bike has wheels that are 27 inches in diameter. After the front wheel picks up a tack, Robin rolls another 120 feet and stops. How far above the ground is the tack? Give your answer to one decimal place. (PEA)

- 12) Use the graph at right to answer the following:

- What is $g(8)$?
- If the domain of g is restricted so that x is within 3 units of 8, written $|x - 8| < 3$, find the range of values for $g(x)$. Write your answer in the forms: interval notation **and** $|g(x) - ?| < ?$.

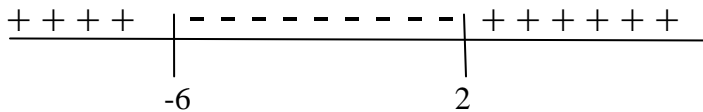


13) Write a polynomial equation of minimal degree that will produce the graph shown in the figure at the below.



On Poly 5 you made a sign chart to analyze the graph of a polynomial function. Sign charts are also used to solve inequalities. For example if

$(x - 2)(x + 6) < 0$ then the sign chart gives us



So our solution is where the sign chart is negative, that is $(-6, 2)$.

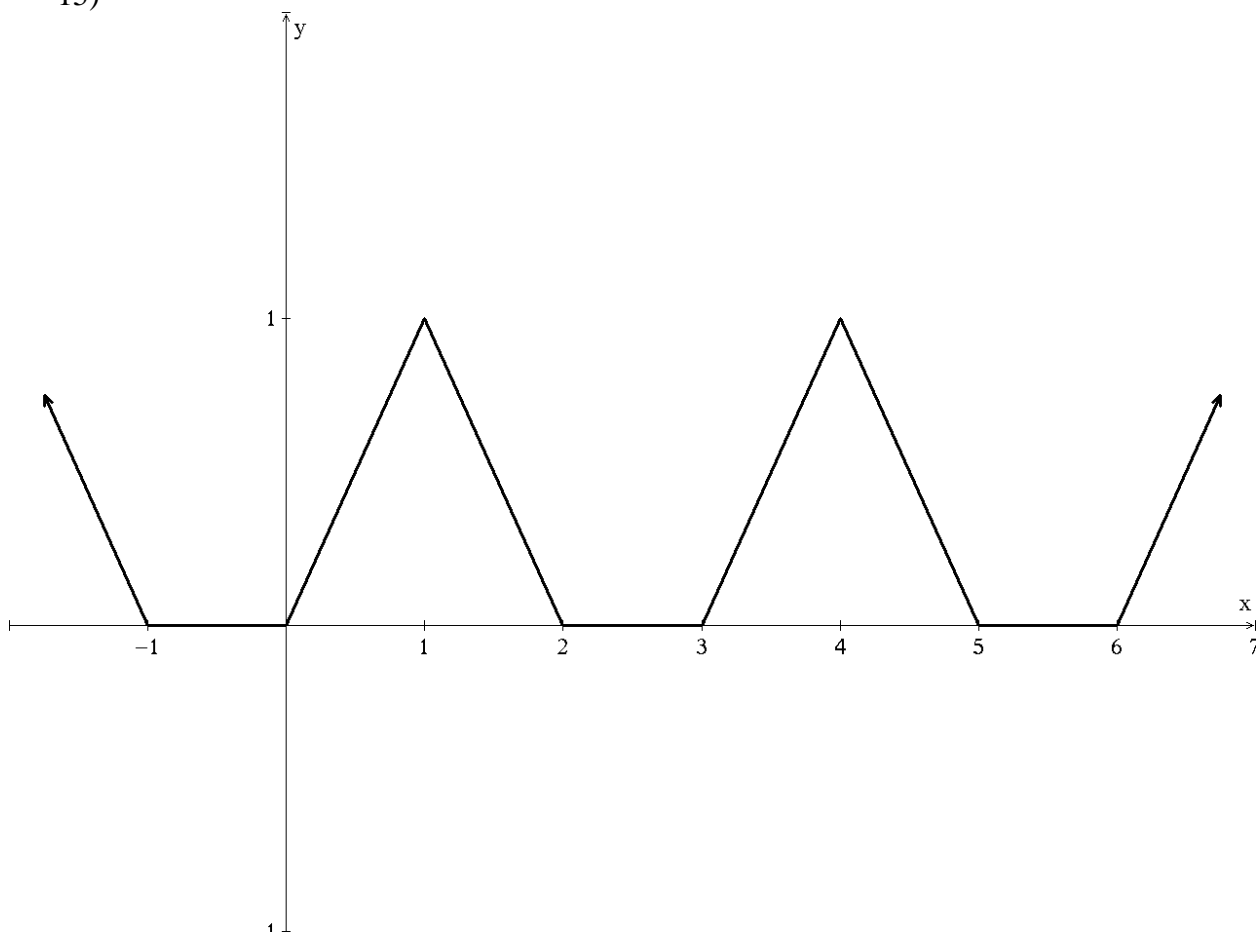
14) Show the sign chart and give the solution to each of the following:

a) $x^2 - 4x - 21 \geq 0$

b) $x^2 - 4x - 5 \geq 0$

c) $\frac{x^2 - 4x - 21}{x^2 - 4x - 5} \leq 0$

15)



The graph of the function $y = g(x)$ is sketched above. The arrows indicate that the pattern from -1 to 6 continues. Find each of the following:

- $g\left(\frac{3}{2}\right), g\left(\frac{10}{3}\right), g\left(\frac{-3}{2}\right)$
- $g(16), g(-7), g(50.5)$
- Find all a such that $g(a) = \frac{1}{2}$