

**Classwork: Periodic functions**

Graph carefully using pencil

1. Given the periodic function  $f(x) = 2\sin(0.4\pi x) + 1$ .

(a) Using the calculator table function, complete the  $y$  values.

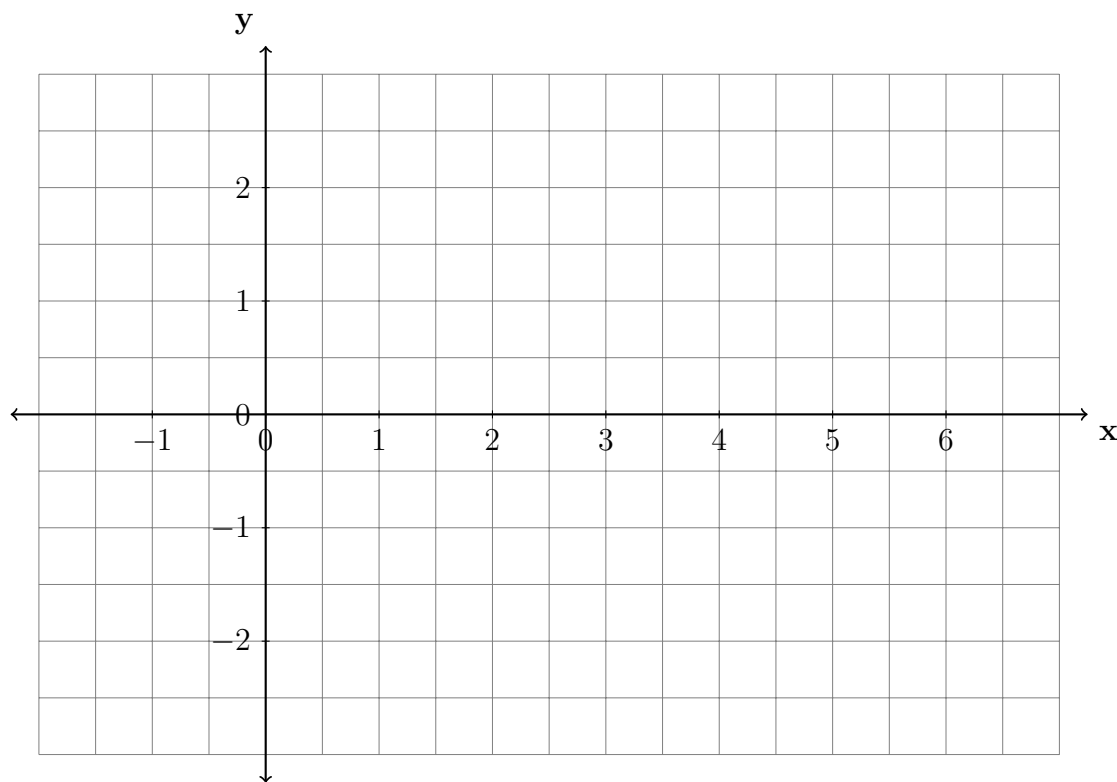
What is the equation of the “midline” (the middle  $y$  value)?

What is the “amplitude” (height from the middle to the top)?

What is the “period” (length of the wave)?

x	$y = f(x)$
-1	
0	
1	
2	
3	
4	
5	
6	
7	

(b) Graph the function on the grid below.



- Simplify the expression  $(5 - 3i)^2$ , where  $i$  is the imaginary unit.
- Given  $i$  is the imaginary unit,  $(1 - ai)^2$  in simplest form is what?
- Write  $\sqrt{x^4} \bullet \sqrt{x^3}$  as a single term with a rational exponent.
- When  $b > 0$  and  $d$  is a positive integer, the expression  $(8x^6)^{\frac{1}{3}}$  is equivalent to what expressed as a radical?
- What does  $\left(\frac{9x^3}{y^6}\right)^{\frac{1}{2}}$  equal?

25 May 2018

Name: .

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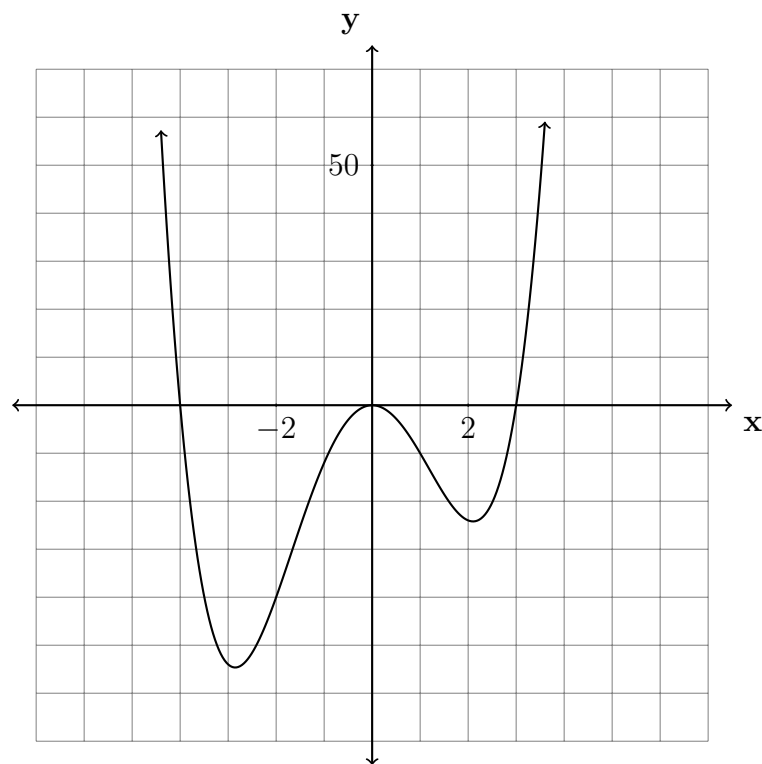
7. What is the inverse of  $f(x) = -6(x - 2)$ ?

Difficulty=6

8. What is the inverse of  $f(x) = \frac{x+1}{x-2}$ ?

9. What are the zeros of the function  $f(x) = x^3 - 5x^2 - 4x + 20$ ?

10. The graph of  $y = f(x)$  is shown below. The function has a leading coefficient of 1.



Write an equation for  $f(x)$ .

The function  $g$  is formed by translating function  $f$  left 2 units. Write an equation for  $g(x)$ .

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11. If the function  $g(x) = ab^x$  represents exponential growth, which statement about  $g(x)$  is false?
- (a)  $a > 0$  and  $b > 1$
  - (b) The  $y$ -intercept is  $(0, a)$ .
  - (c) The asymptote is  $y = 0$ .
  - (d) The  $x$ -intercept is  $(b, 0)$
12. A certain pain reliever is taken in 220 mg dosages and has a half-life of 12 hours. The function  $A = 220 \left(\frac{1}{2}\right)^{\frac{t}{12}}$  can be used to model this situation, where  $A$  is the amount of pain reliever in milligrams remaining in the body after  $t$  hours. According to this function, which statement is true?
- (a) Every hour, the amount of pain reliever remaining is cut in half.
  - (b) In 12 hours, there is no pain reliever remaining in the body.
  - (c) In 24 hours, there is no pain reliever remaining in the body.
  - (d) In 12 hours, 110 mg of pain reliever is remaining.
13. Judith puts \$5000 into an investment account with interest compounded continuously. What is the approximate annual rate is needed for the account to grow to \$9110 after 30 years?