

25 May 2018

Name: .

Classwork: Periodic functions

Graph carefully using pencil

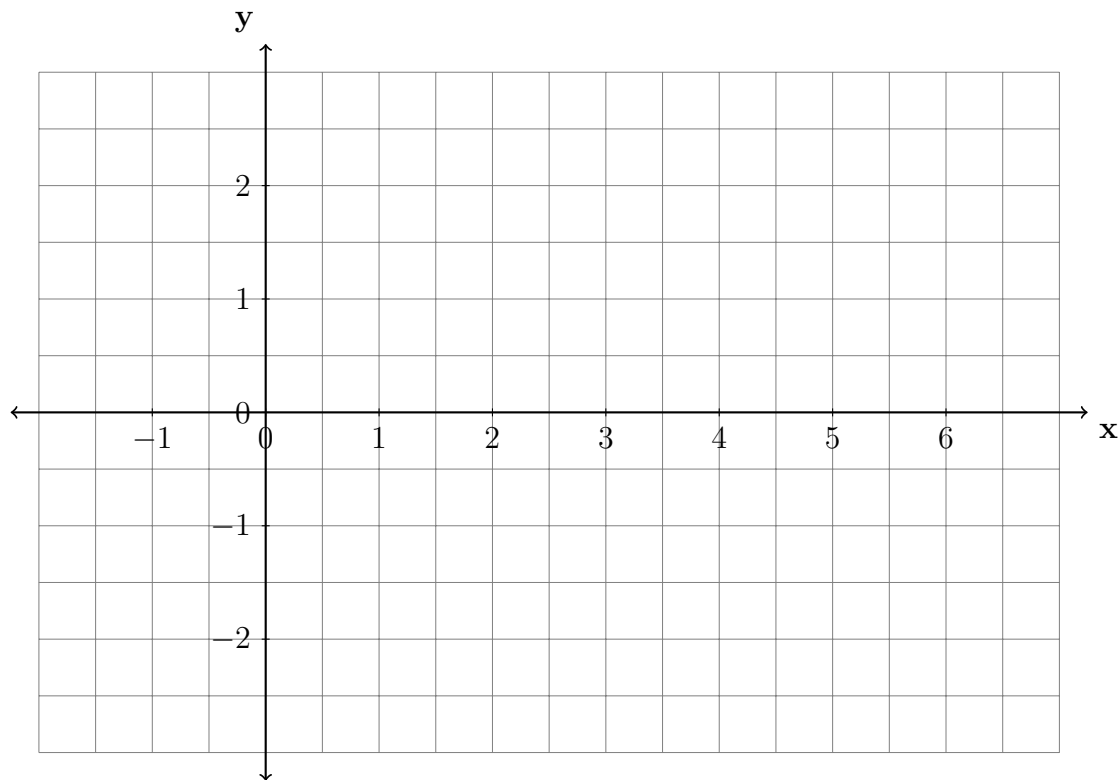
1. Given the periodic function $f(x) = 2\sin(0.4\pi x) + 1$.(a) Using the calculator table function, complete the y values.What is the equation of the “midline” (the middle y value)?

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.



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- 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?

3. Given i is the imaginary unit, $(1 - ai)^2$ in simplest form is what?

4. Write $\sqrt{x^4} \bullet \sqrt{x^3}$ as a single term with a rational exponent.

5. When $b > 0$ and d is a positive integer, the expression $(8x^6)^{\frac{1}{3}}$ is equivalent to what expressed as a radical?

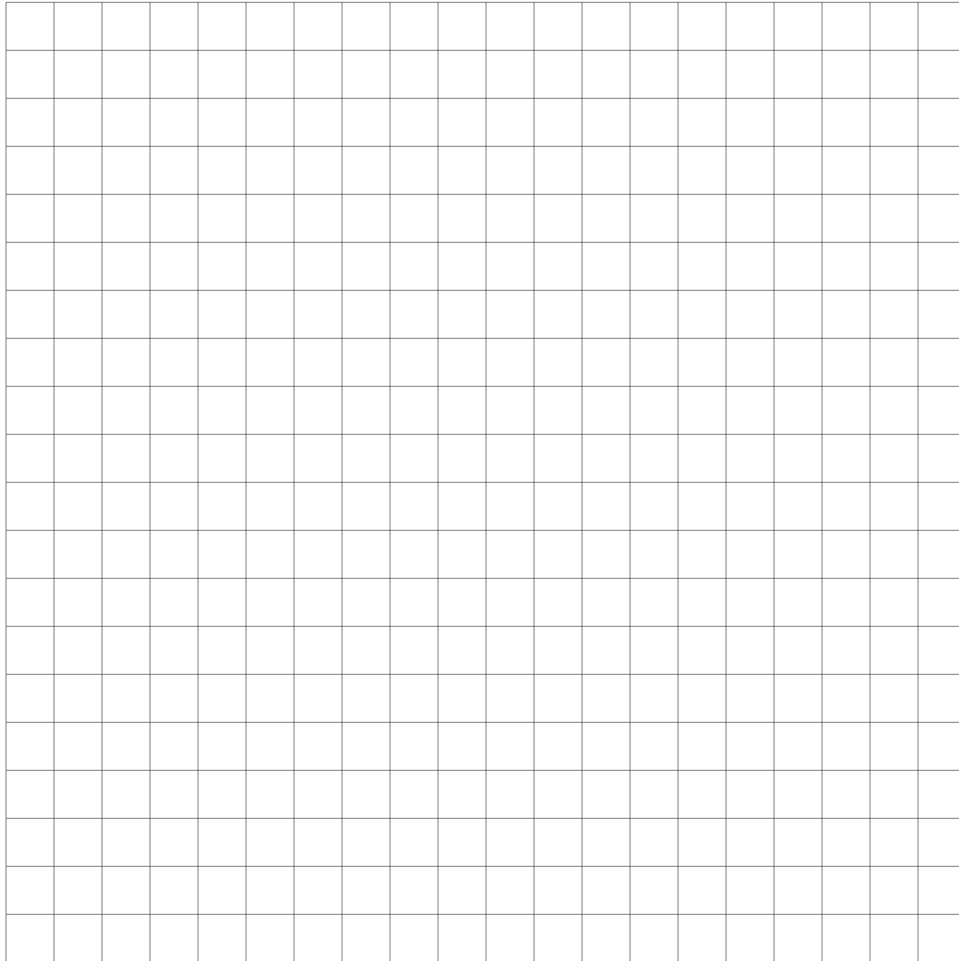
6. What does $\left(\frac{9x^3}{y^6}\right)^{\frac{1}{2}}$ equal?

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7. The zeros of a cubic polynomial function f are $-2, 4$, and 6 . The polynomial has a negative leading coefficient, $a < 0$. Sketch a graph of $y = f(x)$ on the grid below.



Write an equation for $f(x)$ in factored form, assuming the leading coefficient is negative one.

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8. Given: $f(x) = 3x^2 + x - 2$ and $g(x) = 2x - 1$

Express $f(x) \bullet g(x) + 2x$ as a polynomial in standard form.

9. Algebraically determine the values of h and k to correctly complete the identity stated below.

$$2x^3 - 5x^2 + 12x - 5 = (2x - 1)(x^2 - hx + k)$$

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10. What are the zeros for $f(x) = x^4 - 4x^3 - 9x^2 + 36x$?
11. Given that the remainder when $f(x) = x^3 + 3x^2 + 5x - 40$ is divided by $x - 2$ is -10. What is the value of $f(2)$?
12. Simplify the expression $\frac{6x^3 + 9x^2 - 3x}{3x}$, where $x \neq 0$.
13. What is the quotient when $5x^3 + 8x^2 - 2x + 12$ is divided by $x + 2$?

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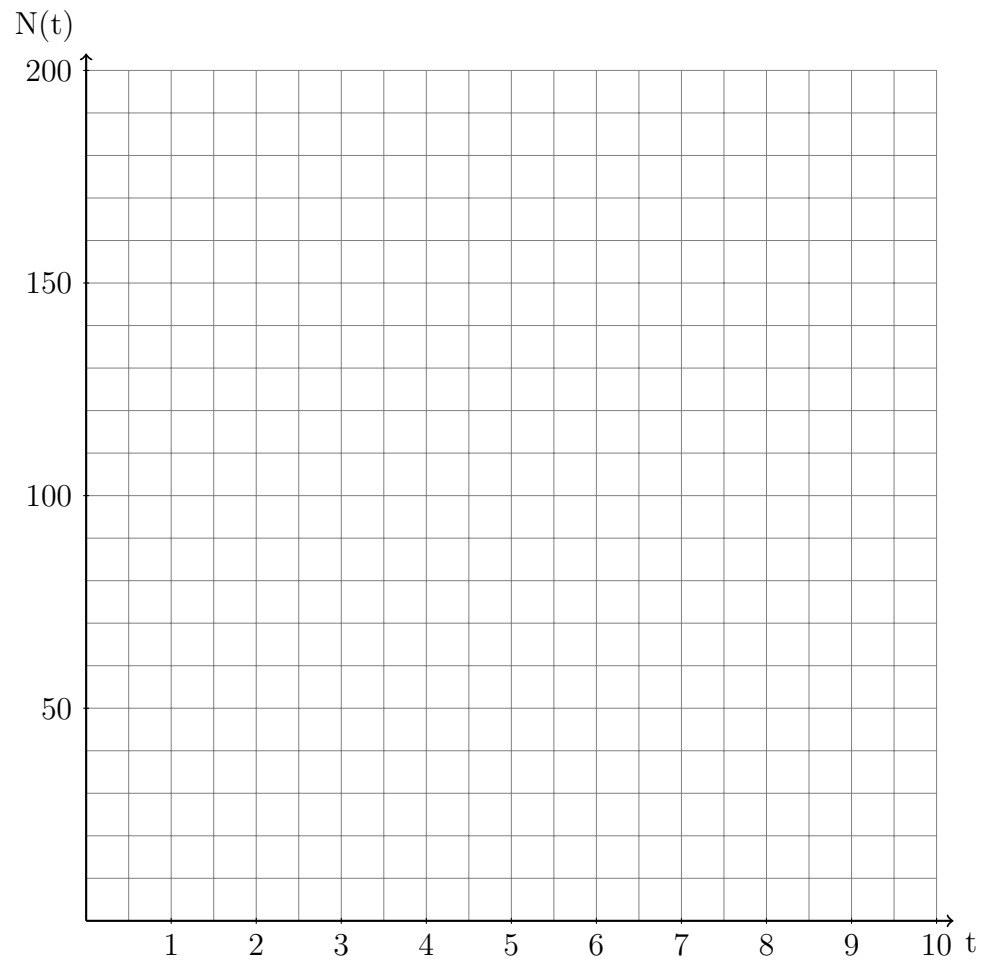
14. Given $N(t) = N_0(e)^{-rt}$, where $N(t)$ is the amount of a drug, N_0 is the initial dosage, r is the decay rate, and t is time in hours.

For A , model $A(t)$ as an initial amount of 175 milligrams and decay rate of 0.25.

For B , $B(t)$ is 90 milligrams initially with a decay rate of 0.075.

Write equations for $A(t)$ and $B(t)$.

Graph each function on the set of axes below.



To the *nearest hour*, t , when will the two drugs be at equal levels?

When will 55 milligrams of drug B remain, to the *nearest tenth of an hour*?

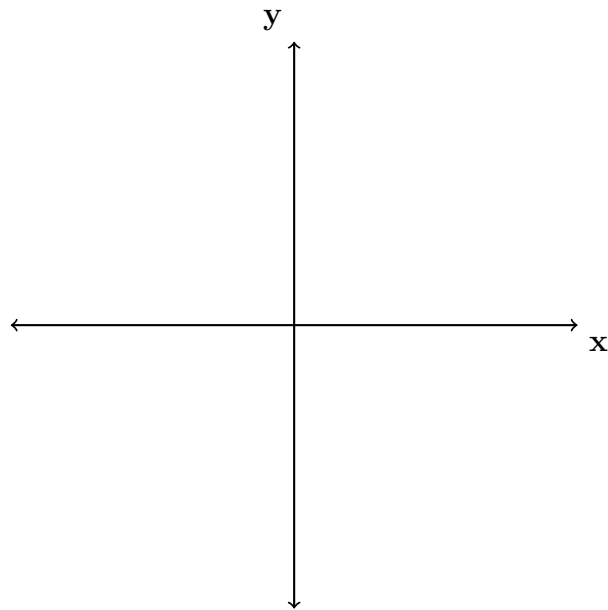
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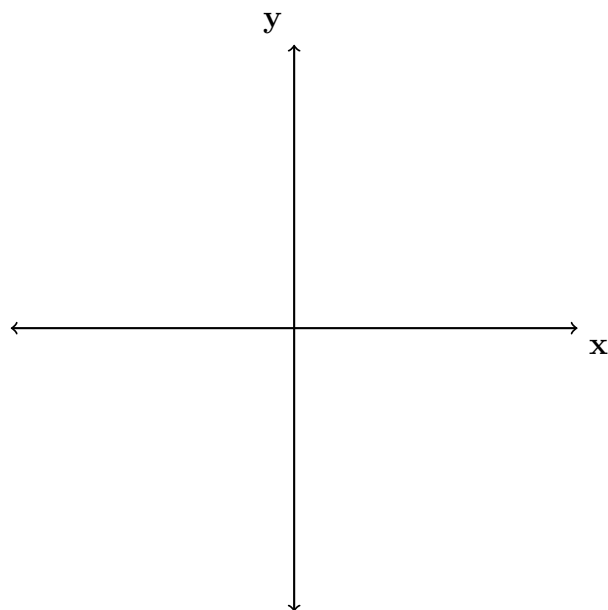
15. Sketch a graph with the following characteristics:

- three real zeros
- as $x \rightarrow +\infty$, $f(x) \rightarrow -\infty$
- as $x \rightarrow -\infty$, $f(x) \rightarrow +\infty$



16. Sketch a graph with the following characteristics:

- polynomial function of order four
- a positive leading coefficient
- four real zeros



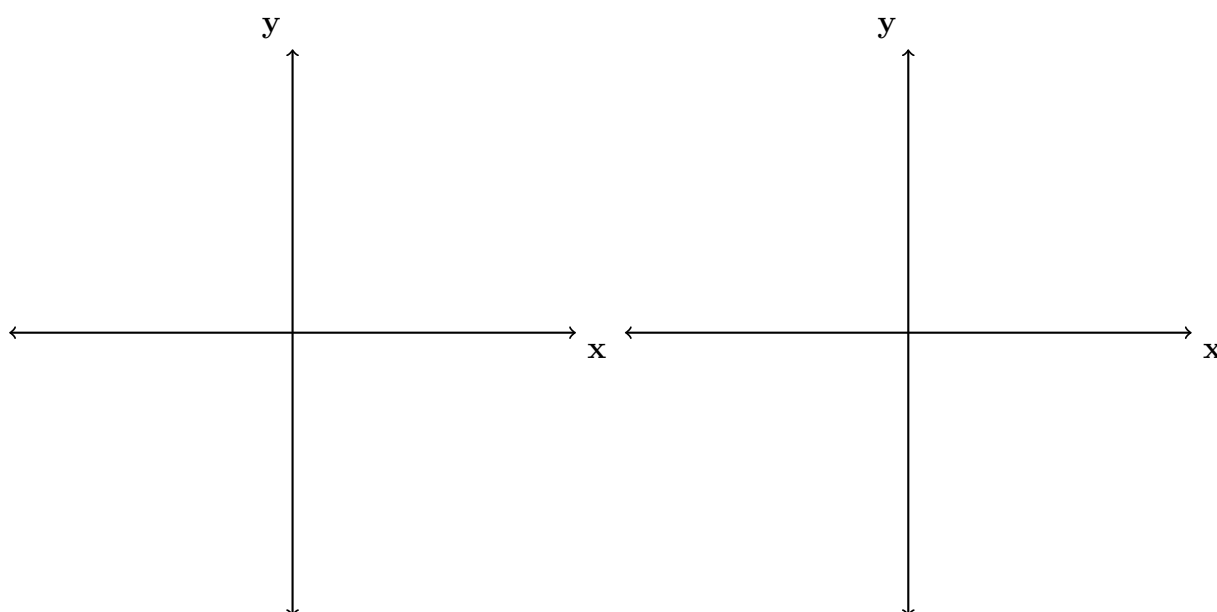
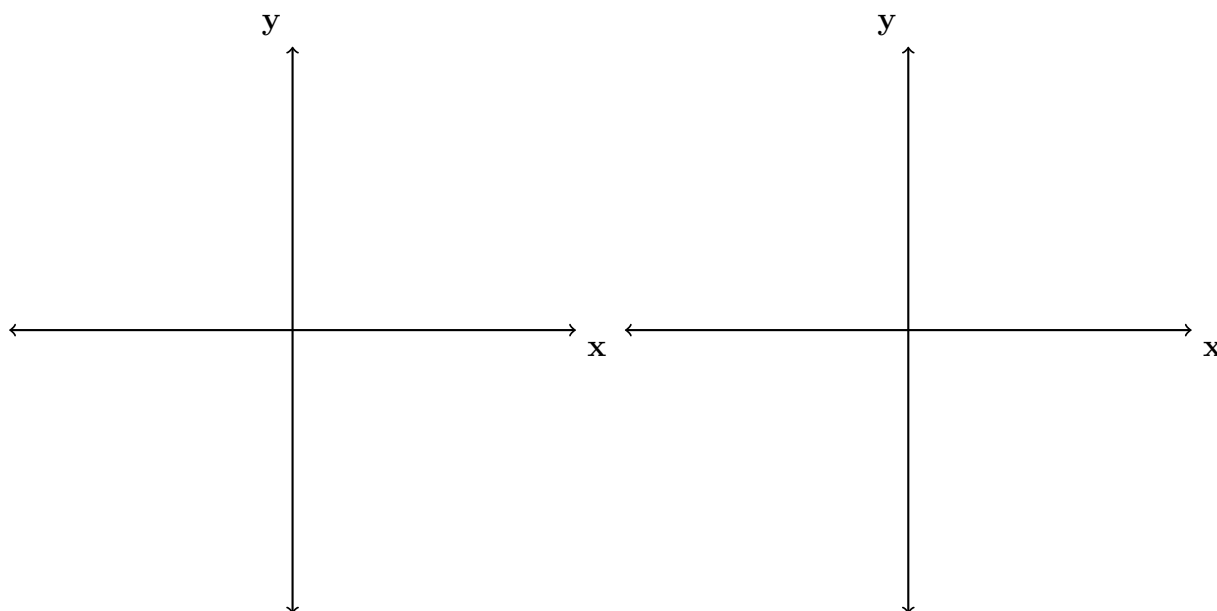
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17. For each polynomial graph, state

- (a) its degree,
- (b) how many distinct zeros it has, and
- (c) the sign of its leading coefficient.



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18. If $g(c) = 1 - c^2$ and $m(c) = c + 1$, then which statement is *not* true?

(a) $g(c) \bullet m(c) = 1 + c - c^2 - c^3$

(b) $g(c) + m(c) = 2 + c - c^2$

(c) $m(c) - g(c) = c + c^2$

(d) $\frac{m(c)}{g(c)} = \frac{-1}{1 - c}$

19. Solve for x : $\frac{1}{x} - \frac{1}{3} = -\frac{1}{3x}$

Solve with a calculator by graphing the left-hand side as $y1 = \frac{1}{x} - \frac{1}{3}$ and the right hand side as $y2 = -\frac{1}{3x}$. Then use the calculator graph-solve function.

To get full credit, show work by sketching the graph. Mark the intersection clearly with the x value. Write “graphical solution.”

