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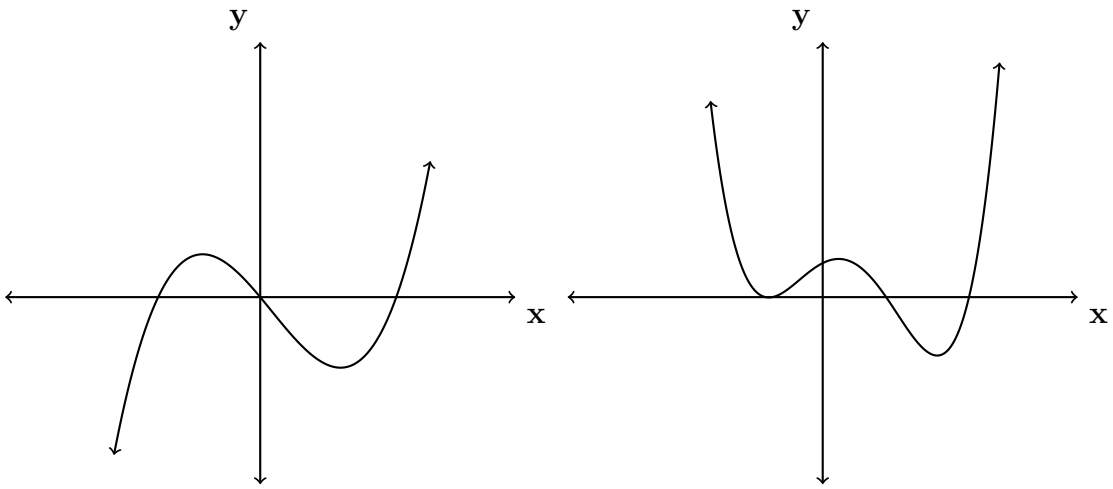
Classwork: Regents review

1. For each polynomial graph, state

   (a) its degree,

   (b) how many distinct zeros it has, and

   (c) the sign of its leading coefficient.



2. Given the function f represented in the table below.

x	$f(x)$
-2	5
-1	0
0	1
1	-2
2	2

   (a) What is the x-intercept?

   (b) For what x is $f(x)$ minimum?

   (c) What is the y-intercept of the function?

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3. A \$4,250 investment earning a continuous interest rate of 3.25% over 3 years would be worth how much?

4. Explain how $\left(3^{\frac{1}{3}}\right)^2$ can be written as the equivalent radical expression $\sqrt[3]{9}$.

5. Given i is the imaginary unit, simplify $(2x - yi)^2$ to the form $a + bi$.

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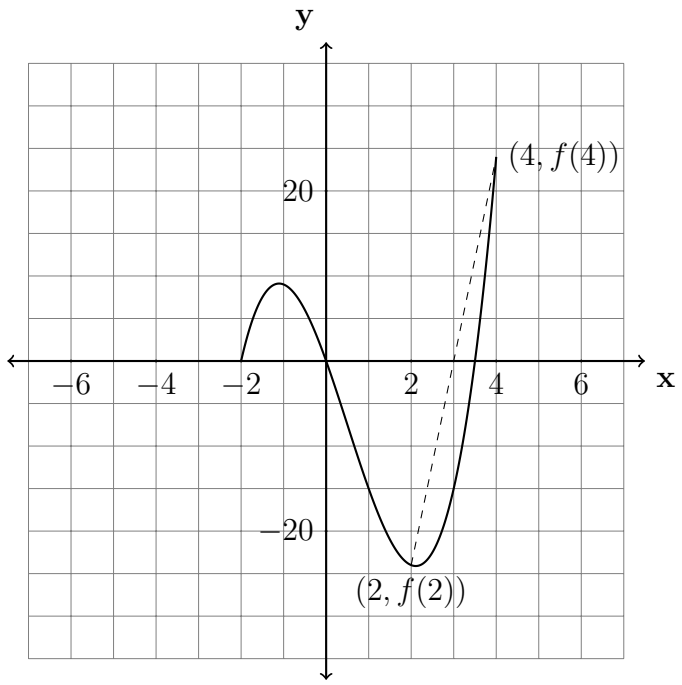
6. Given the polynomial function $f(x) = 2x^3 - 3x^2 - 14x$, as shown on the graph below, over the domain $-2 \leq x \leq 4$.



(a) What is the range of the function, rounded to the nearest integer?

(b) What is the maximum value of $f(x)$ over the given domain?

(c) What is the *average rate of change* of the function between $x = 2, 4$.

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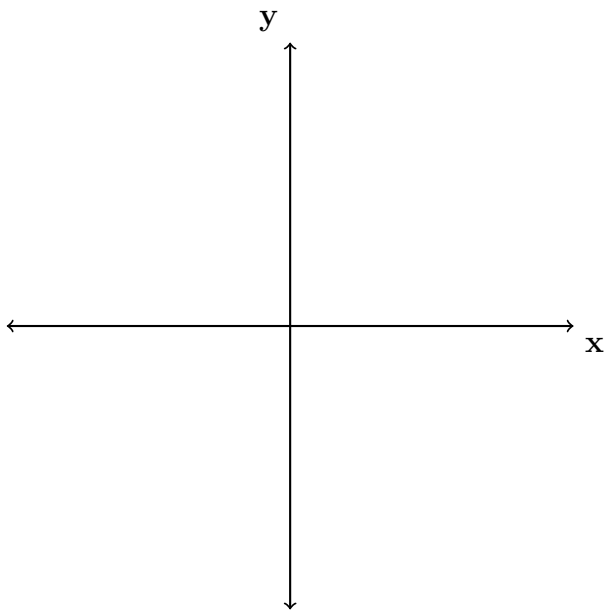
7. Consider the function $h(x) = 2\sin(x) + 1$.
   What is the minimum value of $h(x)$ for the domain $[0, 2\pi]$? Justify your answer by sketching a graph.

8. Sketch a graph of a cubic polynomial with the following characteristics:

   - three zeros: the origin, one positive, one negative
   - as $x \to +\infty$, $f(x) \to -\infty$
   - as $x \to -\infty$, $f(x) \to +\infty$



   What is the sign of the function's leading coefficient?

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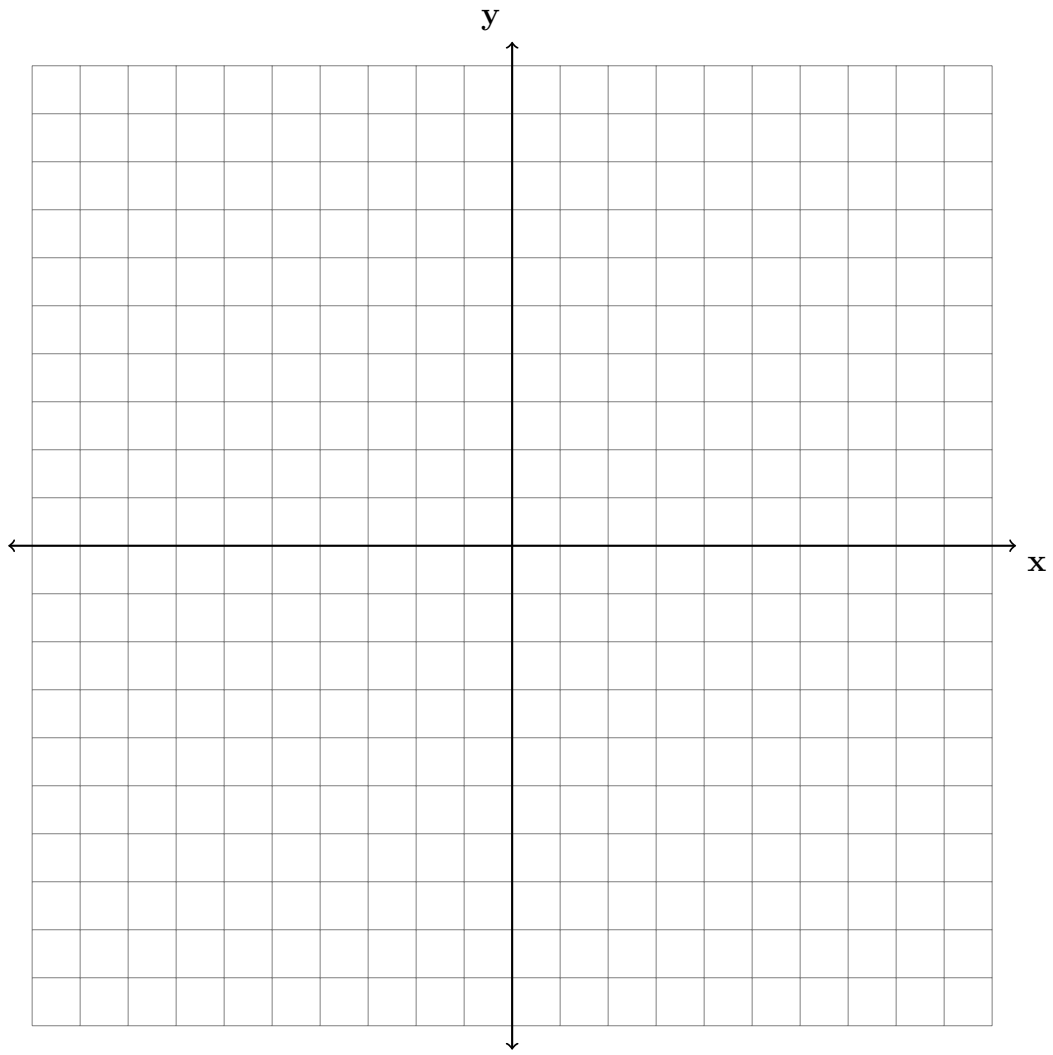
9. On the axes below, graph one cycle of a cosine function with amplitude 3, period π, midline $y = -1$, and passing through the point $(0, 2)$.



What is the minimum of the function?

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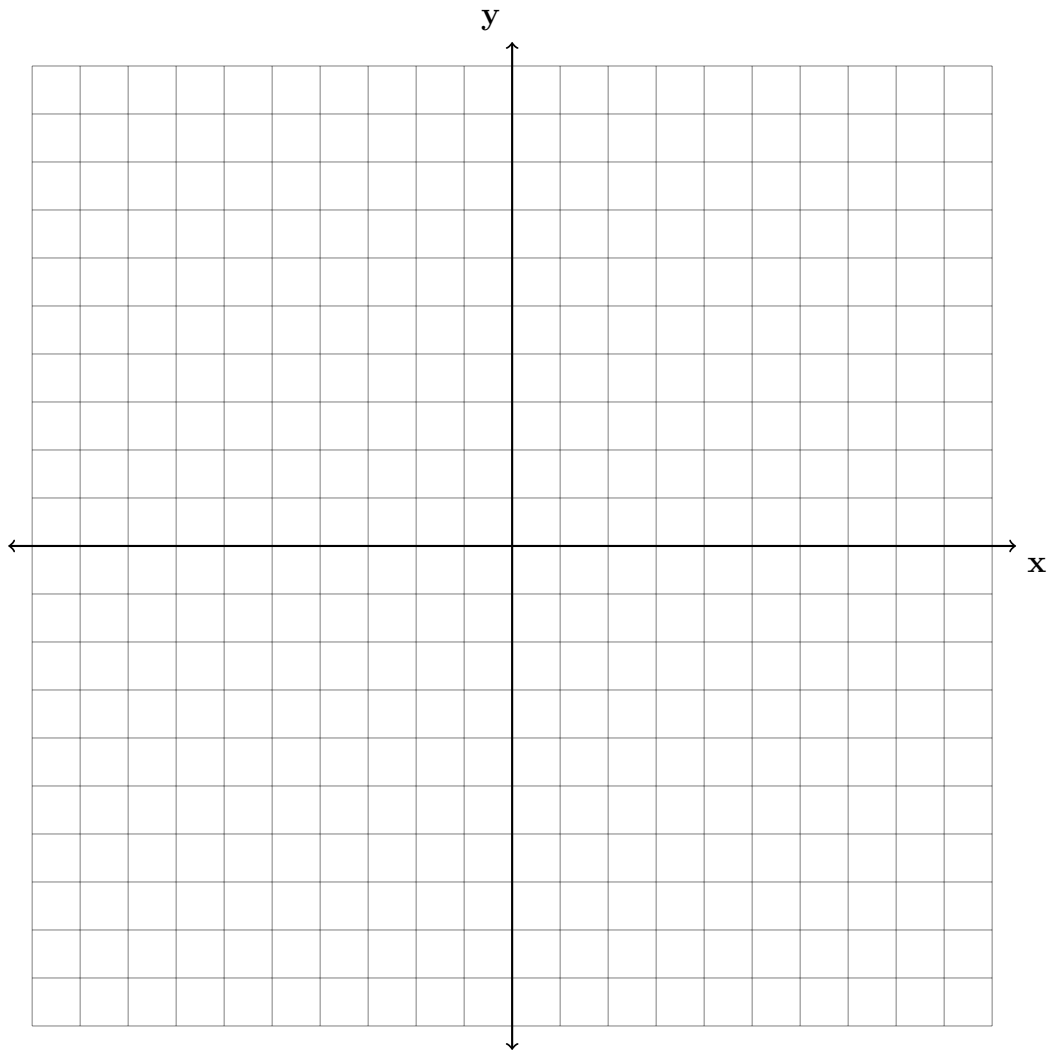
10. Graph $y = \log_2(x+2) - 4$ on the set of axes below. Use an appropriate scale to include both intercepts.



Describe the behavior of the given function as x approaches -2 and as x approaches positive infinity.