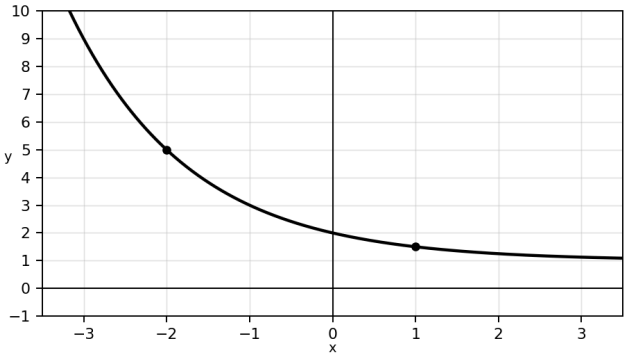
Rates of Change — New Practice Worksheet

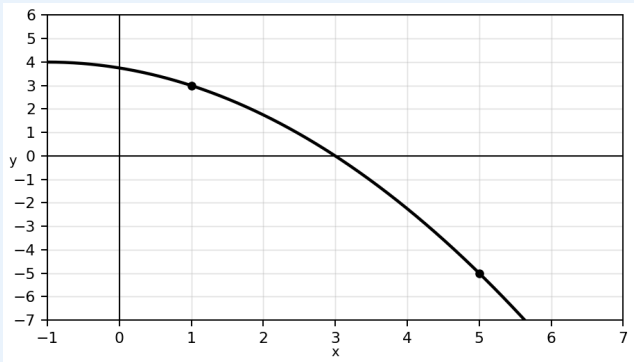
Name: _____ **Date:** _____ **Period:** _____

1–4 Use each graph to calculate the average rate of change. Show endpoint values and the slope calculation.

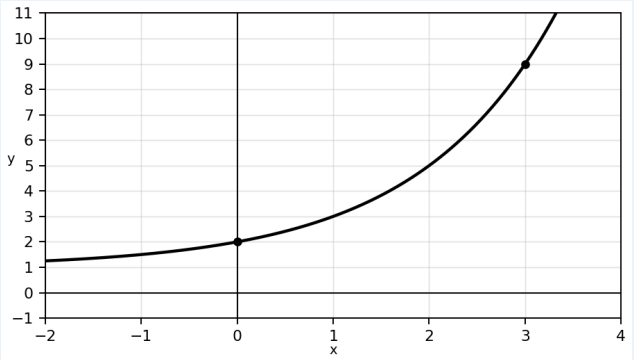
1. Find the average rate of change shown on the graph on $[-2, 1]$.



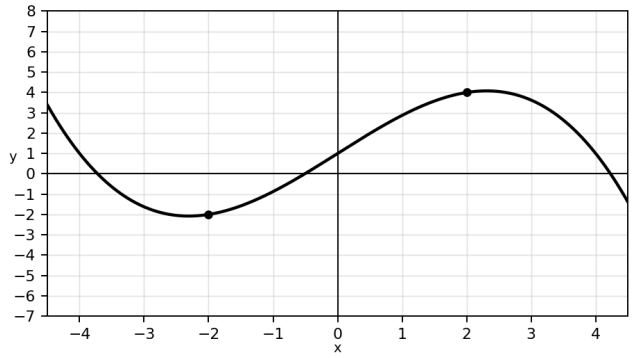
2. Find the average rate of change shown on the graph on $[1, 5]$.



3. Find the average rate of change shown on the graph on $[0, 3]$.



4. Find the average rate of change shown on the graph on $[-2, 2]$.



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5–8 Average rate of change from a function; 9–12 Average rate of change from a table.

5. Find the average rate of change of $f(x) = x^3 - 5x$ on $[2, 5]$.

6. Find the average rate of change of $g(x) = 6 - \frac{1}{4}x^2$ on $[0, 4]$.

7. Find the average rate of change of $h(x) = x^2 + 3$ for $-5 \le x \le -2$.

8. Find the average rate of change of $s(t) = (t + 2)^2 - 6$ for $-2 \le t \le 4$.

For problems 9–12, use this table:

x	0	2.5	4	7	10	13
y	−3	1	3.8	10	15	23.4

9. Using the table, find the average rate of change over [0, 7].

10. Using the table, find the average rate of change over [7, 13].

11. Using the table, find the average rate of change over [2.5, 10].

12. Using the table, find the average rate of change over [4, 10].

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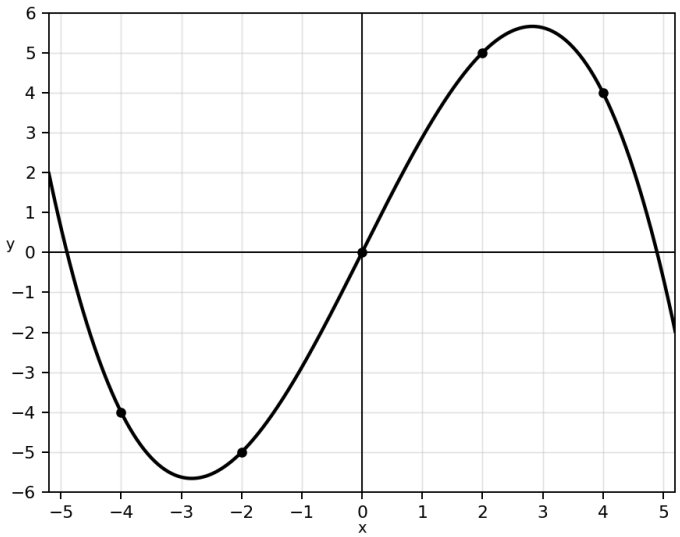
13. Using the graph of $y = h(x)$, estimate the instantaneous rate of change at $x = -4, -2, 0, 2,$ and 4. Draw a tangent at each x-value; choose a second point on that tangent and record its slope.



x	A point (x, h(x))	Second point on tangent	Estimated tangent slope
-4			
-2			
0			
2			
4			

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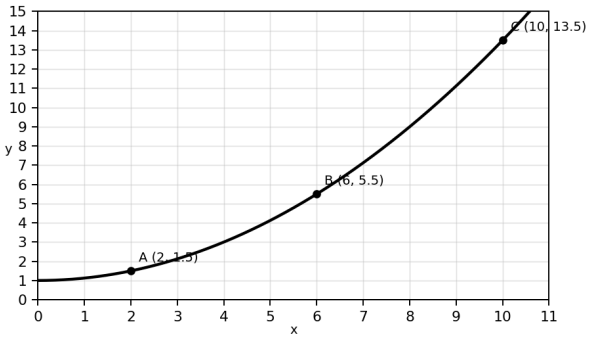
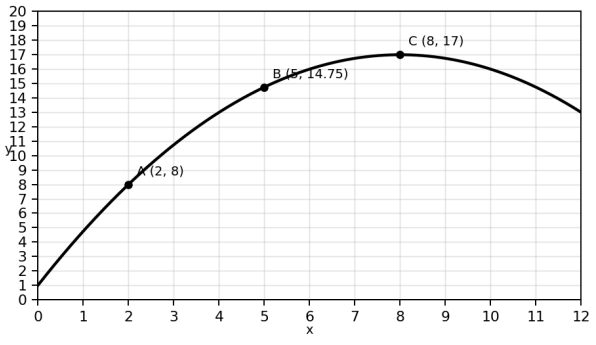
14–16 Use the labeled points on the graphs; **17** Interpret a rate in context.

14. Find the average rates of change from A to B, B to C, and A to C. Which is the largest?



15. Find the average rates of change from A to B, B to C, and A to C. Which is the smallest?



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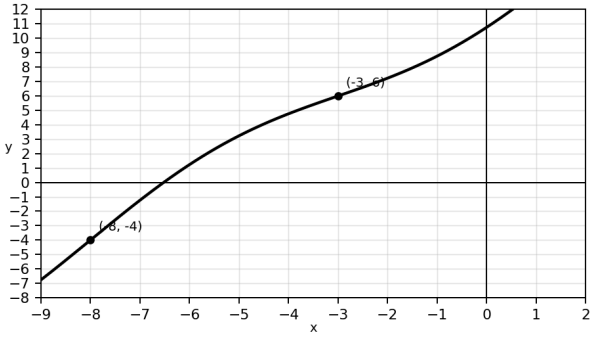
16. Find the average rate of change of $g(x)$ on $[-8, -3]$.



17. A store sells C bags of pet treats at price p dollars, where $C(p) = 24 - p^2 + 2p$ for $1 \le p \le 5$. Find the average rate of change in demand as price increases from \$2 to \$5. Interpret your answer.

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Name: _____ Date: _____ Period: _____

18. A colony begins with 18 insects and triples every week. Its population after x weeks is $P(x) = 18(3^x)$. Find the average growth rate during weeks [0, 3]. Include units.

19. The total cost (in dollars) of producing x items is $C(x) = 0.0001x^3 + 0.08x^2 + 15x + 1200$. A. Find the average cost rate from 100 to 300 items. B. Find it from 200 to 400 items.

20. A ball is launched from a height of 64 ft with an initial upward velocity of 64 ft/s. Its height is $h(t) = -16t^2 + 64t + 64$. A. Find average velocity from $t = 0$ to 2 seconds. B. Find average velocity from $t = 2$ to 4 seconds.

Rates of Change — New Practice Worksheet

Name: _____ Date: _____ Period: _____

21. A table gives a skydiver's velocity during free fall. A. Find the average rate of change of velocity over every 10-second interval. B. Which interval has the largest rate? C. Estimate velocity at t = 15 seconds using the rate from 10 to 20 seconds.

Time (sec)	0	10	20	30	40	50	60
Velocity (ft/sec)	0	110	154	176	187	192.5	193.5

22. The table shows a town's population. A. Find the average rate of change for every decade. B. Which decade has the largest rate? C. Use the 2020–2030 rate to estimate the population in 2026.

Year	1990	2000	2010	2020	2030
Population (millions)	8.4	10.8	14.1	17.5	22.3

Rates of Change — New Practice Worksheet

Name: _____ Date: _____ Period: _____

23–26 A bowl of soup is cooling. Use the following temperature measurements for all four questions.

t (min)	0	2	5	7	10
$T(t)$ (°C)	82	78	69	65	60

23. How quickly is the soup cooling, on average, over the entire 10-minute interval? Include units.

24. Estimate the rate of temperature change at $t = 6$ minutes using nearby data. Explain your approach.

25. During which recorded interval is the soup cooling fastest? Explain how you know.

26. Using the overall average rate of cooling, estimate when the soup will reach 54°C.

Rates of Change — Free Response

Name: _____ **Date:** _____ **Period:** _____

Free-response question. A car trip is represented by the distance–time graph. A. Find the average travel rate for the first 15 minutes in miles per hour. B. How fast is the car going between 15 and 25 minutes? Explain. C. What is its speed at 65 minutes? D. Find its average rate of change in distance for the first 75 minutes in mph. E. Explain why the segment from 90 to 120 minutes slopes downward.

