



Applications of Derivatives

Chapter: Differential Calculus • Level ★★★ •
Time: 30 min

SCORE

___ / 20

Name _____ Class _____ Date _____

AFTER THIS WORKSHEET YOU CAN

- ✓ Use derivatives to find velocity and acceleration.
- ✓ Determine where a function is increasing or decreasing from the sign of f' . ✓ Find critical points by solving $f'(x) = 0$.
- ✓ Interpret the second derivative.



Section A • Concept Check

• BEGINNER

$4 \times 1 = 4$

- 1 If $s(t) = t^3 - 6t$, the velocity at $t = 2$ is:
☐ A. 0 ☐ B. 6 ☐ C. 12 ☐ D. -6
- 2 A function f is increasing where:
☐ A. $f' > 0$ ☐ B. $f' < 0$ ☐ C. $f' = 0$ ☐ D. $f'' = 0$
- 3 Critical points occur where:
☐ A. $f = 0$ ☐ B. $f' = 0$ or undefined ☐ C. $f'' = 0$
☐ D. $x = 0$
- 4 Acceleration is the derivative of:
☐ A. position ☐ B. velocity ☐ C. area
☐ D. slope



Section B • Problem Solving

• INTERMEDIATE

$2 + 3 \times 3 = 11$

- 5 Velocity is the derivative of _____.
- 6 f is increasing where $f'(x)$ _____ 0.
- 7 A particle's position is $s(t) = t^3 - 6t$. Find the velocity at $t = 2$.

- 8 Find the acceleration at $t = 2$ for that particle.

- 9 For $f(x) = x^2 + 2x$, find where f is increasing.



Section C • Challenge

• CHALLENGE

5

- 10 For $f(x) = -x^2 + 4x$, find where f is decreasing.

Reflection — the most useful thing I learned: _____

A ___/4 B ___/11 C ___/5 Total ___/20

Teacher's Signature _____

Parent's Signature _____

ANSWER KEY — FOLD OR CUT BEFORE HANDING OUT

1-B 2-A 3-B 4-B | 5 position 6 > (greater than) 7 = 6 8 = 12 9 = $x > -1$ | 10 = $x > 2$

