

# Derivative Approximation Worksheet

1. Use the slope of the secant line between  $x = -2$  and  $x = -1$  to approximate  $f'(-1.5)$ , where  $f(x) = x^3 + 3x$ .

2. Lisa was 5 miles away from Shmoop at 9am and 3 miles away at 8:15am. Find her average rate of travel.

3. Find the derivative of  $f(x) = 2x^2$  using the limit definition.

4. Use the following table to approximate  $f'(0)$ :

$x$	-0.5	-0.3	-0.1	0.08	0.1
$f(x)$	34.6	27	28.1	26	24.3

5. Find the derivative of  $f(x) = \frac{1}{x}$  at  $x = -1$  using limit definition.

6. If  $x$  is measured in minutes and  $y$  is measured in slices of pizza then find

the units of  $\left. \frac{dy}{dx} \right|_{y=5}$ .

7. Fill the following table to approximate  $f'(1)$  for  $f(x) = e^{-x}$ :

$h$	-0.1	-0.01	0	0.05	0.1
$f(1+h)$					

8. Use the slope of the secant line to approximate the derivative of  $g(x) = 2^x - 1$  at  $x = 1$ .

9. Stan's distance (in miles) from home is given by  $d(t) = 2t^2 + t$ , where  $t = 0$  denotes the time he starts his running. Find his instantaneous speed after 15 minutes.

10. If  $x$  is measured in hours and  $y$  is measured in area of wall painted ( $m^2$ ) then interpret  $\left. \frac{dy}{dx} \right|_{y=2} = 8.3$ .

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