

Mock Test 2 Solutions

Part A: Knowledge and Understanding

1) $f'(x) = \frac{x}{\sqrt{x^2+1}}$

2) 54

3) $a = \frac{3}{2}$

4) $\frac{dy}{dx} = \frac{2}{5\sqrt{x^3}} + \frac{2(x^2+1)-2x(2x+1)}{(x^2+1)^2}$

Part B: Application

1) At 8 minutes.

2) $y = \frac{2}{9}x + \frac{1}{3}$

3) $d'(3) = 3420$

Part C: Thinking

1) $(3, -78)$

2) $x = \pm \sqrt{2}$

3) $(1, -3)$ and $(5, 15)$

4) $\frac{-37}{4}$

5) see video solutions

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Part D: Communication

1) She has to use the chain rule because it is a composite function.

$$f'(x) = 12(2x^2 + 5)^2(4x)$$

2) the slope of the tangent is always negative and the function is always decreasing.

i.e. $f(x) = \frac{1}{x}$

3) see video solutions.