

Fall 2019 Final Exam Answers

1.  $y = -6x + 56$

2. C

3. D

4.

$$\begin{aligned} f(x+h) &= 3(x+h)^2 + 2 \\ f(x+h) &= 3(x^2 + 2xh + h^2) + 2 \\ f(x+h) &= 3x^2 + 6xh + 3h^2 + 2 \end{aligned}$$

$$\frac{f(x+h) - f(x)}{h} = \frac{(3x^2 + 6xh + 3h^2 + 2) - (3x^2 + 2)}{h}$$

$$f'(x) = \lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h} = \lim_{h \rightarrow 0} \frac{6xh + 3h^2}{h} \quad \leftarrow \text{plug in } h=0$$

$$f'(x) = 6x$$

5. C

6. E

7. A

8. Abs. max. = 33, abs. min. = -31

9. There is no interval where  $f$  is both decreasing and concave up

10. A

11.  $r = 3, h = 18$

12. E

13. B

14. C