

MATH 1306 – Homework Handout # 7
Answers To Odd-numbered Problems

- 1a. i) slope of tangent line at input 0 = $f'(0) = -6$
ii) coordinates of possible turning points are $(x, y) = (3, -16)$
Justification:
To find x : solve $f'(x) = 0$ or $2x - 6 = 0$. You get $x = 3$.
To find y : $y = f(3) = (3)^2 - 6(3) - 7 = -16$
- 1b. i) slope of tangent line at input 0 = $g'(0) = -3$
ii) coordinates of possible turning points are $(-3, 18)$ and $(1/3, -14/27) \approx (0.3, -0.5)$
Justification:
To find x : solve $f'(x) = 0$ or $3x^2 + 8x - 3 = 0$. You get $x = -3$ and $x = 1/3$.
To find y : $y = f(-3) = (-3)^3 + 4(-3)^2 - 3(-3) = 18$
And $y = f(1/3) = (1/3)^3 + 4(1/3)^2 - 3(1/3) = -14/27$
- 3a. $g'(1) = -12$ and so the function g is decreasing at the input $x = 1$
3b. $g'(3) = 24$ and so the function g is increasing at the input $x = 3$
3c. The turning point $(2, -20)$ is a valley (local minimum) on the graph of g since the function changes from decreasing to increasing at $x = 2$.
5. i) y -intercept = $f(0) = 2$
ii) x -intercepts are $x = -1, x = 1, x = 2$
iii) coordinates of the possible turning points are approximately $(-0.2, 2.1)$ and $(1.5, -0.6)$
Hint: Use the quadratic formula $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$
iv) coordinates of the possible inflection point are approximately $(2/3, 0.7) \approx (0.7, 0.7)$
v) a possible graphing window is $[xMin, xMax] \times [yMin, yMax] = [-2, 3] \times [-1, 3]$
Note: Different persons may answer differently.
- 7a. i) y -intercept = $f(0) = -21$
ii) x -intercepts are $x = -3, x = 7$
iii) slope of tangent line at input 0 = $f'(0) = -4$
iv) coordinates of possible turning points are $(2, -25)$
v) a possible graphing window is $[-4, 8] \times [-17, 17]$
- 7b. i) slope of tangent line at input 0 = $g'(0) = -12$
ii) coordinates of possible turning points are $(-2, 16)$ and $(2, -16)$
iii) a possible graphing window is $[-4, 4] \times [-17, 17]$