

## MAT 170 Final Review Answers

There is a reasonable assumption that most of these answers are correct. If you find any incorrect answers, please contact your instructor as soon as possible.

### PART I – ALGEBRA

#### A. Difference quotient - Section 1.3

$$1. -\frac{1}{3x(x+h)} \quad 2. -2x+5-h \quad 3. 6x+4+3h$$

#### B. Function composition - Section 1.7

$$4. (f \circ g)(x) = 4x^2 - 14x + 16, (g \circ f)(x) = 2x^2 - 2x + 5 \quad 5. (g \circ f)(x) = 2x$$

#### C. Inverse functions - Section 1.8

$$6. f^{-1}(x) = \frac{3x}{4-x} \quad 7. f^{-1}(x) = \frac{e^{x+4} + 2}{3} \quad 8. f^{-1}(x) = \frac{\ln(x-4) + 2}{5}$$

$$9. f^{-1}(x) = \sqrt[3]{x+10}$$

#### D. Zeros of polynomials - Section 2.3-2.5

$$10. \text{ zeros are } 2, 0, -1 \quad 11. \text{ zeros are } 1, 3i, -3i$$

#### E. Domains of function $s$ - Sections 1.2-1.3

$$12. (-\infty, -3) \cup (-3, 3) \cup (3, \infty) \quad 13. \left(-\infty, \frac{2}{3}\right) \cup \left(\frac{2}{3}, \infty\right) \quad 14. \left(-\frac{1}{2}, \infty\right)$$

$$15. (-\infty, 4]$$

#### F. Exponential equations – Section 3.4

$$16. x = \log_3(7) = \frac{\ln(7)}{\ln(3)} \approx 1.77 \quad 17. x = \frac{\ln(3)}{\ln(3) - \ln(5)} \approx -2.15 \quad 18. x = \ln(9) \approx 2.197$$

#### G. Logarithmic equations – Section 3.4

$$19. x = 8 \quad 20. x = 11 \quad 21. x = \frac{2e}{e-1} \approx 3.16$$

#### H. Application of rational functions – Section 2.6

22. The insect population approaches the size of 50 million.  
23. In the long run the average cost approaches 20 dollars.

#### I. Application of quadratic functions – Section 2.2

24. Maximum time is  $5\frac{5}{9}$  seconds. Maximum height is  $89\frac{5}{6}$  feet.  
25. The minimum percentage increase in tuition was approximately 3.47% when  $x = 6.57$ .



**S. Vectors and Dot Product – Sections 6.6-6.7**

57. a.  $16\mathbf{i} - 11\mathbf{j}$

b.  $-5\mathbf{i} + \mathbf{j}$

58. a. 9

b.  $\sqrt{37}$

c.  $\sqrt{52}$

d.  $\theta = \cos^{-1}\left(\frac{9}{\sqrt{37}\sqrt{13}}\right) \approx 65.8^\circ$