Test 2 Review Key

1. a. $\frac{4}{5}$ b. $\frac{1}{4}$ c. -1 d. $\frac{5}{6}$ e. -1 f. 1 g. $\frac{5}{9}$ h. 0

2. a. No; Jump

   b. Yes

   c. No; Jump

   d. Yes

3. $k = 4$

4. $A = 5\,, B = -2$

5. DNE

6. a. $f'(x) = 24(2x-1)^3$

   b. $y' = 6(\sec(2x))^3 \tan(2x)$

   c. $f'(x) = \frac{3}{2\sqrt{x}} - \frac{5}{x^2}$

   d. $f'(x) = \frac{-1}{2x^{3/2}}$

   e. $f'(x) = \frac{-3}{2x^{5/2}} - \frac{2}{x^2}$

   f. $f'(x) = (x^2+2x)^3(11x^2+6x-8)(x-1)$

   g. $f'(x) = \frac{x^2+4x+1}{(x+2)^2}$

   h. $y' = \frac{5x^3+15x}{2\sqrt{x^3+5x}}$

   i. $f'(x) = \frac{-2\sin(x)}{(1-\cos(x))^2}$

   j. $f'(x) = 4sin^3(4x^2-6x+1)\cos(4x^2-6x+1)(8x-6)$

   k. $y' = \frac{-x^2csc^2(x)-2xcot(x)}{x^4}$

   l. $f'(\theta) = \sec(\theta)\tan(\theta) - sec^2(\theta)$

7. a. $y' = \frac{-2x+4}{2y+3}$

b. $y' = -\cos(x)\csc(y)$

c. $y' = \frac{y-3x^2}{3y^2-x}$

d. $y' = \frac{2y\sqrt{x}-y\sqrt{y}}{2x\sqrt{y}-x\sqrt{x}}$

e. $y' = \frac{-y}{x}$

f. $y' = \frac{-\tan(2y)}{2x}$

g. $y' = \frac{-y^{1/3}}{x^{1/3}}$

h. $y' = \frac{-\sin(x+y)-4y}{4x+\sin(x+y)}$

8. Use $f'(x) = \lim_{h\to 0} \frac{f(x+h)-f(x)}{h}$

9. $18x - 12$

10. $y'(-2) = 297$

11. -3

12. a. $\left(-\infty, \frac{-4}{3}\right] \cup [0, \frac{1}{2}]$

b. $(-\infty, 1) \cup (6, \infty)$

13. $16x - 18$

14. $9\ \frac{units}{sec}$

15. $\frac{9}{2}\ \frac{ft}{min}$ *down the wall*

16. $\frac{-1}{3}\ \frac{units}{sec}$

17. $\frac{\pi}{24}\ \frac{ft}{min}$

18. a. Tangent Line: $y - 3 = \frac{1}{6}(x - 15)$

Normal Line: $y - 3 = -6(x - 15)$

b. Tangent Line: $y + 1 = \frac{5}{4}(x - 1)$

Normal Line: $y + 1 = \frac{-4}{5}\ (x - 1)$

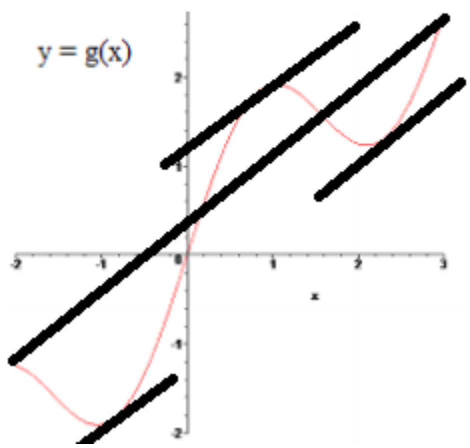
19. $f(x)$ is continuous on $[1,2]$

$$f(-1) = -4\ and\ f(2) = 71$$

$$-4 < 0 < 71 \therefore has\ a\ root$$

20. a. 1 b. 2 c. 3 d. 3 e. $\frac{-5}{16}$ f. 13

21.



22. $c = \pm\frac{\sqrt{3}}{3}$

23. a) $f'(x) = 12x^3 - 60x^2 + 84x - 36$

$f'(1) = 0; x = 1\ is\ a\ critical\ number$

$f'(3) = 0; x = 3\ is\ a\ critical\ number$

b) interval of decrease : $(-\infty, 1) \cup (1,3)$

interval of increase : $(3, \infty)$