Name: Key _____ / 25

Please circle your instructor's name: James Gossell Kevin Meek

There are 5 questions worth 25 points on this quiz. No aids (book, calculator, etc.) are permitted. **Show all work for full credit.** Give **exact** numerical answers such as $\sqrt{7}$ or $\frac{5}{\pi}$.

1. **[7 points]** Determine the following for the function $f(x) = x^2 - 3x - 7$. **Simplify** your answers.

   a. $f(-1)$

   $f(-1) = (-1)^2 - 3(-1) - 7 = 1 + 3 - 7 = -3$

   -3

   b. $f(2a)$

   $f(2a) = (2a)^2 - 3(2a) - 7 = 4a^2 - 6a - 7$

   $4a^2 - 6a - 7$

   c. $f(z+2)$

   $f(z+2) = (z+2)^2 - 3(z+2) - 7$

   $= z^2 + 4z + 4 - 3z - 6 - 7$

   $= z^2 + z - 9$

   $z^2 + z - 9$

   d. Find all values of x such that $f(x) = 3$

   $x^2 - 3x - 7 = 3$

   $x^2 - 3x - 10 = 0$

   $(x - 5)(x + 2) = 0$

   $x = 5, \; x = -2$

2. [4 points] Write an equation for each of the following lines:

a. The line containing the point $(3,-1)$ with slope $\frac{2}{3}$.

$$y-(-1)=\frac{2}{3}(x-3)$$

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

$$y=\frac{2}{3}x-3$$

$y=\frac{2}{3}x-3$

b. The line containing the points $(3,-1)$ and $(-2,6)$.

$$m=\frac{6-(-1)}{-2-3}=\frac{7}{-5}$$

$$y-(-1)=-\frac{7}{5}(x-3)$$

$$y+1=-\frac{7}{5}x+\frac{21}{5}$$

$$y=-\frac{7}{5}x+\frac{16}{5}$$

$y=-\frac{7}{5}x+\frac{16}{5}$

3. [2 points] State the average rate of change for the function $F(x)=\sqrt{3-x}$ on the interval $[-22,-6]$.

$$m=\frac{3-5}{-6-(-22)}$$

$$F(-22)=\sqrt{25}=5$$

$$F(-6)=\sqrt{9}=3$$

$$=\frac{-2}{16}=-\frac{1}{8}$$

$-\frac{1}{8}$

4. [6 points] State the domain and range of the following functions:

a. $f(x) = -2(x-4)^2 + 3$

domain: $(-\infty, \infty)$ range: $(-\infty, 3]$

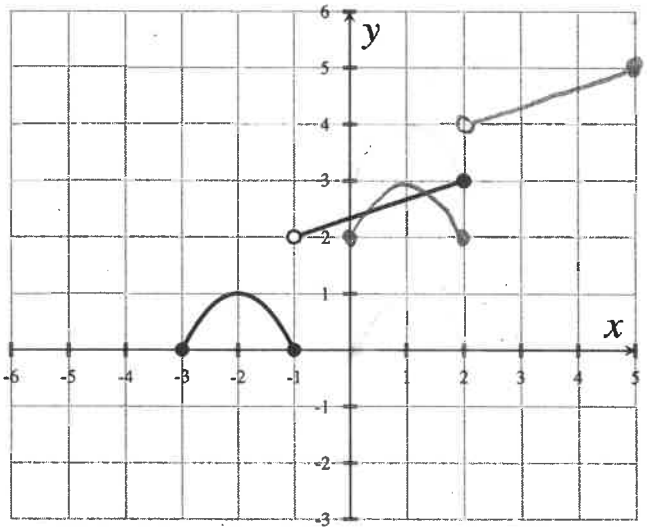
b. $h(x) = 2^x$

domain: $(-\infty, \infty)$ range: $(0, \infty)$

c. $g(x) = \dfrac{3x^2}{x^2 - 8x + 15} = \dfrac{3x^2}{(x-3)(x-5)}$

domain: $(-\infty, 3) \cup (3, 5) \cup (5, \infty)$ range: $(-\infty, -45) \cup (0, \infty)$

5. [6 points] The complete graph of the function $G(x)$ is given below.



a. State the domain of G. $[-3, 2]$

b. State the range of G. $[0, 1] \cup (2, 3]$

c. Estimate $G(0)$. 2.33

d. For which x-value does $G(x) = 1$? $x = -2$

e. Graph the transformed function $G(x-3)+2$ on the axes above.