Name: Soln's _____ _____ / 25

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

There are 6 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. **[6 points]** State the domain and range of the following functions:

   a. $f(x) = \dfrac{3}{x-5}$

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

   b. $g(x) = -2\sqrt{x+4} - 3$

   domain: $[-4, \infty)$ range: $(-\infty, -3]$

   c. $h(x) = 3^{-x}$

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

**2. [5 points]** Determine the following for the function $f(x) = x^2 - 3x + 2$. **Simplify** your answers.

**a.** $f(4)$ $= 4^2 - 3(4) + 2$
$= 16 - 12 + 2$
$= 6$

6

**b.** $f(2y)$ $= (2y)^2 - 3(2y) + 2$
$= 4y^2 - 6y + 2$

$4y^2 - 6y + 2$

**c.** $f(a-2)$ $= (a-2)^2 - 3(a-2) + 2$
$= a^2 - 4a + 4 - 3a + 6 + 2$
$= a^2 - 7a + 12$

$a^2 - 7a + 12$

**d.** Find all values of $x$ such that $f(x) = 12$

$x^2 - 3x + 2 = 12$
$x^2 - 3x - 10 = 0$
$(x-5)(x+2) = 0$
$x = 5, \; x = -2$

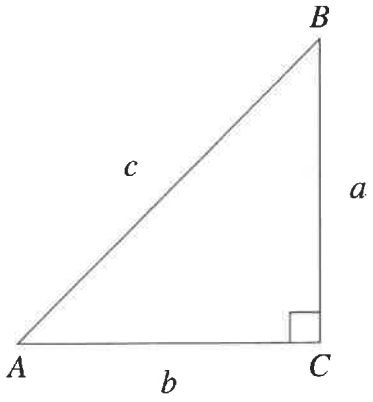
$x = 5, \; x = -2$

**3. [3 points]** Write the equation of the line that passes through the points $(2,3)$ and $(-4,1)$.

slope: $m = \frac{3-1}{2-(-4)} = \frac{2}{6} = \frac{1}{3}$

$y - 3 = \frac{1}{3}(x-2)$
or
$y - 1 = \frac{1}{3}(x+4)$
or
$y = \frac{1}{3}x + \frac{7}{3}$

**4. [4 points]** In the right triangle below, suppose $a = 4$ and $c = 5$.




**a.** Determine the length of $b$. Show your work.

$4^2 + b^2 = 5^2$

$b^2 = 9$

$\boxed{b = 3}$ (algebraically, $b = \pm 3$, but length can't be negative)

**b.** Determine the value of $\sin(A)$?

$\sin(A) = \frac{4}{5}$

**c.** Determine the value of $\cos(A)$?

$\cos(A) = \frac{3}{5}$

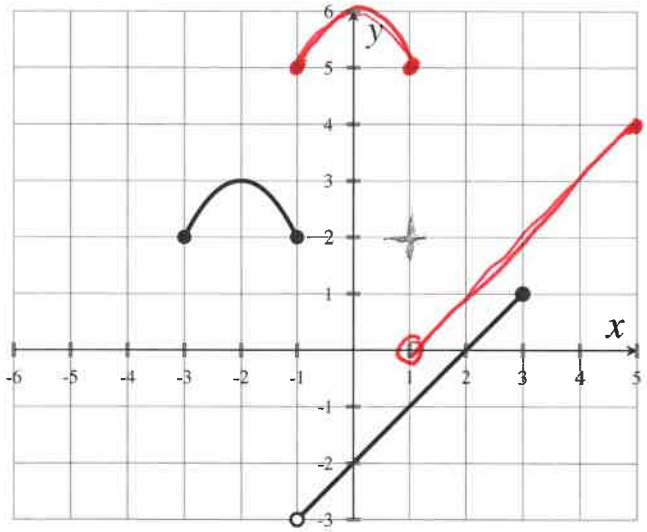
**d.** Determine the value of $\tan(A)$?

$\tan(A) = \frac{4}{3}$

**5. [1 point]** Evaluate $\cos(2\pi/3)$.

$\cos\left(\frac{2\pi}{3}\right) = -\frac{1}{2}$

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




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

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

**c.** State the $y$-intercept of $G$. $(0, -2)$

**d.** State the $x$-intercept(s) of $G$? $(2, 0)$

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