

Name: Solutions

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Please circle your instructor's name:

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

a. $f(-1) = 2(-1)^2 + 5(-1) - 3$
 $= 2 \cdot 1 - 5 - 3 = -6$

-6

b. $f(z-2) = 2(z-2)^2 + 5(z-2) - 3$
 $= 2(z^2 - 4z + 4) + 5z - 10 - 3$
 $= 2z^2 - 8z + 8 + 5z - 13$
 $= 2z^2 - 3z - 5$

 $2z^2 - 3z - 5$

- c. Find all values of x such that $f(x) = 0$

$$\begin{aligned} 0 &= 2x^2 + 5x - 3 \\ &= (2x - a)(x - b) \\ &= 2x^2 + (-a - 2b)x + ab \\ \text{so } 5 &= -a - 2b \\ ab &= -3 \Rightarrow a = 1, b = -3 \end{aligned}$$

check: $(2x-1)(x+3) = 2x^2 + 6x - x - 3 \checkmark$
 so $(2x-1)=0$ or $(x+3)=0$
 $\Rightarrow x = \frac{1}{2}$ or $x = -3$.

 $x = \frac{1}{2}, -3$

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

- a. The line containing the point $(3, 5)$ with slope $\frac{1}{3}$.

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

- b. The line containing the points $(3, 5)$ and $(-2, 8)$.

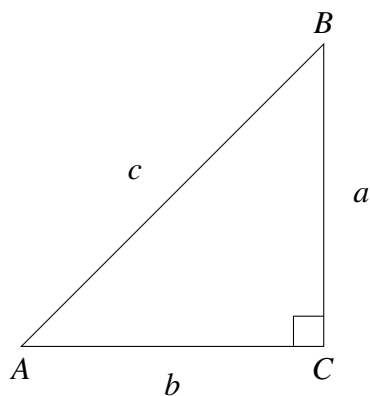
$$m = \frac{8 - 5}{-2 - 3} = \frac{3}{-5}$$

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

3. [2 points] Evaluate $\tan(\arccos(\frac{\sqrt{2}}{2}))$. Show your work.

$$\tan(\arccos(\sqrt{2}/2)) = \tan(\pi/4) = 1$$

4. [2 points] In the right triangle below, suppose $a = 2$ and $b = 3$. Determine the exact value of $\cos(A)$.

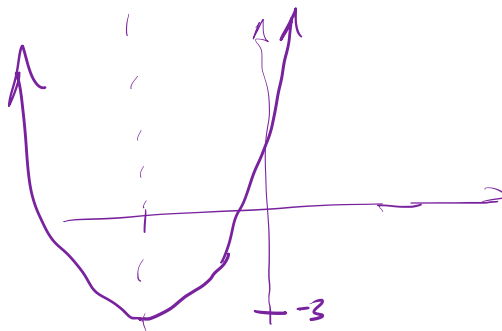


$$c = \sqrt{2^2 + 3^2} = \sqrt{4 + 9} = \sqrt{13}$$

$$\cos(A) = \frac{\text{adj}}{\text{hyp}} = \frac{3}{\sqrt{13}}$$

5. [6 points] State the domain, range, and any vertical or horizontal asymptotes of the following functions. If there are no asymptotes, write "None".

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



domain: $(-\infty, \infty)$ range: $[-3, \infty)$ asymptotes: None

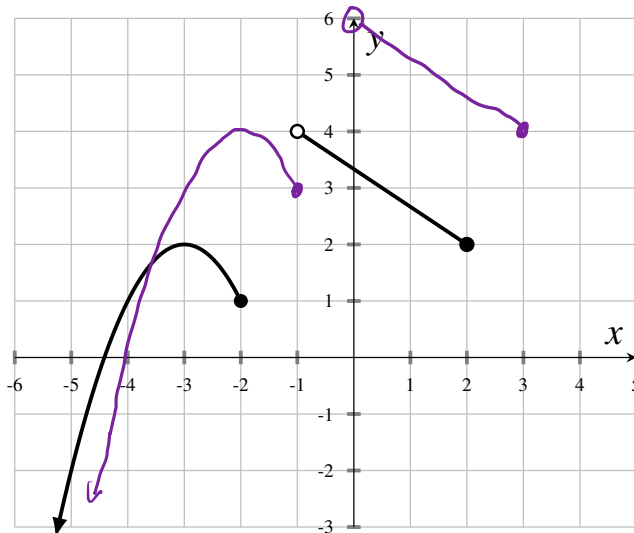
b. $h(x) = \log_3(x) + 2$

domain: $(0, \infty)$ range: $(-\infty, \infty)$ asymptotes: $x = 0$

c. $g(x) = 2 \sin(x)$

domain: $(-\infty, \infty)$ range: $[-2, 2]$ asymptotes: None

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



a. State the domain of G .

$(-\infty, -2] \cup (-1, 2]$

b. State the range of G .

$(-\infty, 4)$

c. Estimate $G(0)$.

3.2

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

$x = -2$ and $x = -4$

e. Graph the transformed function $G(x - 1) + 2$ on the axes above.