

**College Algebra**  
**Chapter 2 Test**

---

1. Evaluate a Function

Given  $f(x) = x^2 + 8x - 1$ , find:

a)  $f(-2)$

$$f(-2) = (-2)^2 + 8(-2) - 1$$

$$f(-2) = 4 - 16 - 1$$

$$f(-2) = -12 - 1$$

$$f(-2) = -13$$

b)  $f(5x - 1)$

$$f(5x - 1) = (5x - 1)^2 + 8(5x - 1) - 1$$

$$f(5x - 1) = (5x - 1)(5x - 1) + 40x - 8 - 1$$

$$f(5x - 1) = 25x^2 - 5x - 5x + 1 + 40x - 9$$

$$f(5x - 1) = 25x^2 + 30x - 8$$

Given  $f(x) = \frac{3x - 5}{4x + 2}$ , find:

a)  $f(3)$

$$f(3) = \frac{3(3) - 5}{4(3) + 2}$$

$$f(3) = \frac{9 - 5}{12 + 2}$$

$$f(3) = \frac{4}{14}$$

$$f(3) = \frac{2}{7}$$

b)  $f(x + 3)$

$$f(x + 3) = \frac{3(x + 3) - 5}{4(x + 3) + 2}$$

$$f(x + 3) = \frac{3x + 9 - 5}{4x + 12 + 2}$$

$$f(x + 3) = \frac{3x + 4}{4x + 14}$$

**College Algebra**  
**Chapter 2 Test**

2. Evaluate a Piecewise Function

<p>Given: <math>f(x) = \begin{cases}  x+3 , &amp; x \leq 0 \\ 9x-1, &amp; x &gt; 0 \end{cases}</math>, find:</p> <p>a) <math>f(-10)</math> <math>f(-10) =  (-10) + 3 </math> <math>f(-10) =  -10 + 3 </math> <math>f(-10) =  -7 </math> <math>f(-10) = 7</math></p> <p>b) <math>f(9)</math> <math>f(9) = 9(9) - 1</math> <math>f(9) = 81 - 1</math> <math>f(9) = 80</math></p> <p>c) <math>f(0)</math> <math>f(0) =  (0) + 3 </math> <math>f(0) =  0 + 3 </math> <math>f(0) =  3 </math> <math>f(0) = 3</math></p>	<p>Given: <math>f(x) = \begin{cases} x^2 - 3x, &amp; x \leq 2 \\ 5x - 1, &amp; x &gt; 2 \end{cases}</math>, find:</p> <p>a) <math>f(8)</math> <math>f(8) = 5(8) - 1</math> <math>f(8) = 40 - 1</math> <math>f(8) = 39</math></p> <p>b) <math>f(2)</math> <math>f(2) = (2)^2 - 3(2)</math> <math>f(2) = 4 - 6</math> <math>f(2) = -2</math></p> <p>c) <math>f(-1)</math> <math>f(-1) = (-1)^2 - 3(-1)</math> <math>f(-1) = 1 + 3</math> <math>f(-1) = 4</math></p>
--	---

3. Determine if a function is even, odd, or neither

<p>Determine if the following function is even, odd, or neither (no guessing, if your “why” is not correct, you will not receive credit):</p> $f(x) =  x^3 - x $ <p>Even, symmetric to y-axis</p>	<p>Determine if the following function is even, odd, or neither (no guessing, if your “why” is not correct, you will not receive credit):</p> $f(x) = \frac{1}{x} - x^3$ <p>Odd, symmetric to origin</p>
---	--

**College Algebra**  
**Chapter 2 Test**

---

4. Find the slope of the line segment that falls between the points  $(-5, -2)$  and  $(-12, -4)$

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

$$m = \frac{(-4) - (-2)}{(-12) - (-5)}$$

$$m = \frac{-4 + 2}{-12 + 5}$$

$$m = \frac{-2}{-7}$$

$$m = \frac{2}{7}$$

5. Find the equation of the line that falls between the points  $(-8, 3)$  and  $(-5, -10)$

step 1: $m = \frac{y_2 - y_1}{x_2 - x_1}$ $m = \frac{(-10) - (3)}{(-5) - (-8)}$ $m = \frac{-13}{-5 + 8}$ $m = \frac{-13}{3}$	step 2: $y = mx + b$ $-10 = \frac{-13}{3}(-5) + b$ $-10 = \frac{65}{3} + b$ $-10 - \frac{65}{3} = b$ $\frac{-95}{3} = b$	step 3: $y = mx + b$ $y = \frac{-13}{3}x - \frac{95}{3}$
--	---	--

**College Algebra**  
**Chapter 2 Test**

6. Find the equation of the line that passes through a point and is either parallel or perpendicular to a line

<p>Find the equation of the line that passes through the point <math>(-4, 1)</math> and is perpendicular to <math>3x - 4y = 2</math></p> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <tr> <td style="width: 33%; padding: 5px;"> <p>Step 1. a. <math>3x - 4y = 2</math> <math>3x - 2 = 4y</math> <math>\frac{3}{4}x - \frac{2}{4} = y</math> <math>\frac{3}{4}x - \frac{1}{2} = y</math></p> </td> <td style="width: 33%; padding: 5px;"> <p>Step 1. b. Slope is <math>\frac{3}{4}</math></p> </td> <td style="width: 33%; padding: 5px;"> <p>Step 1. c. <math>m = \frac{-4}{3}</math></p> </td> </tr> </table> <p>Step 2 <math>y = mx + b</math> <math>1 = \frac{-4}{3}(-4) + b</math> <math>1 = \frac{16}{3} + b</math> <math>1 - \frac{16}{3} = b</math> <math>\frac{-13}{3} = b</math></p> <p>Step 3 <math>y = mx + b</math> <math>y = \frac{-4}{3}x - \frac{13}{3}</math></p>	<p>Step 1. a. <math>3x - 4y = 2</math> <math>3x - 2 = 4y</math> <math>\frac{3}{4}x - \frac{2}{4} = y</math> <math>\frac{3}{4}x - \frac{1}{2} = y</math></p>	<p>Step 1. b. Slope is <math>\frac{3}{4}</math></p>	<p>Step 1. c. <math>m = \frac{-4}{3}</math></p>	<p>Find the equation of the line that passes through the point <math>(-2, -5)</math> and is parallel to <math>9x + y = 3</math></p> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <tr> <td style="width: 33%; padding: 5px;"> <p>Step 1. a. <math>9x + y = 3</math> <math>y = -9x + 3</math></p> </td> <td style="width: 33%; padding: 5px;"> <p>Step 1. b. Slope is <math>-9</math></p> </td> <td style="width: 33%; padding: 5px;"> <p>Step 1. c. <math>m = -9</math></p> </td> </tr> </table> <p>Step 2 <math>y = mx + b</math> <math>-5 = -9(-2) + b</math> <math>-5 = 18 + b</math> <math>-5 - 18 = b</math> <math>-23 = b</math></p> <p>Step 3 <math>y = mx + b</math> <math>y = -9x - 23</math></p>	<p>Step 1. a. <math>9x + y = 3</math> <math>y = -9x + 3</math></p>	<p>Step 1. b. Slope is <math>-9</math></p>	<p>Step 1. c. <math>m = -9</math></p>
<p>Step 1. a. <math>3x - 4y = 2</math> <math>3x - 2 = 4y</math> <math>\frac{3}{4}x - \frac{2}{4} = y</math> <math>\frac{3}{4}x - \frac{1}{2} = y</math></p>	<p>Step 1. b. Slope is <math>\frac{3}{4}</math></p>	<p>Step 1. c. <math>m = \frac{-4}{3}</math></p>					
<p>Step 1. a. <math>9x + y = 3</math> <math>y = -9x + 3</math></p>	<p>Step 1. b. Slope is <math>-9</math></p>	<p>Step 1. c. <math>m = -9</math></p>					

7. Describe the transformation from the basic graph:

<p>Describe the transformation from the basic graph to <math>f(x) = (x + 3)^2 - 4</math></p> <p>Down 4 Left 3</p>	<p>Describe the transformation from the basic graph to <math>f(x) = - x - 2  + 5</math></p> <p>Up 5 Right 2 Reflects across x-axis</p>
---	--

**College Algebra**  
**Chapter 2 Test**

8. Find the domain of the following functions:

<p>a) <math>f(x) = \frac{3x+2}{x^2-9x+18}</math></p> <p><math>x^2 - 9x + 18 = 0</math></p> <p><math>(x-3)(x-6) = 0</math></p> <p><math>x-3 = 0 \quad x-6 = 0</math></p> <p><math>x = 3 \quad x = 6</math></p> <p><math>x \neq 3 \quad x \neq 6</math></p> <p>or</p> <p><math>(-\infty, 3) \cup (3, 6) \cup (6, \infty)</math></p>	<p>b) <math>f(x) = \sqrt{3x+8}</math></p> <p><math>3x+8 \geq 0</math></p> <p><math>3x \geq -8</math></p> <p><math>\frac{3x}{3} \geq \frac{-8}{3}</math></p> <p><math>x \geq \frac{-8}{3}</math></p> <p>or</p> <p><math>\left[ \frac{-8}{3}, \infty \right)</math></p>
---	---

9. Find the composition of two functions:

<p>Given <math>f(x) = x^2 - 3x - 2</math> and <math>g(x) = x - 5</math>, find:</p> <p>a) <math>f \circ g</math></p> <p><math>f \circ g</math></p> <p><math>= f(g)</math></p> <p><math>= (x-5)^2 - 3(x-5) - 2</math></p> <p><math>= (x-5)(x-5) - 3x + 15 - 2</math></p> <p><math>= x^2 - 5x - 5x + 25 - 3x + 13</math></p> <p><math>= x^2 - 13x + 38</math></p> <p>b) <math>g \circ f</math></p> <p><math>g \circ f</math></p> <p><math>= g(f)</math></p> <p><math>= (x^2 - 3x - 2) - 5</math></p> <p><math>= x^2 - 3x - 7</math></p>	<p>Given <math>f(x) = 11x - 1</math> and <math>g(x) = 3x + 7</math>, find:</p> <p>a) <math>f \circ g</math></p> <p><math>f \circ g</math></p> <p><math>= f(g)</math></p> <p><math>= 11(3x+7) - 1</math></p> <p><math>= 33x + 77 - 1</math></p> <p><math>= 33x + 76</math></p> <p>b) <math>g \circ f</math></p> <p><math>g \circ f</math></p> <p><math>= g(f)</math></p> <p><math>= 3(11x-1) + 7</math></p> <p><math>= 33x - 3 + 7</math></p> <p><math>= 33x + 4</math></p>
--	--

**College Algebra**  
**Chapter 2 Test**

10. Find the inverse of a function:

<p>Find the inverse of <math>f(x) = \frac{1}{9}x - 2</math></p> $f(x) = \frac{1}{9}x - 2$ $y = \frac{1}{9}x - 2$ $x = \frac{1}{9}y - 2$ $9(x) = 9\left(\frac{1}{9}y\right) + 9(-2)$ $9x = y - 18$ $9x + 18 = y$ $f^{-1}(x) = 9x + 18$	<p>Find the inverse of <math>f(x) = \sqrt[3]{4x - 1}</math></p> $f(x) = \sqrt[3]{4x - 1}$ $y = \sqrt[3]{4x - 1}$ $x = \sqrt[3]{4y - 1}$ $(x)^3 = \left(\sqrt[3]{4y - 1}\right)^3$ $x^3 = 4y - 1$ $x^3 + 1 = 4y$ $\frac{x^3 + 1}{4} = y$ $f^{-1}(x) = \frac{x^3 + 1}{4}$
---	---