




**Question No. 1 of 10**

**Instructions:** (1) Read the problem and answer choices carefully (2) Work the problems on paper as needed (3) Pick the answer (4) Go back to review the core concept tutorial as needed.

 <p><b>Question</b></p>	<p><b>1.</b> Find the slope of the line through <math>A(-4, 6)</math> and <math>B(-1, 18)</math>.</p> <p>(A) 4 (B) 3 (C) 2 (D) 1 (E) 0</p>
 <p><b>Feedback</b></p>	<p>A. Correct! You used the slope formula to get the slope of the line through <math>A</math> and <math>B</math> is 4.</p> <p>B. Incorrect! Use the slope formula to find the solution.</p> <p>C. Incorrect! Use the slope formula to find the solution.</p> <p>D. Incorrect! Use the slope formula to find the solution.</p> <p>E. Incorrect! Use the slope formula to find the solution.</p>
 <p><b>Solution</b></p>	<p>The slope of a line passing through two given points can be calculated using the following formula:</p> $m = \frac{y_2 - y_1}{x_2 - x_1}$ <p>Substitute the coordinates of the points into the formula to get:</p> $m = \frac{y_2 - y_1}{x_2 - x_1}$ $= \frac{18 - 6}{-1 - (-4)}$ $= \frac{12}{3}$ $= 4$ <p><b>The correct answer is (A).</b></p>

**Question No. 2 of 10**

**Instructions:** (1) Read the problem and answer choices carefully (2) Work the problems on paper as needed (3) Pick the answer (4) Go back to review the core concept tutorial as needed.

**Question**

2. Find the equation of the line through  $A(-4, 6)$  and  $B(-1, 18)$ .

- (A)  $3x - y + 20 = 0$
- (B)  $2x - y + 18 = 0$
- (C)  $4x - y + 22 = 0$
- (D)  $2x - 3y + 22 = 0$
- (E)  $4x - 3y + 18 = 0$

**Feedback**

A. Incorrect!  
Use the points to find the slope and equation of the line.

B. Incorrect!  
Use the points to find the slope and equation of the line.

C. Correct!  
You used the points to find that the equation is  $4x - y + 22 = 0$ .

D. Incorrect!  
Use the points to find the slope and equation of the line.

E. Incorrect!  
Use the points to find the slope and equation of the line.

**Solution**

Step 1: Determine the slope of this line:

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{18 - 6}{-1 - (-4)} = \frac{12}{3} = 4$$

Step 2: Select the point to put into a modified point-slope form equation.  $A(-4, 6)$

Step 3: Substitute the slope and the point into the formula and simplify:




$$\begin{aligned} y &= m(x - x_1) + y_1 \\ y &= 4(x - (-4)) + 6 \\ &= 4x + 16 + 6 \\ &= 4x + 22 \end{aligned}$$

The line equation is  $4x - y + 22 = 0$ .

**The correct answer is (C).**

**Question No. 3 of 10**

**Instructions:** (1) Read the problem and answer choices carefully (2) Work the problems on paper as needed (3) Pick the answer (4) Go back to review the core concept tutorial as needed.

 <p><b>Question</b></p>	<p><b>3.</b> Find the equation of the line through <math>A(-1, -3)</math> and <math>B(-2, 2)</math>.</p> <p>(A) <math>5x + y + 8 = 0</math>          (B) <math>6x + y + 8 = 0</math>          (C) <math>5x - y + 8 = 0</math>          (D) <math>5x + y + 6 = 0</math>          (E) <math>6x - y + 6 = 0</math></p>
 <p><b>Feedback</b></p>	<p>A. Correct! Use the points to find the slope and that the equation is <math>5x + y + 8 = 0</math>.</p> <p>B. Incorrect! Use the points to find the slope and equation of the line.</p> <p>C. Incorrect! Use the points to find the slope and equation of the line.</p> <p>D. Incorrect! Use the points to find the slope and equation of the line.</p> <p>E. Incorrect! Use the points to find the slope and equation of the line.</p>
 <p><b>Solution</b></p>	<p>Find the slope of the line through the given points, and then use point-slope to find the equation of the line.</p> $m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{2 - (-3)}{-2 - (-1)} = \frac{5}{-1} = -5$ <p>Substituting the slope and the coordinate of the selected point yields:</p> $y = m(x - x_1) + y_1$ $y = -5(x - (-2)) + 2$ $y = -5x - 10 + 2$ $y = -5x - 8$ <p>So the equation of the line is <math>5x + y + 8 = 0</math>.</p> <p><b>The correct answer is (A).</b></p>

**Question No. 4 of 10**

**Instructions:** (1) Read the problem and answer choices carefully (2) Work the problems on paper as needed (3) Pick the answer (4) Go back to review the core concept tutorial as needed.

**Question**

4. Find the inverse function of  $y = 5x + 3$ .

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

(B)  $y = 3x + 5$

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

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

(E)  $y = 5x - 3$

**Feedback**

A. Correct!

Switch the roles of  $x$  and  $y$  to find that the inverse function is  $y = (x - 3)/5$ .

B. Incorrect!

Switch the roles of  $x$  and  $y$  to find the inverse function.

C. Incorrect!

Switch the roles of  $x$  and  $y$  to find the inverse function.

D. Incorrect!

Switch the roles of  $x$  and  $y$  to find the inverse function.

E. Incorrect!

Switch the roles of  $x$  and  $y$  to find the inverse function.

**Solution**

Since  $y = 5x + 3$  is a one-to-one function, its inverse function exists. By the definition of inverse functions, we have

$$f(g(x)) = x$$

$$5(g(x)) + 3 = x$$

$$5g(x) = x - 3$$




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

So, the inverse function is  $y = \frac{x - 3}{5}$ .

**The correct answer is (A).**

**Question No. 5 of 10**

**Instructions:** (1) Read the problem and answer choices carefully (2) Work the problems on paper as needed (3) Pick the answer (4) Go back to review the core concept tutorial as needed.

 <p><b>Question</b></p>	<p>5. Find the inverse function of <math>y = x^2 - 3</math>.</p> <p>(A) <math>y = \sqrt{x} + 3</math> (B) <math>y = \sqrt{x + 3}</math> (C) <math>y = \frac{\sqrt{x}}{3}</math> (D) <math>y = 3\sqrt{x}</math> (E) None of the above</p>
 <p><b>Feedback</b></p>	<p>A. Incorrect! Check the definition and requirements for inverse functions and then try again.</p> <p>B. Incorrect! Check the definition and requirements for inverse functions and then try again.</p> <p>C. Incorrect! Check the definition and requirements for inverse functions and then try again.</p> <p>D. Incorrect! Check the definition and requirements for inverse functions and then try again.</p> <p>E. Correct! This equation does not have an inverse since <math>y = x^2 - 3</math> is not a one-to-one function.</p>
 <p><b>Solution</b></p>	<p>Graphing the given equation shows that <math>y = x^2 - 3</math> is not a one-to-one function. So, it does not have an inverse function.</p> <p><b>The correct answer is (E).</b></p>

**Question No. 6 of 10**

**Instructions:** (1) Read the problem and answer choices carefully (2) Work the problems on paper as needed (3) Pick the answer (4) Go back to review the core concept tutorial as needed.

**Question**

6. Find the parent function of  $y = \frac{(x + 4)^3 + 10}{6}$ .

- (A)  $y = \frac{1}{x}$   
 (B)  $y = x$   
 (C)  $y = x^3$   
 (D)  $y = x^2$   
 (E)  $y = \sqrt{x}$

**Feedback**

A. Incorrect!  
Find the parent function that looks most like the given equation.

B. Incorrect!  
Find the parent function that looks most like the given equation.

C. Correct!  
Look at the equation to find that the parent function is  $y = x^3$ .

D. Incorrect!  
Find the parent function that looks most like the given equation.

E. Incorrect!  
Find the parent function that looks most like the given equation.

**Solution**

Step 1: The give function is  $y = \frac{(x + 4)^3 + 10}{6}$  and its curvature is like  $y = x^3$ . So assume the parent function is  $y = x^3$ .

Step 2: Verify the assumption.

$$y = x^3$$

horizontal shift  $\text{---}\rightarrow y = (x + 4)^3$

vertical shift  $\text{---}\rightarrow y = (x + 4)^3 + 10$

Vertical shrinking  $\text{---}\rightarrow y = \frac{(x + 4)^3 + 10}{6}$  Target function!

So, the parent function is  $y = x^3$ .

**The correct answer is (C).**

**Question No. 7 of 10**

**Instructions:** (1) Read the statement and answer choices carefully (2) Work the problems on paper as needed (3) Pick the answer (4) Go back to review the core concept tutorial as needed.

**Question**

7. If the functions  $f(x)$  and  $g(x)$  are defined by  $f(x) = x^2 + 3$  and  $g(x) = 2x + 3$ , find  $(g \circ f)(x)$ .

- A.  $y = 2x^2 + 9$
- B.  $y = 4x^2 + 12x + 12$
- C.  $y = 4x^2 + 12x + 9$
- D.  $y = 2x^2 + 12x + 12$
- E.  $y = x^2 + 2x + 6$

**Feedback**

- A. Correct!  
You used the definition of composite functions and substitution to find the new function  $y = 2x^2 + 9$ .
- B. Incorrect!  
Use the definition of composite functions and substitution to find the new function.
- C. Incorrect!  
Use the definition of composite functions and substitution to find the new function.
- D. Incorrect!  
Use the definition of composite functions and substitution to find the new function.
- E. Incorrect!  
Use the definition of composite functions and substitution to find the new function.

**Solution**

Find the composite function  $g \circ f$ .

$$\begin{aligned}g \circ f &= g(f(x)) \\ &= 2(f(x)) + 3 \\ &= 2[x^2 + 3] + 3 \\ &= 2x^2 + 9\end{aligned}$$

**The correct answer is (A).**

**Question No. 8 of 10**

**Instructions:** (1) Read the problem and answer choices carefully (2) Work the problems on paper as needed (3) Pick the answer (4) Go back to review the core concept tutorial as needed.



8. If the functions  $f(x)$  and  $g(x)$  are defined by  $f(x) = x^2 + 3$  and  $g(x) = 2x + 3$ , find  $(f \circ g)(x)$ .

- A.  $y = 2x^2 + 9$
- B.  $y = 4x^2 + 12x + 12$
- C.  $y = 4x^2 + 12x + 9$
- D.  $y = 2x^2 + 12x + 12$
- E.  $y = x^2 + 2x + 6$



A. Incorrect!  
Use the definition of composite functions and substitution to find the new function.

B. Correct!  
You used the definition of composite functions and substitution to find the new function  $y = 4x^2 + 12x + 12$ .

C. Incorrect!  
Use the definition of composite functions and substitution to find the new function.

D. Incorrect!  
Use the definition of composite functions and substitution to find the new function.

E. Incorrect!  
Use the definition of composite functions and substitution to find the new function.



Find the composite function  $f \circ g$ .

$$\begin{aligned} f \circ g &= f(g(x)) \\ &= [g(x)]^2 + 3 \\ &= [2x + 3]^2 + 3 \\ &= 4x^2 + 12x + 12 \end{aligned}$$

**The correct answer is (B).**



**Question No. 9 of 10**

**Instructions:** (1) Read the problem and answer choices carefully (2) Work the problems on paper as needed (3) Pick the answer (4) Go back to review the core concept tutorial as needed.

**Question**

9. Find the slope of the line created by a composite function  $(f \circ g)(x)$ , where  $g(x) = 2x + 3$  and  $f(x) = 6x + 3$ .

- A. 6
- B. 2
- C. 8
- D. 12
- E. 18

**Feedback**

A. Incorrect!  
Use the definition of composite functions and substitution to find the new function and then find the slope.

B. Incorrect!  
Use the definition of composite functions and substitution to find the new function and then find the slope.

C. Incorrect!  
Use the definition of composite functions and substitution to find the new function and then find the slope.

D. Correct!  
You used the definition of composite functions and substitution to find the new function, then found the slope of the composite function is 12.

E. Incorrect!  
Use the definition of composite functions and substitution to find the new function and then find the slope.

**Solution**

Find the composite function  $g \circ f$  and then find the slope.




$$\begin{aligned} f \circ g &= f(g(x)) \\ &= 6[g(x)] + 3 \\ &= 6[2x + 3] + 3 \\ &= 12x + 21 \end{aligned}$$

So the equation of the line  $y = 12x + 21$ . The slope of the line is the coefficient of the  $x$ -term. So, the slope of this line is 12.

**The correct answer is (D).**

**Question No. 10 of 10**

**Instructions:** (1) Read the problem and answer choices carefully (2) Work the problems on paper as needed (3) Pick the answer (4) Go back to review the core concept tutorial as needed.

 <p><b>Question</b></p>	<p><b>10.</b> Which point is on the line created by a composite function <math>(f \circ g)(x)</math>, where <math>g(x) = 2x + 3</math> and <math>f(x) = 6x + 3</math>?</p> <p>A. (0, 20) B. (-1, 9) C. (-1, 10) D. (3, 4) E. (2, 6)</p>
 <p><b>Feedback</b></p>	<p>A. Incorrect! Use the definition of composite functions and substitution to find the new function and then test each point.</p> <p>B. Correct! You used the definition of composite functions and substitution to find the new function, then found that point (-1, 9) is on the line.</p> <p>C. Incorrect! Use the definition of composite functions and substitution to find the new function and then test each point.</p> <p>D. Incorrect! Use the definition of composite functions and substitution to find the new function and then test each point.</p> <p>E. Incorrect! Use the definition of composite functions and substitution to find the new function and then test each point.</p>
 <p><b>Solution</b></p>	<p>Find the composite function <math>g \circ f</math> and then test each point.</p> $\begin{aligned} f \circ g &= f(g(x)) \\ &= 6[g(x)] + 3 \\ &= 6[2x + 3] + 3 \\ &= 12x + 21 \end{aligned}$ <p>So the equation of the line <math>y = 12x + 21</math>. Check each point to find that (-1, 9) is the one on the line.</p> <p><b>The correct answer is (B).</b></p>