

## Sample Math Placement Exam

**Instructions:** This is a sample placement exam to show you the type of questions that will appear on the actual placement exam. To get the most out of the placement exam, you should try these practice problems without any inside help, such as calculators, books, notes, friends or relatives. Also, on the actual placement exam, all fractions must be fully simplified to be marked correct. Good luck!

### Placement Exam Part 1

1. Compute  $31 - (-11) - (6 - 9)$
2. Find the numerical value of  $11 - 3(21 - 16)$
3. Evaluate  $|-24 + 17|$
4. Compute  $\left(\frac{3}{5}\right)^2$  in lowest terms.
5. Add the following fractions and express your answer as a fully reduced fraction:  $\frac{2}{3} + \frac{5}{11}$
6. Divide the following fractions and express your answer as a fully reduced fraction:  $\frac{13}{5} \div \frac{10}{3}$
7. Simplify:  $\left(\frac{1}{2} \cdot \frac{-4}{5}\right) + \left(\frac{-1}{3} \cdot \frac{3}{4}\right)$
8. Simplify the expression  $4(3x + 1) - (2x - 6)$  to one of the form  $ax + b$ . Write your answers for  $a$  and  $b$ .
9. Simplify the expression  $(3x^2 + 2x - 3) - (4x^2 - 2x - 6)$  to one of the form  $ax^2 + bx + c$ . Write your answers for  $a$ ,  $b$ , and  $c$ .
10. Solve for  $x$ :  $5x + 2 = -3x + 4$

## Placement Exam Part 2

1. Find the two roots  $x_1$  and  $x_2$  of the quadratic equation  $x^2 - 8x + 12 = 0$ . Enter your answers in any order.
2. Solve for  $x$ :  $3x + 2 = 1 - 5x$
3. Solve for  $x$ :  $2(x - 3) = 1 - 4(2x + 5)$
4. Simplify  $2(-3x + 1) - (-3x + 1) - 5x + 2$  to one of the form  $ax + b$ . Write your answers for  $a$  and  $b$ .
5. Solve for  $x$ :  $|4x + 1| + 3 = 6$ . Enter your answers in any order.
6. Solve for  $x$ :  $x^2 - 11x = -28$ . Enter your answers in any order.
7. Simplify  $\frac{20x^3y^4}{2x^6y^3}$ . Enter  $a$ ,  $b$ , and  $c$  where the answer is  $ax^by^c$ .
8. Calculate the slope of the line going through the points  $(-5, 6)$  and  $(2, 3)$ .
9. Solve for  $x$ :  $\frac{2}{x} - \frac{1}{4} = \frac{1}{7}$
10. Evaluate  $x^2 - 2x + 6$  for  $x = -1$ .

## Placement Exam Part 3

1. If  $f(x) = -3x + 7$ , calculate and simplify  $\frac{f(4+h) - f(4)}{h}$ . Enter the values of  $a$  and  $b$ , where your answer is in the form  $ah + b$ .
2. Solve for  $x$  by factoring:  $x^2 + -9x + 14 = 0$ . Enter your answers in any order.
3. The graph of  $y = \frac{1}{x+2} + 9$  is the graph of  $y = \frac{1}{x}$  with what transformations?
  - (a) shifted left 9 units and down 2 units
  - (b) shifted left 2 units and up 9 units
  - (c) shifted left 2 units and down 9 units
  - (d) shifted right 2 units and up 9 units
  - (e) shifted left 9 units and up 2 units
4. Write the exponential equation  $2^x = 7$  in an equivalent logarithm equation. Enter  $a$ ,  $b$ , and  $c$  where your answer is  $\log_b a = c$ .
5. A right triangle has sides A, B, and C, where C is the hypotenuse. Side A has length 18, side B has length 24, and side C has length 30. If  $\theta$  is the angle between sides A and C, what is the value of  $\sin(\theta)$ ? Enter your answer as a fully simplified fraction.

6. Which of the following is the inverse of  $f(x) = (x - 10)^3$ ?

- (a)  $f^{-1}(x) = (x - 10)^{\frac{1}{3}}$
- (b)  $f^{-1}(x) = (x - 10)^{\frac{1}{3}} + 10$
- (c)  $f^{-1}(x) = x^{\frac{1}{3}} - 10$
- (d)  $f^{-1}(x) = x^{\frac{1}{3}} + 10$
- (e)  $f^{-1}(x) = x^3 + 10$

7. Solve for  $x$ :  $7^{x+6} = 2$ . Enter  $a$ ,  $b$ , and  $c$  where your answer is  $x = \log_b a + c$ .

8. Evaluate  $\ln(e^{43})$ .

9. Find the equation of the curve formed by vertically stretching the graph of  $y = \sin(x)$  by 2 and then shifting it right by 7 units. Enter  $a$ ,  $b$ ,  $c$ , and  $d$  where your answer is  $y = a\sin(bx + c) + d$ .

10. Use the method of completing the square to write  $x^2 + 6x - 2$  in the form  $(x + a)^2 + b$ .

*Part 1 Answers:*

1. 45	2. -4	3. 7	4. $\frac{9}{25}$	5. $\frac{37}{33}$	6. $\frac{39}{50}$	7. $\frac{-13}{20}$	8. $a = 10$ $b = 10$	9. $a = -1$ $b = 4$ $c = 3$	10. $\frac{1}{4}$
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*Part 2 Answers:*

1. 2, 6	2. $\frac{-1}{8}$	3. $\frac{-13}{10}$	4. $a = -8$ $b = 3$	5. $-1, \frac{1}{2}$	6. 4, 7	7. $a = 10$ $b = -3$ $c = 1$	8. $\frac{-3}{7}$	9. $\frac{56}{11}$	10. 9
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*Part 3 Answers:*

1. $a = 0$ $b = -3$	2. 2, 7	3. $b$	4. $a = 7$ $b = 2$ $c = x$	5. $\frac{4}{5}$	6. $d$	7. $a = 2$ $b = 7$ $c = -6$	8. 43	9. $a = 2$ $b = 1$ $c = -7$ $d = 0$	10. $a = 3$ $b = -11$
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