

Name: _____

IWU Mathematics Placement Test

The purpose of this test is to provide a recommendation about which mathematics course you should first take at IWU. It is specifically designed for students who are planning to take Applied Analysis 1. Choosing your first math course is a crucial decision; therefore, the recommendation should be seriously considered.

Recommendations:

- At least 14 correct answers: enroll in MATH 176 Applied Analysis 1.
- From 10 to 13 correct answers: discuss the results with your advisor to determine your best path.
- Less than 10 correct answers: enroll in MATH 145 Measurement and Approximation or another mathematics course as determined after consulting with your IWU academic advisor.

More generally, the test can be used to identify areas for which improvement might be helpful for successful study of collegiate mathematics. The results of this test will not be included in any course grade. Your test data will be stored locally by the math department for two years, but will only be used for advising purposes and will not be shared outside of the department. Please follow all directions to ensure an accurate assessment of your mathematical background.

Directions:

- Take the test by yourself with no outside help.
- No calculators allowed.
- Choose the unique correct answer to each question.
- Don't guess. It is more informative to choose "I don't know" if you don't know the answer.

1. What is the simplified form of the expression $\frac{3}{8} + \frac{9}{7}$?

- (i) $\frac{12}{15}$ (ii) $\frac{27}{56}$ (iii) $\frac{93}{56}$ (iv) $\frac{72}{21}$ (v) $\frac{21}{72}$ (vi) I don't know

2. Evaluate $\frac{3}{2} \cdot \frac{7}{5}$.

- (i) $\frac{21}{10}$ (ii) $\frac{10}{7}$ (iii) $\frac{21}{7}$ (iv) $\frac{10}{10}$ (v) I don't know

3. Which of the following is true? Assume $a, b, c, d \neq 0$.

- (i) $\frac{a+b}{a} = b$ (ii) $\frac{a/b}{c/d} = \frac{ad}{bc}$ (iii) $\frac{a}{b} + \frac{c}{d} = \frac{a+c}{bd}$
(iv) $\frac{a}{a+c} = \frac{1}{c}$ (v) I don't know

4. Which of the following is a factor of $x^2 - y^2$?

- (i) $x + y$ (ii) $x^2 + xy + y^2$ (iii) $x^3 - y^3$
 (iv) $x^2 + y^2$ (v) I don't know

5. Factor the polynomial $x^2 + 6x - 16$.

- (i) $(x - 8)(x + 8)$ (ii) $(x + 10)(x - 4)$ (iii) $(x - 10)(x + 4)$
 (iv) $(x - 8)(x + 2)$ (v) $(x + 8)(x - 2)$ (vi) I don't know

6. Which of the following is true? Note that "ln" is short for natural logarithm.

- (i) $\ln(x)^2 = 2\ln(x)$ for any x (ii) $\ln\left(\frac{x-1}{x-2}\right) = \ln(x-1) - \ln(x-2)$ for any x (iii) $e^{\ln(x)} = x$ for any x
 (iv) $\ln(e^x) = x$ for any x (v) I don't know

7. Which of the following is true? Assume $a, b \neq 0$.

- (i) $\frac{\sqrt{a^2}}{\sqrt{a^2} + \sqrt{b^2}} = 1 + \frac{a}{b}$ (ii) $\sqrt{a^2} = |a|$ (iii) $\sqrt{a^2 + b^2} = a + b$
 (iv) $\sqrt{a^2}\sqrt{b^2} = ab$ (v) I don't know

8. Which of the following is not true? Assume $x > 0$.

- (i) $\sqrt[m]{\sqrt[n]{x}} = \sqrt[n]{\sqrt[m]{x}}$ (ii) $\sqrt[m]{\sqrt[n]{x}} = \sqrt[mn]{x}$ (iii) $\sqrt[n]{x^m} = (\sqrt[n]{x})^m$
 (iv) $(x^m)^n = x^{m+n}$ (v) I don't know

9. Is the following statement true or false: If $a < b$ and $c < 0$, then $ca > cb$.

- True False I don't know

10. Is the following statement true or false: If $a > 0$ and $|x| > a$, then $x < a$ or $x > -a$.

- True False I don't know

11. What is the solution set of the inequality $|x - 5| < 4$?

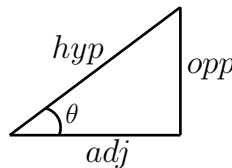
- (i) $-8 < x < -1$ (ii) $x > 1$ (iii) $x < 9$ (iv) $1 < x < 9$ (v) I don't know

12. Is the following statement true or false: $|x| < |y| \Leftrightarrow x^2 < y^2$.

- True False I don't know

13. Which of the following is the output of the sine function with input θ ?

- (i) $\frac{hyp}{opp}$ (ii) $\frac{opp}{adj}$ (iii) $\frac{opp}{hyp}$
 (iv) $\frac{adj}{hyp}$ (v) $\frac{hyp}{adj}$ (vi) I don't know



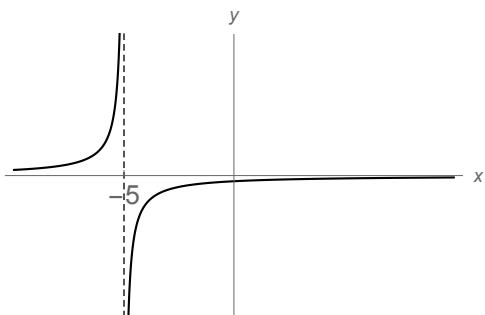
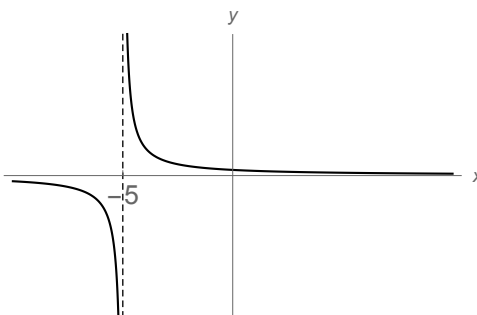
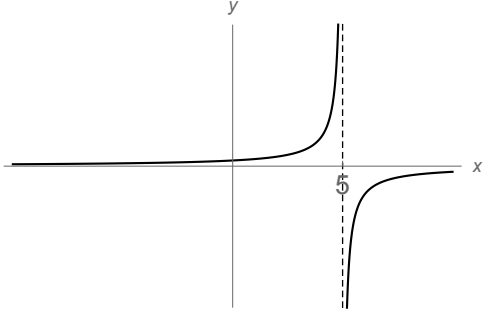
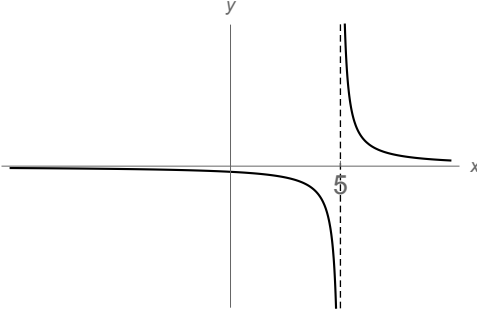
14. Which of the following is not true?

- (i) $\sin^2(x) + \cos^2(x) = 1$ (ii) $\sin(x + y) = \sin(x)\cos(y) + \cos(x)\sin(y)$ (iii) $\sin(2x) = 2\sin(x)\cos(x)$
 (iv) $\sin^2(x) = \frac{1 + \cos(2x)}{2}$ (v) $1 + \tan^2(x) = \sec^2(x)$ (vi) I don't know

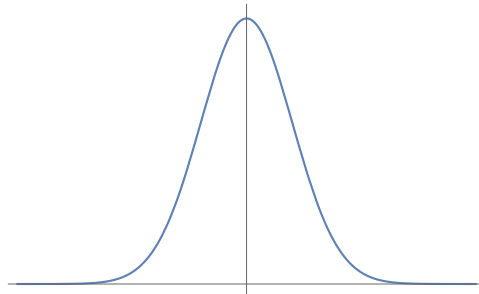
15. Evaluate $\cos\left(\frac{-7\pi}{2}\right)$.

- (i) $\sin\left(\frac{-7\pi}{2}\right)$ (ii) $\sin\left(\frac{\pi}{4}\right)$ (iii) $\cos\left(\frac{\pi}{4}\right)$ (iv) $\cos\left(\frac{\pi}{2}\right)$ (v) $\cos(-7\pi)$ (vi) I don't know

16. Which of the following is the graph of $f(x) = \frac{1}{5+x}$.

- (i) 
- (ii) 
- (iii) 
- (iv) 
- (v) I don't know

17. Which of the following equations does the graph shown below satisfy?



- (i) $f(x) = 1 - f(x)$ (ii) $f(x) = f(-x)$ (iii) $f(x) = -f(x)$ (iv) $f(x) = -f(-x)$ (v) I don't know

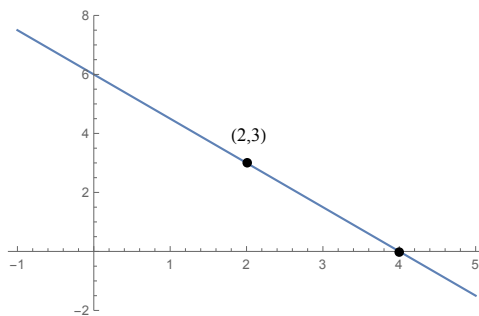
18. What is the distance between the two points $(-1, 3)$ and $(1, 2)$?

- (i) 3 (ii) $\sqrt{3}$ (iii) 5 (iv) $\sqrt{5}$ (v) I don't know

19. Find the slope of the line containing the two points $(-2, 5)$ and $(3, 6)$.

- (i) 5 (ii) -5 (iii) $\frac{1}{5}$ (iv) $-\frac{1}{5}$ (v) I don't know

20. What is the equation of the line shown in the graph below?



- (i) $y - 3 = -\frac{3}{2}(x - 2)$ (ii) $y = x + 4$ (iii) $y = -x + 4$ (iv) $y = \frac{3}{2}(x - 4)$ (v) I don't know