

AFM Exam Study Guide – Fall 2016

Unit 1: Exponential and Logarithmic Functions

I. Solve for x.

1. $\left(\frac{1}{100}\right)^x = \sqrt{10}$

2. $4^{3x+2} = 8^x$

3. $(x-5)^{-\frac{2}{3}} = 9$

4. $\left(\frac{2}{9}\right)^{|3x-2|} = \frac{4}{81}$

II. Find each logarithm:

5. $\log_2 \sqrt[3]{2}$

6. $\log_{\frac{1}{3}} 27$

7. $\log_2 \sqrt[5]{16}$

8. $\log_{2n} \frac{1}{4n^2}$

9. $\log_{1.2} 1$

III. Solve each equation for the variable:

10. $\log_b \frac{1}{9} = -2$

11. $\log_{\frac{1}{2}} y = 3$

IV. Write each logarithmic expression in expanded form using Laws of Logs:

12. $\log_3 \frac{4}{a}$

14. $\log_b \sqrt{x^2(x+2)}$

13. $\log_b \left(\frac{mn^2}{p^3}\right)^3$

AFM Exam Study Guide – Fall 2016

V. Write each expression as the logarithm of one expression:

15. $\log_b 9c + \log_b 8c - \log_b 6c$

16. $\frac{1}{3} \log_4 2a + \frac{1}{3} \log_4 5b - 2 \log_4 a - \log_4 b$

VI. Evaluate:

17. $\log_7 4 + \log_7 \frac{1}{4}$

18. $3 \log_{\frac{4}{9}} \sqrt[3]{\frac{27}{8}}$

VIII. Solve:

19. $\log_b (t^2 - 3t) - \log_b t = \log_b 3$

20. $\log_6 (x - 5) + \log_6 x = 2$

21. $\frac{1}{3} \log_4 x + \frac{1}{3} \log_4 (x + 2) = \log_4 2$

22. $\log_2 (9t + 5) - \log_2 (t^2 - 1) = 2$

Unit 2: Functions (Piecewise)

I. Linear and Quadratic Regression

1. A student who waits on tables at a restaurant recorded the cost of meals and the tip left by single diners.

Meal Cost	\$4.75	\$6.84	\$12.52	\$20.42	\$8.97
Tip	\$1.50	\$1.90	\$2.50	\$4.50	\$2.00

Linear Equation _____ Quadratic Equation _____

Which is better and WHY? _____

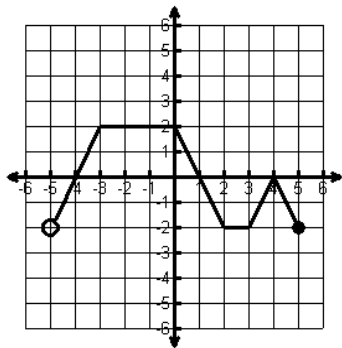
If the next diner orders a meal costing \$15.50, how much tip should the waiter expect to receive?

Tip expected _____

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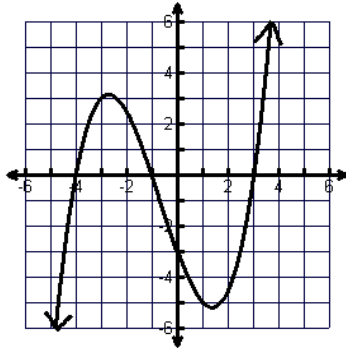
II. Domain and Range:

2. Determine the domain and range of the following functions. Write your answers in interval notation.



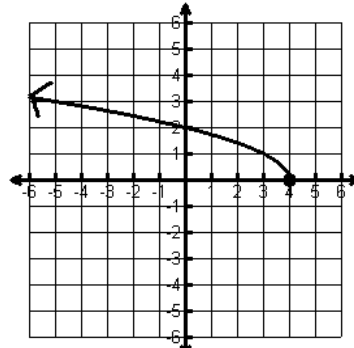
D: _____

R: _____



D: _____

R: _____



D: _____

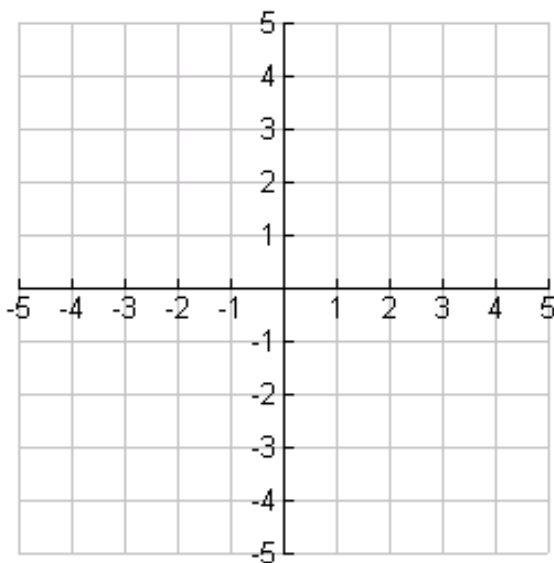
R: _____

III. Piecewise Functions

Graph each function, and evaluate the given value.

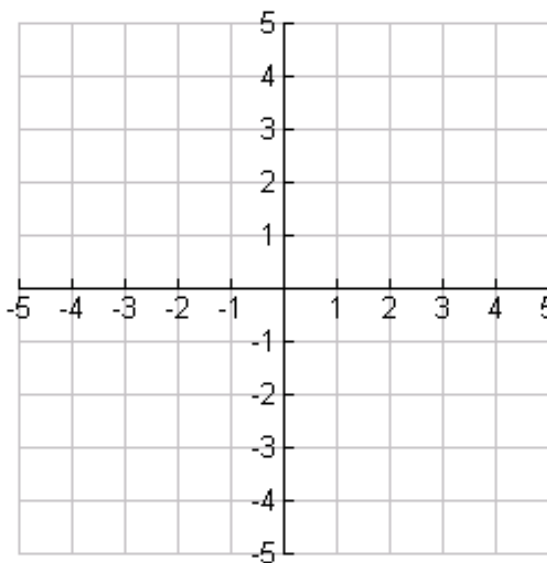
4.
$$g(x) = \begin{cases} 1 - 2x, & \text{if } x \leq -2 \\ x, & \text{if } -2 < x \leq 0 \\ 3 - x, & \text{if } x > 0 \end{cases}$$

5.
$$f(x) = \begin{cases} x, & \text{if } x \leq -3 \\ 2x, & \text{if } -3 < x \leq 1 \\ x + 2, & \text{if } x > 1 \end{cases}$$



Evaluate $f(-2)$ _____

Evaluate $f(3)$ _____



Evaluate $f(0)$ _____

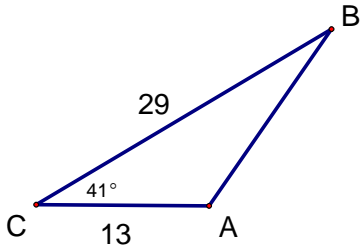
Evaluate $f(-3)$ _____

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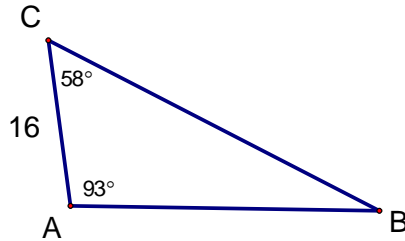
Unit 3: Trigonometry Unit

Solve for the indicated side or angle. Round your answers to the nearest hundredth.

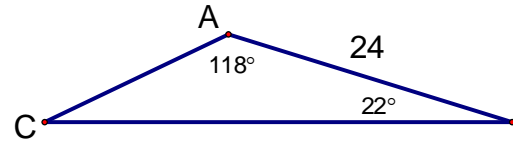
1. Find AB _____



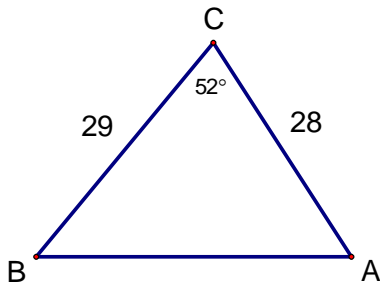
2. Find BC _____



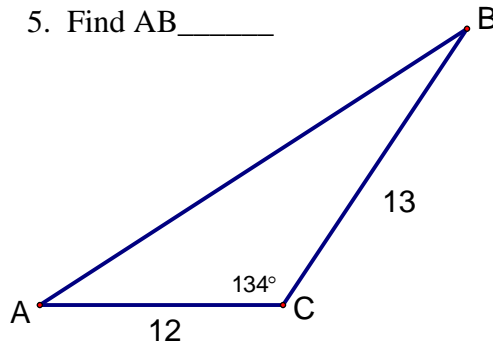
3. Find AC _____



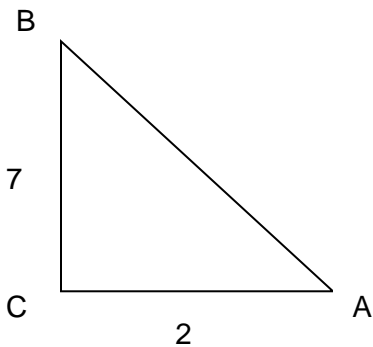
4. Find $m\angle A$ _____



5. Find AB _____



6. Two sides of a right triangle ABC are given (not drawn to scale). Find the ratios in reduced radical form.



$$\sin A = \underline{\hspace{2cm}}$$

$$\csc A = \underline{\hspace{2cm}}$$

$$\cos A = \underline{\hspace{2cm}}$$

$$\sec A = \underline{\hspace{2cm}}$$

$$\tan A = \underline{\hspace{2cm}}$$

$$\cot A = \underline{\hspace{2cm}}$$

7. Determine the remaining 4 trig ratios given that $\cos\theta = \frac{3}{4}$. Draw a triangle and label accordingly.

$$\tan\theta = \underline{\hspace{2cm}}$$

$$\csc\theta = \underline{\hspace{2cm}}$$

$$\cot\theta = \underline{\hspace{2cm}}$$

$$\sec\theta = \underline{\hspace{2cm}}$$

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Use a calculator to find the value of the trig function to two decimal places. **Use the correct mode for each based on degree or radian!!!**

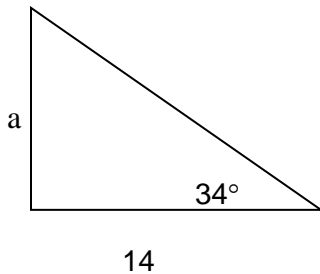
8. $\sin 79^\circ$

9. $\csc 79^\circ$

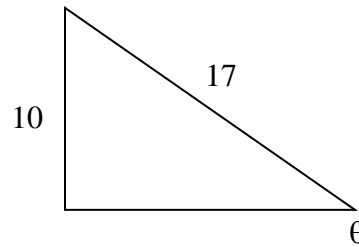
10. $\cos \frac{3\pi}{7}$

11. $\cot \frac{\pi}{10}$

12. Find the measure of side 'a'.



13. Use a calculator to find the measure of θ



14. A building 240 feet tall casts a 30 foot long shadow. If a person stands at the end of the shadow and looks up to the top of the building, what is the angle of the person's eyes to the top of the building (to the nearest hundredth of a degree)? Assume the person's eyes are 4 feet above ground level.

15. A radio transmission tower is 200 feet tall. How long should a guy wire be if it is to be attached 14 feet from the top and is to make an angle of 23° with the ground? Give your answer to the nearest tenth of a foot.

16. A straight trail with a uniform inclination of 11° leads from a lodge at an elevation of 700 feet to a mountain lake at an elevation of 5200 feet. What is the length of the trail (to the nearest foot)?

Determine whether the Law of Sines or the Law of Cosines should be used to solve the following triangles.

DO NOT SOLVE!

17. $a = 13$; $b = 15$; $c = 16$

18. $C = 35^\circ$; $a = 11$; $b = 10.5$

19. $b = 17$; $B = 45^\circ$; $a = 12$

20. $A = 40^\circ$; $c = 14$; $C = 70^\circ$