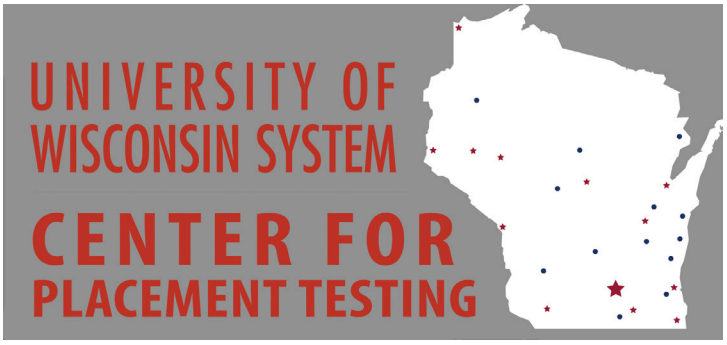
Name _____



UNIVERSITY OF WISCONSIN SYSTEM

MATHEMATICS

PRACTICE EXAM 2018

UNIVERSITY OF
WISCONSIN SYSTEM

Check us out at our website: http://www.testing.wisc.edu/center.html

GENERAL INSTRUCTIONS:

You will have 90 minutes to complete the mathematics practice test. Work rapidly but carefully. Do not spend too much time on any one question. If you have time after you have finished the test, you may go back and review your answers.

PLEASE NOTE that the use of a non-graphing calculator on this test is optional. No question on this test requires the use of a calculator. GRAPHING CALCULATORS ARE NOT ALLOWED. You may not share a calculator.

When you take the official Math Placement Test, your placement will be based on three math scores which will be used in combination to determine your optimal math placement. In order to get the most accurate assessment using this practice test, you should try to duplicate the actual testing situation as closely as possible. When taking the test, you should not use any additional materials or look up the answers to the questions. You should only allow yourself 90 minutes to take this test and should take the entire test in one sitting. If possible, take the test in a quiet room where you will not be interrupted. When you have completed the test, you should score your test using the answer key and scoring instructions provided on the last page.

1.) $-2(6 \div 3)^2 =$

a) -24

b) -8

c) 8

d) -4

e) 16

2.) $\frac{5 + 15}{35} =$

a) $\frac{1 + 15}{7}$

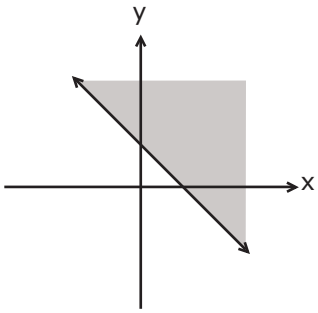
b) $\frac{5 + 3}{7}$

c) $\frac{1 + 3}{7}$

d) $\frac{0 + 15}{7}$

e) None of these

3.) The shaded region including the boundary line is a graph of



a) $x + y \geq 0$

b) $x + y \geq 1$

c) $x + y > 1$

d) $x + y \leq 1$

e) $x + y \leq 0$

4.) $\frac{2^3 2^5}{2^4} =$

a) 2

b) 4

c) 8

d) 16

e) 32

5.) $(2x - 3)^2 =$

a) $-12x$

b) $4x^2 + 9$

c) $4x^2 - 5x + 9$

d) $4x^2 - 12x + 9$

e) $4x^2 - 6x + 9$

6.) How many real numbers are solutions for $x^2 - 5x + 7 = 0$?

a) none

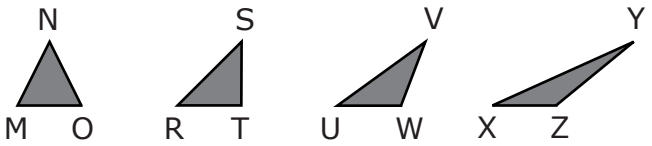
b) one

c) two

d) three

e) more than three

7.) In which triangle is the sum of the measures of the angles the greatest?



a) MNO

b) RST

c) UVW

d) XYZ

e) None of these

8.) Fifteen ounces of concentrate is mixed with 45 ounces of water to make 60 ounces of orange juice. What percent of the orange juice is concentrate?

a) 3

b) 4

c) 25

d) 30

e) $33\frac{1}{3}$

9.) The distance between the points (x, y) and (2, 3) is

a) $\sqrt{(x^2 + y^2) - (2^2 + 3^2)}$

b) $|x - 2| + |y - 3|$

c) $(x - 2)^2 + (y - 3)^2$

d) $\sqrt{(x - 2)^2 + (y - 3)^2}$

e) $\sqrt{(x - 2) + (y - 3)}$

10.) $5(a + b) + 2(a + c) - 4(b + c) =$

a) $3(a + b + c)$

b) $7a + b - 2c$

c) $7a - 3b + 2c$

d) $3(a + b)$

e) $7a + b + 6c$

11.) Subtracting n from 4 added to three times n is equal to

a) $-2n - 4$

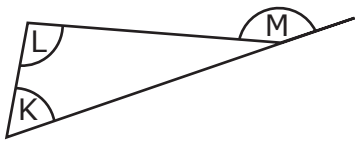
b) $-2n + 4$

c) $2n + 4$

d) $4n - 4$

e) $4n + 4$

12.) Which best describes how angles K , L , and M are related?



a) K + L = M

b) K + L > M

c) K + L < M

d) K + L + M = 180

e) More information needed

13.) $(-2)^3 + (-3)^2 =$

a) – 17

b) – 1

c) 0

d) 1

e) 17

14.) Which of the following equations has a graph that is a straight line?

a) $y = x^2 + 1$

b) $2x + 3xy = 5$

c) $x^2 - y^2 = 3$

d) $x - y = 2x$

e) None of these

15.) A line <u>not</u> parallel to $y - 3 = ax$ is

a) $x - 3 = \frac{y}{a}$

b) $x = \frac{y}{a} - \frac{3}{a}$

c) $x = ay - 3$

d) $2ax = 2y + 5$

e) $ax - y = 5a$

16.) If $(ax + 3y)^2 = a^2x^2 - 6xy + 9y^2$, then $a =$

a) 2

b) – 2

c) 1

d) – 1

e) – 6

17.) If $d = \frac{F + 2}{p}$, then $p =$

a) $d(F + 2)$

b) $dF - 2$

c) $\frac{d}{F + 2}$

d) $\frac{F + 2}{d}$

e) $\frac{d - 2}{F}$

18.) Solve for x: $x + 3(x - 5) = x - 2(x + 5)$

a) $x = -1$

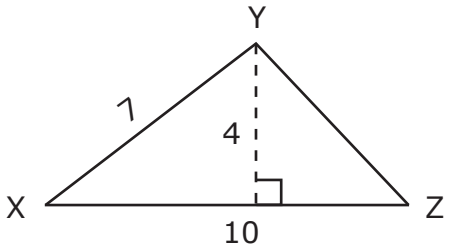
b) $x = 1$

c) $x = 2$

d) $x = 3$

e) $x = 5$

19.) The area of triangle XYZ is



a) 20 d) 35

b) 22 e) 40

c) 28

20.) $\frac{x}{3} + \frac{x}{2} - \frac{x}{5} =$

a) $\frac{x}{30}$ d) 0

b) $\frac{x}{5}$ e) $\frac{19x}{30}$

c) $\frac{x + 5}{5}$

21.) Express 0.000719 in scientific notation.

a) 7.19×10^{3}

b) 7.19×10^{-3}

c) 0.719×10^{-4}

d) 7.19×10^{-4}

e) 7.19×10^{4}

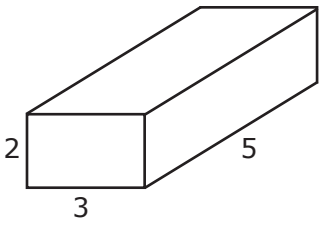
22.) If $\frac{5}{x + 1} = \frac{x + 1}{x^2 - 1}$, then x =

a) $\frac{1}{2}$ d) $\frac{3}{2}$

b) $\frac{1}{4}$ e) $\frac{\sqrt{2}}{2}, -\frac{\sqrt{2}}{2}$

c) $\sqrt{\frac{3}{2}}, -\sqrt{\frac{3}{2}}$

23.) What is the volume of this rectangular box?



a) 24 d) 62

b) 30 e) None of these

c) 60

24.) The remainder when $x^3 - 4x^2 + x + 9$ is divided by $x - 2$ is

a) – 1 d) – 17

b) 3 e) 19

c) 15

25.) If $h(y) = \frac{4 - y^2}{3 - y}$, which of the following is not defined?

a) h(0)

b) h(3)

c) h(−3)

d) h(2)

e) h(−2)

26.) $\frac{2^{-2} + 3^{-2}}{2^{-1} + 3^{-1}} =$

a) $\frac{13}{30}$

b) $\frac{5}{6}$

c) $\frac{6}{5}$

d) $\frac{13}{5}$

e) $\frac{1}{5}$

27.) One factor of $4x^2 - 8x + 4$ is

a) 2x + 2

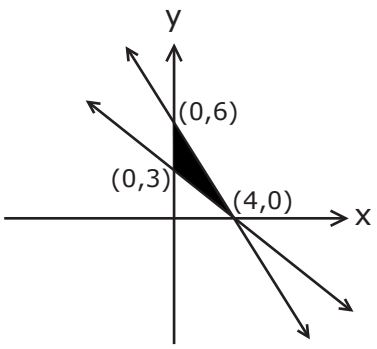
b) x − 2

c) x + 4

d) x − 1

e) x + 1

28.) Find the area of the shaded region between the lines.



a) 4

b) 6

c) 8

d) 10

e) 12

29.) The slope of the line with the equation $y = -7x + 3$ is

a) 3

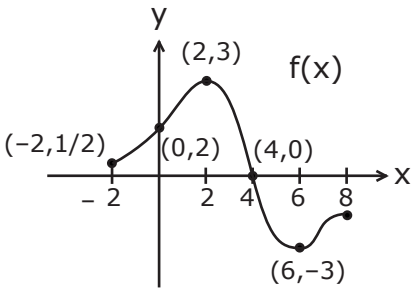
b) 7

c) $-\frac{1}{7}$

d) $-\frac{3}{7}$

e) − 7

30.) The function f(x) is graphed over the interval from $x = -2$ to $x = 8$. Which statement is true about f(x) over the given interval?



a) The largest value of the function is 8.

b) The maximum value of f(x) is $\frac{1}{2}$.

c) The solution to $f(x) = 0$ is 2.

d) $f(x) = 0$ when $x = 4$.

e) None of these

31.) 9 square yards is

a) 1 square foot

b) 3 square foot

c) 27 square foot

d) 81 square foot

e) 243 square foot

32.) One factor of $3x^2 + 6x + 3$ is

a) $3x + 1$

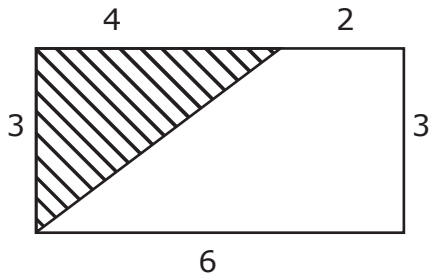
b) $x + 1$

c) $x + 3$

d) $3x - 1$

e) $x - 1$

33.) What fraction of the rectangle's area is shaded?



a) $\frac{1}{5}$

b) $\frac{1}{4}$

c) $\frac{1}{3}$

d) $\frac{2}{5}$

e) $\frac{2}{3}$

34.) Solve for x : $ax - 3 = x + d$

a) $x = \frac{d + 3}{a - 1}$

b) $x = \frac{a - 1}{d - 3}$

c) $x = \frac{d - 3}{a}$

d) $x = \frac{d + 3}{a}$

e) $x = \frac{d - 3}{a - 1}$

35.) The amount of bacteria doubles every day. If there are 320 bacteria on day 6, when will there be 5,120 bacteria?

a) day 8

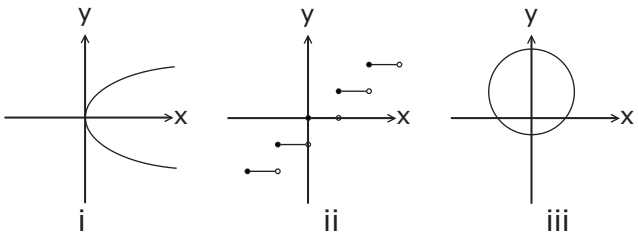
b) day 10

c) day 12

d) day 14

e) day 16

36.) Which of the following represent(s) functions of x ?



a) i only

b) ii only

c) iii only

d) i and iii

e) i , ii , and iii

37.) An equation of the circle with center $(-2, k)$ and radius 5 is

a) $\frac{x^2}{4} + \frac{x^2}{k^2} = 25$

b) $(x - 2)^2 + (y + k)^2 = 5$

c) $(x - 2)^2 + (y + k)^2 = 25$

d) $(x + 2)^2 + (y - k)^2 = 5$

e) $(x + 2)^2 + (y - k)^2 = 25$

38.) The solution set of $x^6 - 7x^3 + 12 = 0$ includes

a) 1

b) $\sqrt[3]{12}$

c) $\sqrt[6]{12}$

d) $\sqrt[3]{4}$

e) $\sqrt[3]{6}$

39.) When you solve the equation $x^3 - 3x^2 + 2x = 0$, how many roots are greater than $\frac{1}{2}$?

a) no root

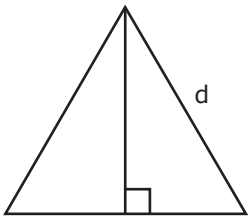
b) one root

c) two roots

d) three roots

e) all roots

40.) The area of an equilateral triangle with sides of length d is



a) $\frac{d^2}{2}$

b) $\frac{d^2}{4}$

c) $\frac{\sqrt{3}d^2}{8}$

d) $\frac{\sqrt{3}d^2}{4}$

e) $\frac{\sqrt{2}d^2}{4}$

41.) An equation for the circle of radius 1 with center at $(0, 1)$ is

a) $x^2 + y^2 - 2y = 0$

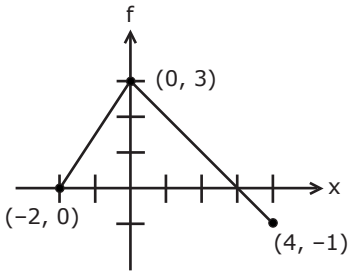
b) $x^2 + y^2 + 2y = 0$

c) $x^2 + y^2 - 2y = 2$

d) $x^2 + y^2 + 2y = 2$

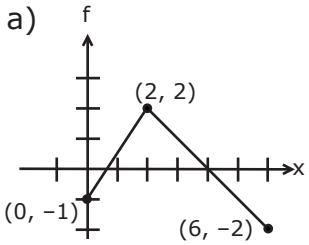
e) $x^2 + y^2 = 0$

42.) If the graph of $y = f(x)$ is

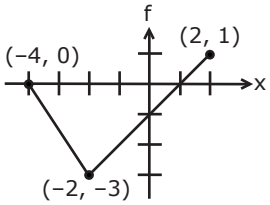


then which of the following is the graph of $y = f(x + 2) - 1$?

a)



d)



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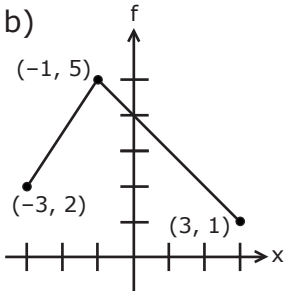
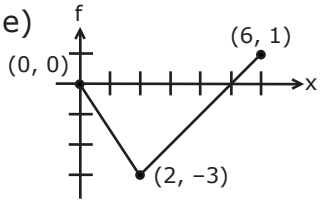
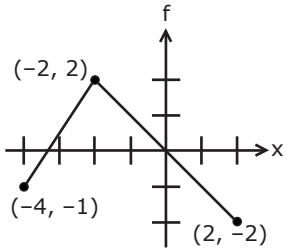


e)



c)



43.) $| 6 + 3x | < 9$ is equivalent to

a) $-1 < x < 1$

b) $1 < x < -5$

c) $x < 1$

d) $-5 < x < 5$

e) $-5 < x < 1$

44.) How many pounds of peanuts at \$2 per pound should be mixed with ten pounds of cashews at \$5 per pound to make a mixture worth \$3 per pound?

	POUNDS	COST/POUND	VALUE
Cashews	10	\$5	\$50
Peanuts	x	\$2	\$2x
Mixture	10 + x	\$3	\$3(10 + x)

a) 10

b) 20

c) 25

d) 30

e) 40

45.) $\dfrac{(3y)^{-2}(9y^2)}{3y^{-4}} =$

a) 27

b) $\dfrac{1}{9}$

c) $\dfrac{3}{y^6}$

d) $\dfrac{y^4}{3}$

e) $-\dfrac{y^4}{3}$

46.) If $3 \log x = \log 8$, then $x =$

a) $\dfrac{8}{3}$

b) 2

c) 8

d) $\dfrac{\log 8}{3}$

e) $\log\left(\dfrac{8}{3}\right)$

47.) The solution to $x^2 + 5 < 9$ is

a) $x < -2$ or $x > 2$

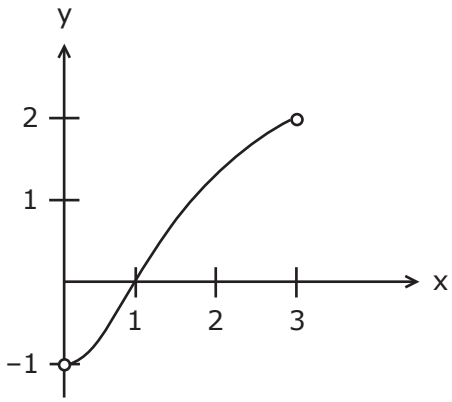
b) $-2 < x < 2$

c) $x < 2$

d) $x < -2$ or $x < 2$

e) $x < -2$

48.) The graph of a function $y = f(x)$ is given by



The domain of the inverse $f^{-1}(x)$ is the set of real numbers between

a) 0 and 3

b) − 1 and 1

c) − 1 and 2

d) − 1 and 3

e) 1 and 3

49.) Phil bikes a distance of x miles at a rate of 15 miles per hour. How many hours did the trip take?

a) $15x$

b) $\frac{x}{15}$

c) $\frac{15}{x}$

d) $x - 15$

e) None of these

50.) If $f(x) = x^2 + 1$, then $\frac{f(x+h) - f(x)}{h} =$

a) $x + h$

b) h

c) $h + 2$

d) $2x + h + 2$

e) $2x + h$

51.) Find all solutions of the equation $x^4 - 10x^2 + 9 = 0$.

a) − 1 and 1

b) − 3 and 3

c) 1 and 3

d) 1 and 9

e) − 1 , 1 , −3 and 3

52.) A y value in the solution of

$$\begin{cases} 5x^2 + y^2 = 9 \\ 2x + y = 0 \end{cases}$$ is

a) 0 d) 4

b) 1 e) 6

c) 2

53.) The graph of $y = \frac{2x + 3}{5x + 7}$ has vertical asymptote

a) $x = -\frac{7}{5}$ d) $x = \frac{2}{5}$

b) $x = -\frac{3}{2}$ e) $x = \frac{7}{5}$

c) $x = \frac{3}{7}$

54.) A 90–pound coil of cable is 300 feet long. If a 30–foot length is cut off, what is the weight in pounds of the remaining cable?

a) 9 d) 80

b) 45 e) 81

c) 60

55.) Simplify: $3(5 - 2i) - 4(2 - 3i)^2 =$

a) $35 + 18i$ d) $-37 + 42i$

b) $35 - 6i$ e) $23 + 42i$

c) $35 + 42i$

56.) $\sqrt{50} - \sqrt{18} + \sqrt{32} =$

a) $-2\sqrt{2}$ d) 0

b) $6\sqrt{2}$ e) 8

c) $8\sqrt{2}$

57.) The function $f(x) = \frac{3}{2}x + 4$ multiplies the input by $\frac{3}{2}$ then adds 4 . Then $f^{-1}(x)$, the inverse of f ,

a) multiplies the input by $\frac{2}{3}$, then subtracts 4 .

b) multiplies the input by 4 , then subtracts $\frac{3}{2}$.

c) subtracts 4 from the input, then multiplies by $\frac{2}{3}$.

d) adds 4 to the input, then mulitiplies by $\frac{3}{2}$.

e) multiplies the input by $-\frac{3}{2}$, then subtracts 4 .

58.) $\frac{1}{2}\log(4x^6) - 2\log(x^3)$ is equal to

a) $\log(2x^6 - 2x^3)$

b) $\log(2x^3 + x^6)$

c) $\log 2x^3$

d) $\log\frac{2}{x^3}$

e) $-\frac{3}{2}\log(4x^3)$

59.) If $(5x + ay)^2 = 25x^2 - 10xy + a^2y^2$, then a =

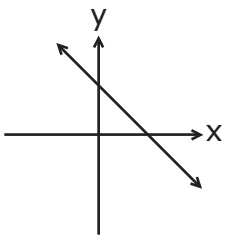
a) 2 d) −1

b) −2 e) −10

c) 1

60.) Which of the following could be a graph of $y = 1 - |x|$?

a)



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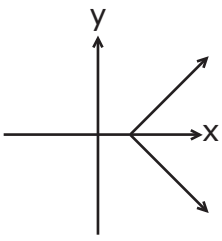

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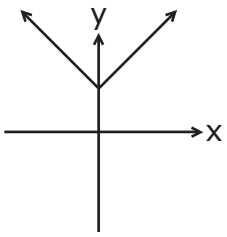

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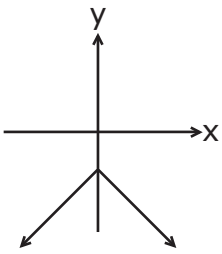

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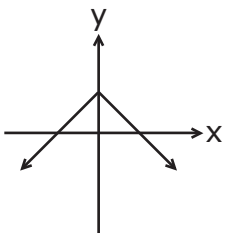


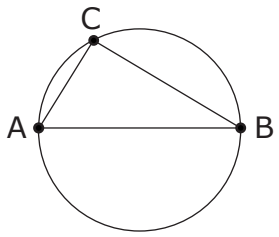
61.) The vertex of the parabola $y = x^2 + 6x + 7$ is

a) (3, –2)
b) (–3, –2)
c) (–3, 7)
d) (3, 16)
e) (–3, 16)

62.) Solve for x: $2^x = \frac{2^a 2^b}{2^c}$

a) $2^{ab/c}$
b) $2^{ab - c}$
c) $\frac{ab}{c}$
d) $\frac{a + b}{c}$
e) $a + b - c$

63.) Let A , B , C be distinct points on a circle with diameter AB . Then we may conclude that

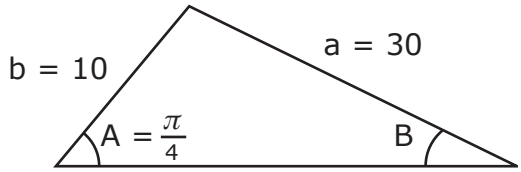


a) AC is longer than AB .
b) angle ABC is greater than angle BAC .
c) angle BAC is greater than angle ACB .
d) angles BAC and ACB are complementary.
e) angle ACB is a right angle.

64.) If $\sin A = \frac{1}{3}$ and $0° < A < 90°$, then $\cos A =$

a) $\frac{\sqrt{8}}{3}$
b) $\frac{2}{3}$
c) $\frac{3}{\sqrt{8}}$
d) $\frac{\sqrt{8}}{9}$
e) $\frac{\sqrt{8}}{\sqrt{10}}$

65.) Suppose a triangle has the dimensions indicated below:



Then sin B equals

a) $\frac{60}{\sqrt{2}}$
b) $\frac{6}{\sqrt{2}}$
c) $\frac{\sqrt{6}}{2}$
d) $\frac{\sqrt{2}}{6}$
e) $\frac{\sqrt{2}}{60}$

66.) $\cos \theta \tan \theta =$

a) $\sin \theta$
b) $\frac{\cos^2 \theta}{\sin \theta}$
c) 1
d) $\cot \theta$
e) $\sec \theta$

67.) Let θ be the angle formed by the line $y = 3x$ and the positive x–axis. Then $\sin\theta$ equals

a) $\sqrt{10}$

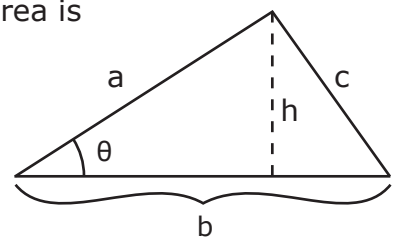
b) $\frac{1}{\sqrt{10}}$

c) 3

d) $\frac{\sqrt{10}}{3}$

e) $\frac{3}{\sqrt{10}}$

68.) If h is an altitude of the triangle, then the area is



a) $\frac{1}{2}$ bc

b) $\frac{1}{2}$ ab

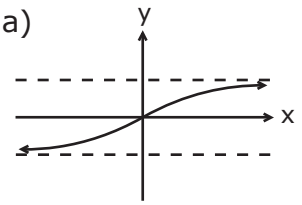
c) $\frac{1}{2}$ ab tan θ

d) $\frac{1}{2}$ ab sin θ

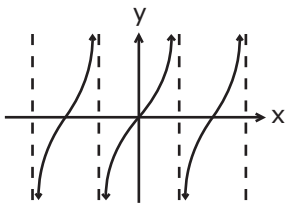
e) $\frac{1}{2}$ ab cos θ

69.) A sketch of the graph of $y = \tan(x)$ is

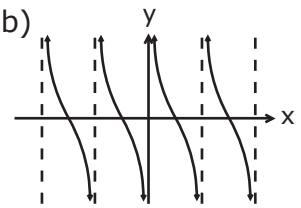
a)



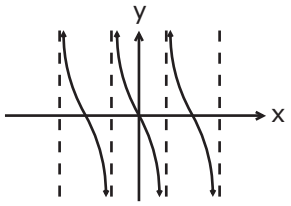
d)



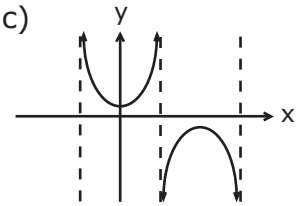
b)



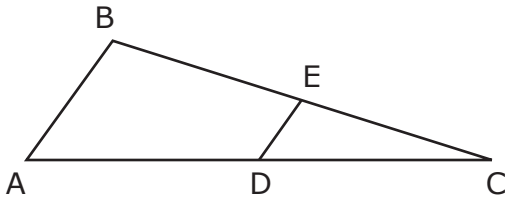
e)



c)



70.) Given Δ ABC with D the midpoint of side AC and E the midpoint of side BC.



Then which of the following is <u>not</u> true?

a) $\overline{AB} \parallel \overline{DE}$

b) $\overline{AB} = 2\overline{DE}$

c) $\angle ADE = \angle DEC$

d) $\angle A = \angle EDC$

e) Δ ABC is similar to Δ DEC

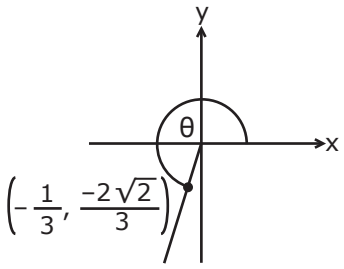
71.) If $\cos\theta = \frac{3}{5}$ and $0 < \theta < 90°$, then $\cos(90° - \theta)$ equals

a) $-\frac{3}{5}$ d) $\frac{5}{3}$

b) $\frac{4}{5}$ e) $-\frac{5}{3}$

c) $-\frac{4}{5}$

72.) The cosine of the angle θ in the figure is

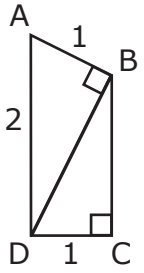


a) $\frac{1}{3}$ d) $\frac{-2\sqrt{2}}{3}$

b) $-\frac{1}{3}$ e) $\frac{1}{2\sqrt{2}}$

c) $\frac{2\sqrt{2}}{3}$

73.) In the figure below, $\angle ABD = 90°$ and $\angle BCD = 90°$. The length of BC is



a) $\frac{\sqrt{2}}{2}$ d) $\sqrt{3}$

b) $\sqrt{2}$ e) $\sqrt{6}$

c) $\frac{\sqrt{3}}{2}$

74.) Which of the following statements is false?

a) All squares are similar.

b) All congruent rectangles are similar.

c) All equiangular triangles are similar.

d) All equilateral triangles are similar.

e) All right triangles are similar.

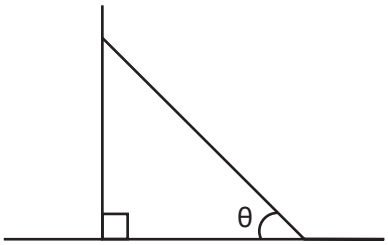
75.) If $\cos x = 0.70$, then $\cos(-x) =$

a) 0.70 d) − 0.30

b) 0.30 e) $\frac{1}{0.70}$

c) − 0.70

76.) Suppose a 5 foot ladder is leaning against a vertical wall, where the bottom of the ladder is a distance of x feet from the wall. Then the angle θ that the ladder makes with the ground is given by



a) $\frac{x}{5}$

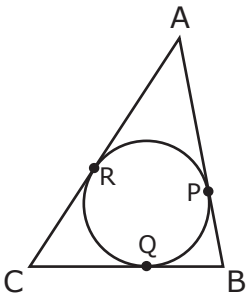
b) $\cos\left(\frac{x}{5}\right)$

c) $\frac{1}{\cos\left(\frac{x}{5}\right)}$

d) $\cos^{-1}\left(\frac{x}{5}\right)$

e) $\cos^{-1}\left(\frac{5}{x}\right)$

77.) The triangle ABC is circumscribed about a circle with P , Q , and R as the points of tangency. If AR = 10 , CQ = 8 , and BQ = 4 , then the length of AB is



a) 10

b) 12

c) 14

d) 16

e) 18

78.) The solutions to $\sin^2 x = \frac{1}{4}$ in the interval $0 \le x \le 2\pi$ are

a) $x = \frac{\pi}{6}, \frac{5\pi}{6}$

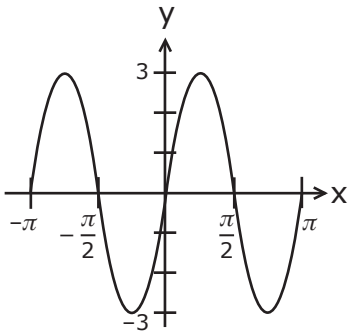
b) $x = \frac{\pi}{3}, \frac{2\pi}{3}$

c) $x = \frac{\pi}{4}, \frac{3\pi}{4}, \frac{5\pi}{4}, \frac{7\pi}{4}$

d) $x = \frac{\pi}{3}, \frac{2\pi}{3}, \frac{4\pi}{3}, \frac{5\pi}{3}$

e) $x = \frac{\pi}{6}, \frac{5\pi}{6}, \frac{7\pi}{6}, \frac{11\pi}{6}$

79.) Let f(x) have the graph shown below:



Then f(x) could be

a) $3\sin\left(\frac{x}{2}\right)$

b) 3 cos (2x)

c) $3\cos\left(\frac{x}{2}\right)$

d) 2 sin (3x)

e) 3 sin (2x)

80.) $\sin^2(3x) + \cos^2(3x) =$

a) 9

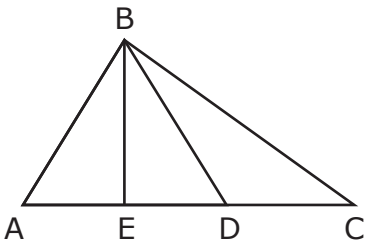
b) 3

c) 1

d) $\cos(6x)$

e) None of these

81.) In the figure below, AB = BD and BE is perpendicular to AC. If AC = 13 and AD = 8, find AE.



a) $\frac{13}{2}$

b) $\frac{13}{3}$

c) 4

d) 5

e) None of these

82.) $\tan 30° =$

a) $\frac{1}{2}$

b) $\frac{\sqrt{3}}{3}$

c) 2

d) $\sqrt{3}$

e) $\frac{\sqrt{3}}{2}$

83.) An angle of radian measure, x, has degree measure of

a) $\frac{180}{\pi x}$

b) $\frac{\pi}{180x}$

c) $\frac{\pi x}{180}$

d) $\frac{180x}{\pi}$

e) None of these

84.) $\sin 2\theta =$

a) $2 \sin \theta$

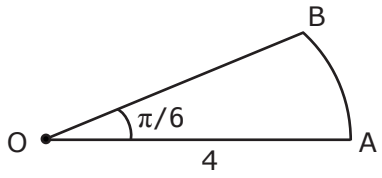
b) $2 \cos \theta$

c) $2 \sin \theta \cos \theta$

d) $\sin \theta + \cos \theta$

e) $\cos \theta - \sin \theta$

85.) Point O is the center of a circle having radius 4. The arc length of AB is



a) $\frac{\pi}{3}$

b) $\frac{4\pi}{3}$

c) $\frac{\pi}{6}$

d) $\frac{2\pi}{3}$

e) 16π

END OF TEST

ANSWER KEY:

The answers to this practice test are given below. Give yourself one point for each question you answered correctly and zero points for each question you answered incorrectly. Add up your points for each section (Math Fundamentals, Advanced Algebra, and Trigonometry) separately.

Placement into a developmental level math course is determined solely by your score on the Math Fundamentals section of the test. For this practice test, you would need to obtain a score of 18 or higher on Math Fundamentals to place out of a developmental level math course.

A typical score on Math Fundamentals is between 13 and 26. A typical score on Advanced Algebra is between 6 and 16 and a typical score on Trigonometry is between 4 and 13.

Math Fundamentals

1. B
2. C
3. B
4. D
5. D
6. A
7. E
8. C
9. D
10. B
11. C
12. A
13. D
14. D
15. C
16. D
17. D
18. B
19. A
20. E
21. D
22. D
23. B
24. B
25. B
26. A
27. D
28. B
29. E
30. D
31. D
32. B
33. C
34. A

Advanced Algebra

35. B
36. B
37. E
38. D
39. C
40. D
41. A
42. C
43. E
44. B
45. D
46. B
47. B
48. C
49. B
50. E
51. E
52. C
53. A
54. E
55. C
56. B
57. C
58. D
59. D
60. C
61. B
62. E

Trigonometry

63. E
64. A
65. D
66. A
67. E
68. D
69. D
70. C
71. B
72. B
73. B
74. E
75. A
76. D
77. C
78. E
79. E
80. C
81. C
82. B
83. D
84. C
85. D