

CUMULATIVE PRACTICE PROBLEMS
FUNDAMENTALS OF COLLEGE MATHEMATICS 1
MA121

MULTIPLE CHOICE. Choose and CIRCLE one alternative that best answers the question.
SHOW ALL YOUR WORK.

Perform the indicated operations on a calculator. Express the result with the proper accuracy and precision. Assume that all numbers are approximate.

1) $\frac{23.686 \times 0.03309}{40.802 - 1.677}$ 1) _____
A) 0.0200 B) 0.02003 C) 0.020030 D) 0.01145

Solve the equation.

2) $9x - (8x - 1) = 2$ 2) _____
A) -1 B) 1 C) $-\frac{1}{17}$ D) $\frac{1}{17}$

Solve the problem. Assume all data are accurate to two significant digits unless greater accuracy is given.

3) Two pieces of equipment were purchased for a total of \$4000. If one piece cost \$850 more than the other, find the price of the less expensive piece of equipment. 3) _____
A) \$1600 B) \$1575 C) \$2400 D) \$2425

Find the required value by setting up the general equation and then evaluating.

4) Find s when t = 6.0 if s is inversely proportional to the square of t, and s = 6.0 when t = 12.0. 4) _____
A) 216 B) 2 C) 72 D) 24

5) Find y for x = 4 and z = 3 if y varies directly as x and inversely as z, and y = 36 when x = 6 and z = 10. 5) _____
A) 60 B) $\frac{4}{5}$ C) 80 D) $\frac{24}{5}$

Evaluate the function.

6) Find f(3) for 6) _____

$$f(x) = \begin{cases} 9x + 1 & \text{if } x < 1 \\ 3x & \text{if } 3 \leq x \leq 6 \\ 3 - 7x & \text{if } x > 6 \end{cases}$$

A) 10 B) 9 C) -18 D) 43

7) Find f(-5) for 7) _____

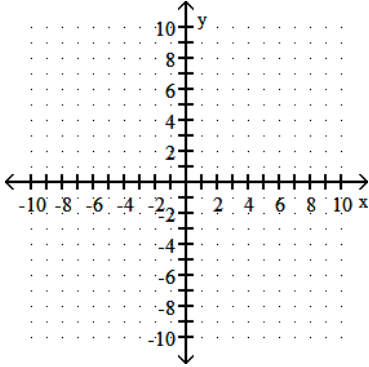
$$f(x) = \begin{cases} 7x & \text{if } x \leq -1 \\ x - 2 & \text{if } x > -1 \end{cases}$$

A) 35 B) -35 C) -7 D) 3

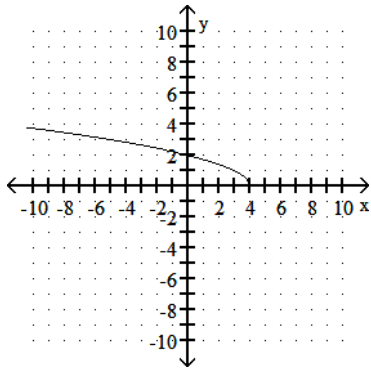
Graph the function.

8) $y = \sqrt{-4 - x}$

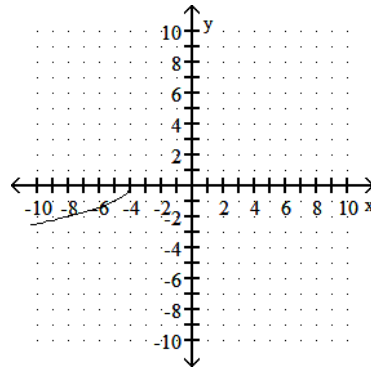
8) _____



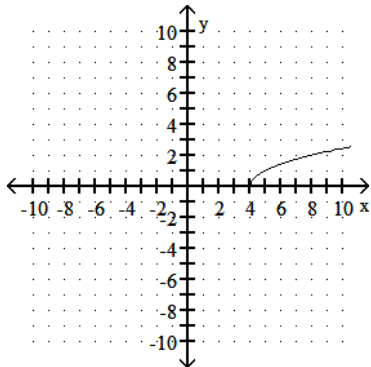
A)



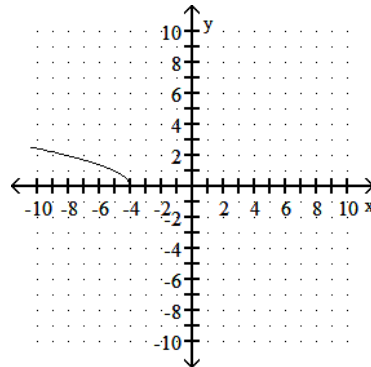
B)



C)



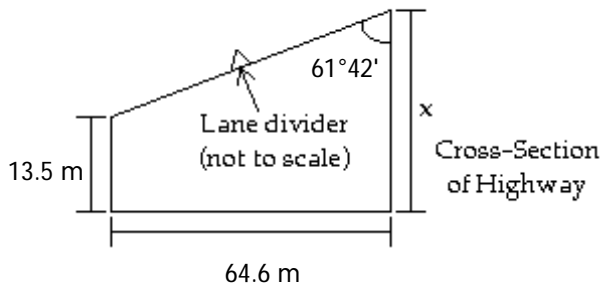
D)



Determine the value of x or α as requested. Round results to an appropriate number of significant digits.

9) Determine the value of x .

9) _____



A) 168.3 m

B) 48.3 m

C) 34.8 m

D) 120.0 m

Solve the right triangle. Round results to an appropriate number of significant digits.

10) $a = 3.8$ m, $B = 36.4^\circ$

A) $A = 53.6^\circ$, $b = 2.8$ m, $c = 4.7$ m

B) $A = 53.6^\circ$, $b = 5.4$ m, $c = 4.7$ m

C) $A = 53.6^\circ$, $b = 5.4$ m, $c = 6.6$ m

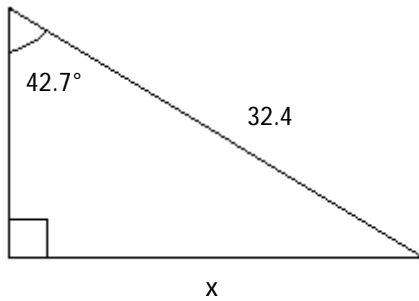
D) $A = 53.6^\circ$, $b = 1.7$ m, $c = 4.2$ m

10) _____

Find the requested part of the triangle. Round your answer to two decimal places.

11) Find the measure of the side labeled x .

11) _____



A) 23.81

B) 23.17

C) 21.97

D) 25.57

Find the value of the trigonometric function.

12) $\sec(339.03^\circ)$

A) 0.9338

B) 1.071

C) -2.794

D) -0.3833

12) _____

13) $\cot(-295.5^\circ)$

A) -0.193

B) 2.10

C) 0.903

D) 0.477

13) _____

Find θ for $0^\circ \leq \theta < 360^\circ$ that satisfies the stated conditions. Round your answer to the nearest hundredth.

14) $\tan \theta = -1.65$, $\sin \theta < 0$

A) 299.84°

B) 346.22°

C) 256.22°

D) 301.22°

14) _____

15) $\csc \theta = 1.5385$, $\cos \theta < 0$

A) 139.46°

B) 140.80°

C) 220.54°

D) 221.88°

15) _____

Find θ for $0^\circ \leq \theta < 360^\circ$.

16) $\cot \theta = -3.821$

A) 345.33° , 14.67°

B) 284.67° , 104.67°

C) 165.33° , 345.33°

D) 165.33° , 194.67°

16) _____

17) $\tan \theta = 2.223$

A) 65.78° , 294.22°

B) 24.22° , 204.22°

C) 65.78° , 114.22°

D) 65.78° , 245.78°

17) _____

18) $\sin \theta = 0.1253$

A) 7.20°

B) 7.20° , 172.80°

C) 7.20° , 352.80°

D) 82.80° , 277.20°

18) _____

19) $\cos \theta = 0.0305$

A) 88.25° , 271.75°

B) 1.75° , 181.75°

C) 88.25° , 268.25°

D) 88.25° , 91.75°

19) _____

For an arc length s , area of sector A , and a central angle θ of a circle of radius r , find the indicated quantity.

20) $r = 94.8$ cm, $\theta = \frac{\pi}{6}$ radians, find A 20) _____

- A) 748 cm² B) 2350 cm² C) 24.8 cm² D) 4700 cm²

21) $A = 28.0$ m², $r = 7.04$ m, find θ in radian measure 21) _____

- A) 0.565 B) 1.13 C) 2.26 D) 7.95

Solve by the method of elimination by substitution.

22) $0.04x + 0.08y = 0.28$ 22) _____

$-0.04x + y = 2.96$

- A) $x = 0.1, y = 0.3$ B) $x = 1, y = 3$ C) $x = 3, y = 1$ D) Inconsistent

23) $x - 5y = -34$ 23) _____

$2x - 5y = -28$

- A) $x = 7, y = 6$ B) $x = 6, y = 8$ C) $x = 7, y = 7$ D) Inconsistent

Solve by the method of elimination by addition or subtraction.

24) $-5x + 9y = -71$ 24) _____

$-2x + 2y = -22$

- A) $x = 6, y = -3$ B) $x = 7, y = -4$ C) $x = 7, y = -3$ D) Inconsistent

25) $9x + 62 = 7y$ 25) _____

$-6x - 2y = 8$

- A) $x = -4, y = 6$ B) $x = -3, y = 6$ C) $x = -3, y = 5$ D) Inconsistent

Evaluate the determinant.

26) 26) _____

$$\begin{vmatrix} 5 & 5 & 2 \\ -4 & 5 & -4 \\ -3 & -4 & -3 \end{vmatrix}$$

- A) -93 B) 93 C) 127 D) -213

27) 27) _____

$$\begin{vmatrix} 2 & 1 & 5 \\ 3 & 2 & 4 \\ 4 & 1 & 1 \end{vmatrix}$$

- A) -48 B) 16 C) 86 D) -16

Factor completely.

28) $15z^2 - 2z - 8$ 28) _____

- A) $(15z + 2)(z - 4)$ B) $(3z - 2)(5z + 4)$ C) $(15z + 1)(z - 8)$ D) $(3z + 2)(5z - 4)$

29) $32x^3 + 88x^2 + 20x$ 29) _____

- A) $x(4x + 1)(8x + 20)$ B) $x(16x + 4)(2x + 5)$
C) $4x(4x + 1)(2x + 5)$ D) $4(4x^2 + 1)(2x + 5)$

30) $343c^3 + 64$ 30) _____
 A) $(7c + 4)(49c^2 + 16)$ B) $(343c + 4)(c^2 - 28c + 16)$
 C) $(7c + 4)(49c^2 - 28c + 16)$ D) $(7c - 4)(49c^2 + 28c + 16)$

31) $216y^3 - 343$ 31) _____
 A) $(6y - 7)(36y^2 + 49)$ B) $(6y + 7)(36y^2 - 42y + 49)$
 C) $(216y - 7)(y^2 + 42y + 49)$ D) $(6y - 7)(36y^2 + 42y + 49)$

Multiply and simplify.

32) $\frac{k^2 + 10k + 21}{k^2 + 12k + 35} \cdot \frac{k^2 + 5k}{k^2 - 2k - 15}$ 32) _____
 A) $\frac{1}{k - 5}$ B) $\frac{k}{k^2 + 12k + 35}$ C) $\frac{k}{k - 5}$ D) $\frac{k^2 + 5k}{k - 5}$

33) $\frac{k^2 + 7k + 10}{k^2 + 9k + 20} \cdot \frac{k^2 + 4k}{k^2 + 10k + 16}$ 33) _____
 A) $\frac{k}{k^2 + 9k + 20}$ B) $\frac{k^2 + 4k}{k + 8}$ C) $\frac{k}{k + 8}$ D) $\frac{1}{k + 8}$

Divide and simplify.

34) $\frac{z^2 + 8z + 12}{z^2 + 11z + 18} \div \frac{z^2 + 6z}{z^2 + 19z + 90}$ 34) _____
 A) $\frac{z + 10}{z}$ B) $z + 10$ C) $\frac{z + 10}{z^2 + 9z}$ D) $\frac{z}{z^2 + 11z + 18}$

Perform the indicated operation. Simplify, if possible.

35) $\frac{16x}{9(4x + 1)} - \frac{1}{9x(4x + 1)} + \frac{1}{x}$ 35) _____
 A) $\frac{4(x + 2)}{9x}$ B) $\frac{16x^2 + 36x + 8}{36x^2 + 9x}$
 C) $\frac{4(x + 2)}{36x^2 + 9x}$ D) $\frac{16x^2 + 36x + 8}{9x}$

36) $\frac{8}{4 - 5x} - \frac{2}{5x - 4} + \frac{x - 4}{5x^2 + 16x - 16}$ 36) _____
 A) $\frac{7x + 20}{(5x - 4)(x + 4)}$ B) None of these C) $\frac{-9x - 44}{(5x - 4)(x + 4)}$ D) $\frac{-5x - 28}{(5x - 4)(x + 4)}$

Simplify.

37)

$$\frac{4 + \frac{2}{x}}{\frac{x}{4} + \frac{1}{8}}$$

37) _____

A) $\frac{16}{x}$

B) 16

C) 1

D) $\frac{x}{16}$

Solve for the specified variable.

38) $\frac{1}{a} + \frac{1}{b} = c$ for b

38) _____

A) $ac - \frac{1}{a}$

B) $\frac{1}{ac}$

C) $\frac{1}{c} - a$

D) $\frac{a}{ac - 1}$

39) $3x + \frac{9}{z} = \frac{8}{y}$ for z

39) _____

A) $z = \frac{-9y}{3x - 8}$

B) $z = \frac{8 - 3xy}{9y}$

C) $z = \frac{-9y}{3xy - 8}$

D) $z = \frac{9y}{8 - 3x}$

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.
SHOW ALL YOUR WORK.

Use the principle of square roots to solve the equation.

40) $-8k^2 - 20 = -308$

40) _____

41) $(x + 5)^2 = 40$

41) _____

Solve the problem.

42) A water tank can be filled in 5 minutes and emptied in 8 minutes. If the drain is accidentally left open when the tank is being filled, how long does it take to fill the tank?

42) _____

43) Ron can mow the lawn in two hours more time than Paul. Working together they can mow the lawn in 5 hours. How long does it take each of them working alone?

43) _____

Solve the given applied problem.

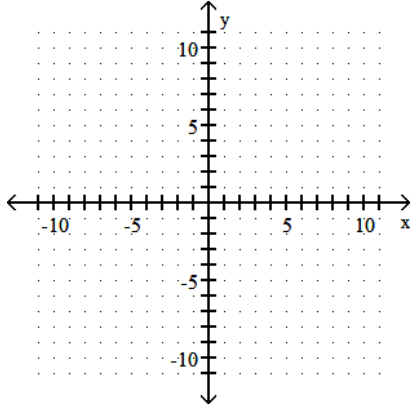
44) A projectile moves vertically upward such that its distance s (in ft) above the ground is given by $s = 250 + 250t - 16t^2$. Determine how long it will take to reach a height of 300 ft (to 0.1 s).

44) _____

Graph the parabola.

45) $y = -3x^2 - 2x - 4$

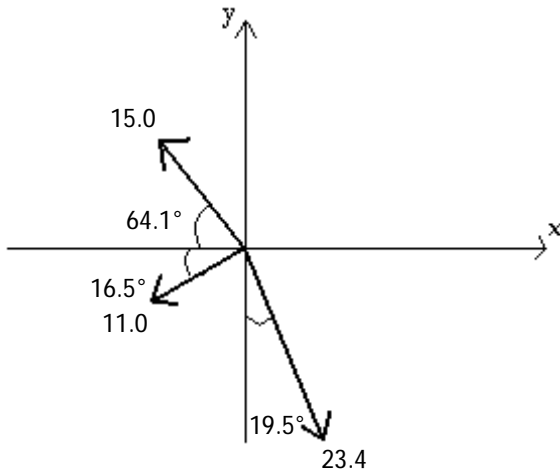
45) _____



Add the given vectors.

46)

46) _____



Find the missing parts of the triangle.

47) $B = 15.9^\circ$

$b = 11.70$

$a = 14.24$

47) _____

48) $B = 63^\circ 30'$

$a = 12.20$

$c = 7.80$

48) _____

Find the equation of the given function with the given amplitude, period, and displacement, respectively.

49) cosine, 8, 3, -8

49) _____

Simplify the given expression. Express answer with positive exponents.

50) $x^{1/4}x^{2/5}$

50) _____

51) $\frac{2^{-2/3} 2^3 x^{-6}}{2^{1/3} x^{-2}}$

51) _____

Rationalize the denominator.

52) $\sqrt{A^{-2} + B^{-1}}$

52) _____

Express the radical in simplest form, rationalize denominators, and perform the indicated operations.

53) $20\sqrt[3]{2} - 4\sqrt[3]{128}$

53) _____

54) $\sqrt{108} + 7\sqrt{27} - 5\sqrt{192}$

54) _____

Perform the indicated operations, expressing the answer in simplest form with rationalized denominators.

55) $\sqrt{x^8y^2} \sqrt{xy^3}$

55) _____

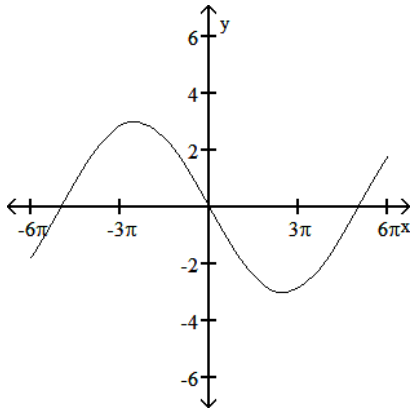
56) $\sqrt{4x^{14}z} \sqrt{8x^2z}$

56) _____

Write an equation for the graph of the sine or cosine curve.

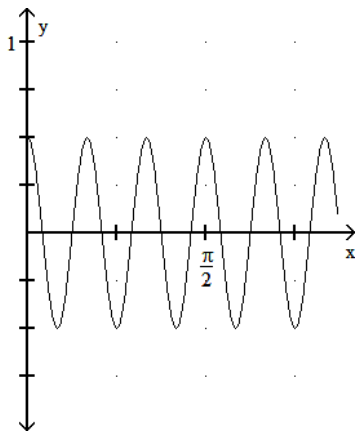
57)

57) _____



58)

58) _____



Answer Key

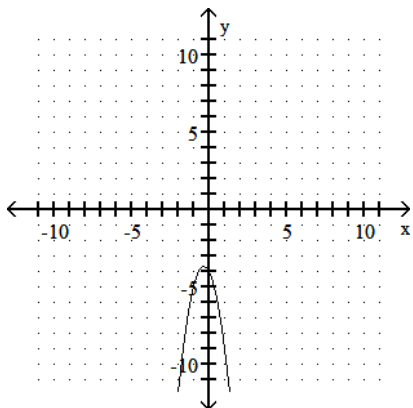
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- 1) B
- 2) B
- 3) B
- 4) D
- 5) C
- 6) B
- 7) B
- 8) D
- 9) B
- 10) A
- 11) C
- 12) B
- 13) D
- 14) D
- 15) A
- 16) C
- 17) D
- 18) B
- 19) A
- 20) B
- 21) B
- 22) B
- 23) B
- 24) B
- 25) C
- 26) A
- 27) D
- 28) D
- 29) C
- 30) C
- 31) D
- 32) C
- 33) C
- 34) A
- 35) A
- 36) C
- 37) A
- 38) D
- 39) C
- 40) ± 6
- 41) $-5 + 2\sqrt{10}, -5 - 2\sqrt{10}$
- 42) 13.333 min
- 43) Paul: 9.1 hr
Ron: 11.1 hr
- 44) 0.2 s

Answer Key

Testname: MA121 S2019 FCPP

45)



46) $R = 14.9, \theta = 231.5^\circ$

47) $A = 19.48^\circ, C = 144.62^\circ, c = 24.73;$
 $A' = 160.52^\circ, C' = 3.58^\circ, c' = 2.67$

48) $b = 11.17, A = 77^\circ 49', C = 38^\circ 41'$

49) $y = 8 \cos\left(\frac{2\pi}{3}x + \frac{16\pi}{3}\right)$

50) $x^{13/20}$

51) $\frac{2^2}{x^4}$

52) $\frac{\sqrt{A^2B + B^2}}{AB}$

53) $4\sqrt[3]{2}$

54) $-13\sqrt{3}$

55) $x^4y^2\sqrt{xy}$

56) $4x^8z\sqrt{2}$

57) $y = -3 \sin\left(\frac{1}{5}x\right)$

58) $y = \frac{1}{2} \cos(12x)$