Math 102 Name:_____

FINAL EXAM REVIEW & KEY

Final Exam Study Suggestions
The 50 question, multiple-choice final exam consists of two parts: no calculator and calculator. To help you thoroughly study for the final exam, the mathematics department has prepared this review packet. The review contains 50 open-response questions (A) and 50 multiple-choice questions (B). After working all the open-response questions, use the multiple-choice questions as a practice test. Set aside a one hour and 50 minute block of time and complete the multiple-choice questions without using your notes, text, or a tutor. Use the answer key to check your work and pay close attention to the questions you get wrong. Additional practice on the concepts giving you difficulty is suggested. Refer to your notes or text for additional practice problems. Seek help from your instructor or a tutor.

Additional study tips are:

- Watch for sign errors!
- Check your answer in the problem.
- Final Exam problems combine ideas - think through the steps necessary to get the correct answer.
- Be sure to study ideas that look similar but are very different.
- Use the distinguishing characteristics of equations to guide you in selecting an appropriate method for solving.
- Complete the Math 102 Review in time to get help from the Learning Center and/or your instructor. Do not wait until the day before the Final Exam.
- Know when your final is scheduled:
  - Day and Date _____
  - Time _____
  - Room _____
- Bring sharpened #2 pencils with erasers, your TI-30XS Multiview calculator, and your Schoolcraft ID number.
- Review questions 1-15 reflect the type of skills tested on the **No Calculator** part of the test.

Math 102 Formula Sheet

Surface Area

$S = 2\pi r^2 + 2\pi rh$ (cylinder)

$S = 4\pi r^2$ (sphere)

$S = \pi r^2 + \pi rl$ (cone)

Volume

$V = \pi r^2 h$ (cylinder)

$V = \frac{1}{3}\pi r^2 h$ (cone)

$V = \frac{4}{3}\pi r^3$ (sphere)

$V = \frac{1}{3}Bh$ (pyramid)

Area

1 sq mile = 640 acres

1 acre = 43,560 sq ft

Temperature

$F = \frac{9}{5}C + 32$

$C = \frac{5}{9}(F - 32)$

Length US/Metric

1 inch = 2.54 cm

1 meter = 3.28 ft

1 mile = 1.61 km

Area US/Metric

1 sq inch = 6.45 sq cm

1 sq meter = 1.196 sq yd

1 hectare = 2.47 acres

Volume US/Metric

1 cu inch = 16.39 mL

1 gallon = 3.79 liters

1 cu cm = 1 mL

1 liter = 1.06 qt

1 liter = 1000 cu cm

Weight US/Metric

1 ounce = 28.3 grams

1 kg = 2.20 lb

Problems 1-15 should be completed WITHOUT the use of a calculator

1A. Simplify the expression $-4 + 2(4 - 7)$

1B. Simplify the expression $2 + 3(15 - 8)$

A) 23

B) 29

C) 35

D) 39

2A. Simplify the expression $-2^2 - (-2)^2 + 10$

2B. Simplify the expression $-5^2 + (-5)^2 + 4$

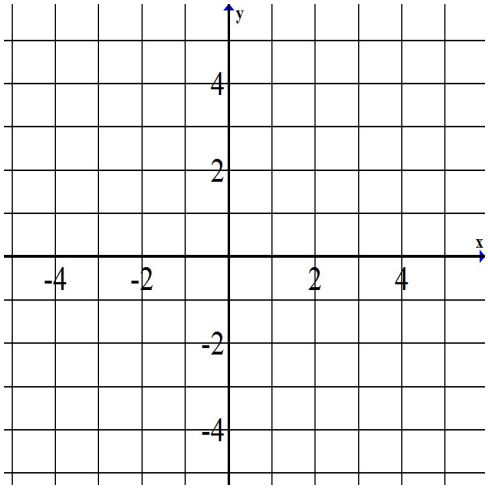
A) 54

B) 4

C) -46

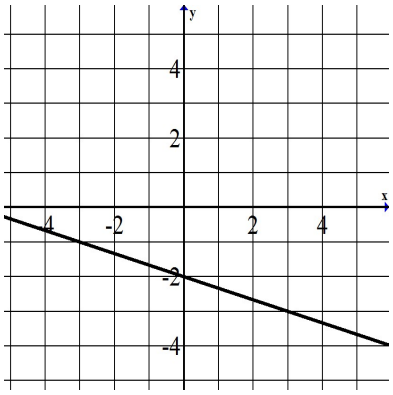
D) 0

3A. Graph the solution set for $y = -3x + 1$.



3B. Identify the graph of the solution set for $y = \frac{1}{3}x - 2$.

A)



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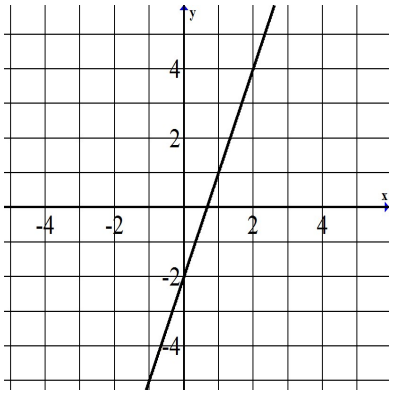

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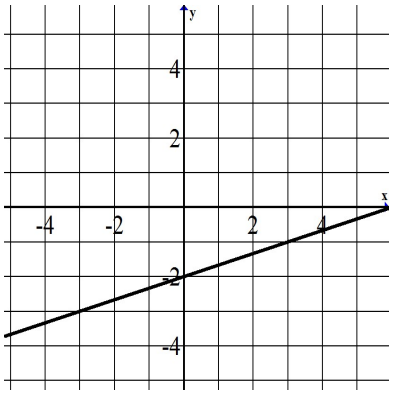

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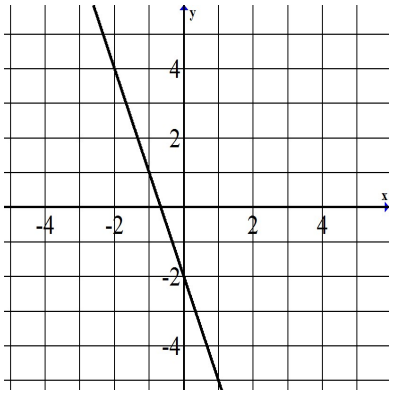
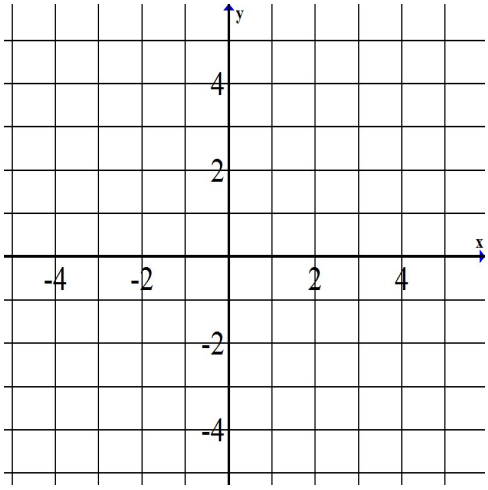
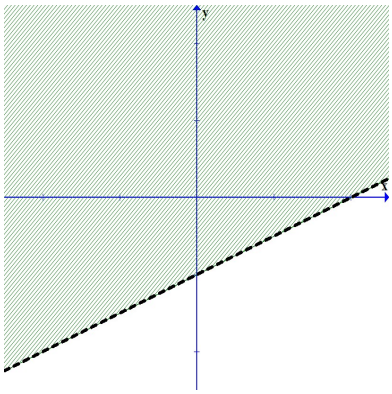


4A. Graph the solution set for $x + y > 2$.



4B. Identify the graph of the solution set for $x - 2y \leq 4$.

A)



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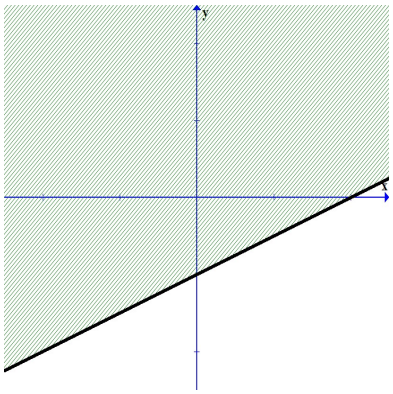

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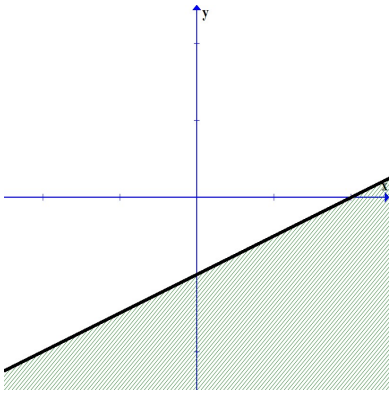
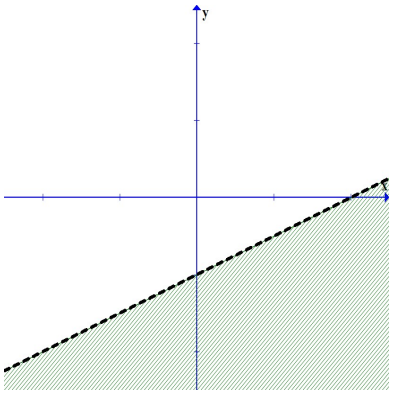


D)



5A. Perform the indicated operation. Simplify and reduce where necessary.

$$\frac{1}{3} - \frac{5}{6}$$

5B. Perform the indicated operation. Simplify and reduce where necessary.

$$\frac{2}{15} + \frac{7}{10}$$

A) $\frac{9}{25}$

B) $\frac{3}{10}$

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

D) 1

6A. The average annual snowfall at a ski resort is $62\frac{3}{10}$ inches. Last year, it had $54\frac{1}{2}$ inches. Find how many inches below average last year's snowfall was. Simplify and reduce where necessary.

6B. Perform the indicated operation. Simplify and reduce where necessary.

$6\frac{2}{3} - 2\frac{4}{5}$

A) $3\frac{2}{15}$

B) $3\frac{13}{15}$

C) $4\frac{2}{15}$

D) $4\frac{13}{15}$

7A. Perform the indicated operation. Simplify and reduce where necessary.

$$-\frac{7}{12} \div \left(-\frac{7}{8}\right)$$

7B. A 12-acre lot is subdivided into $\frac{3}{4}$ acre lots. How many lots are there?

A) 3

B) 9

C) 16

D) 36

8A. If a car can travel $30\frac{2}{3}$ miles on a gallon of gas, how far will it travel on $\frac{1}{4}$ gallons of gas? Write your answer as an integer or mixed number.

8B. Perform the indicated operation. Write your answer as an integer or a mixed number.

$3\frac{1}{5} \cdot 2\frac{7}{8}$

A) $5\frac{8}{13}$

B) $6\frac{7}{40}$

C) $7\frac{3}{40}$

D) $9\frac{1}{5}$

9A. Perform the indicated operation. Simplify.

$5.2178 + 8.74$

9B. Perform the indicated operation. Simplify.

$63.57 - 212.6$

A) -250.97

B) -149.03

C) 149.17

D) 42.31

10A. If a shot of espresso contains 63.4 mg of caffeine, how much caffeine is contained in 3 shots of espresso?

10B. Perform the indicated operation. Simplify.

$0.28 \div 0.7$

A) 0.004

B) 0.04

C) 0.4

D) 4

11A. Convert $\frac{3}{16}$ to a percent.

11B. Convert $\frac{3}{8}$ to a percent.

A) $\frac{3}{8}\%$

B) 37.5%

C) 75%

D) 0.375%

12A. Divide. If necessary, round to the nearest thousandth.

$0.028 \div 0.6$

12B. Divide. If necessary, round to the nearest hundredth.

$13 \div 7$

A) 0.19

B) 1.09

C) 1.85

D) 1.86

13A. Write 9.02×10^{-5} in standard form.

13B. Write $70,400,000$ in scientific notation.

A) 70.4×10^{-6}

B) 7.04×10^{-7}

C) 70.4×10^{6}

D) 7.04×10^{7}

14A. Solve $\frac{12}{18} = \frac{x}{24}$

14B. Solve $\frac{15}{10} = \frac{9}{x}$

A) $x = 1\frac{1}{2}$

B) $x = 4$

C) $x = 6$

D) $x = 14\frac{1}{2}$

15A. Simplify the expression.

$3\sqrt{64} + 5\sqrt{36}$

15B. Simplify the expression.

$4\sqrt{49} - 3\sqrt{25}$

A) 2

B) 13

C) 43

D) 121

A calculator is allowed for problems 16-50

16A. Simplify. Write your answer using positive exponents only.

$$\frac{12x^7y^8z}{18x^{11}y^3z}$$

16B. Simplify. Write your answer using positive exponents only.

$$\frac{a^{-5}b^3}{a^4b^{-8}}$$

A) $\frac{a^9}{b^5}$

B) $\frac{b^5}{a}$

C) $\frac{a}{b^{11}}$

D) $\frac{b^{11}}{a^9}$

17A. Simplify. Write your answer using positive exponents only.

$$\frac{(2y^5)^3}{(y^4)^2}$$

17B. Simplify. Write your answer using positive exponents only.

$(2x^2y)^3(x^4y^3)^2$

A) $2x^{14}y^9$

B) $8x^{14}y^9$

C) $8x^{11}y^8$

D) $6x^{14}y^8$

18A. Add $(11x^2 - 5x - 9) + (4x^3 - 6x + 3)$

18B. Subtract $(4y^3 - 5y^2 - 8y + 1) - (9y^3 + 4y^2 - 2y - 8)$

A) $-5y^3 - y^2 - 10y - 7$

B) $-5y^3 - 9y^2 - 6y + 9$

C) $-5y^3 - y^2 - 6y + 9$

D) $5y^3 - y^2 - 10y - 7$

19A. Nora drives 528 miles in 9 hours. What is the rate of the car, in miles per hour, rounded to the nearest tenth?

19B. Before John left for Chicago, he filled up his gas tank and noted that the odometer read 19,526.8. When he arrived in Chicago 3.5 hours later, it took 6.58 gallons to top off his gas tank and his odometer read 19,724.2. How many miles per gallon did John's car get?

A) 30 mpg

B) 35 mpg

C) 56.4 mpg

D) 65.8 mpg

20A. Find the unit price for each of the following.

(a) 12 oz of cereal for \$2.99

(b) \$15.00 for 13 muffins

20B. Which brand of paper cups has the lowest unit price?

Brand	**# of cups**	**Price**
A	18	\$0.99
B	36	\$1.99
C	12	\$0.79
D	24	\$1.29

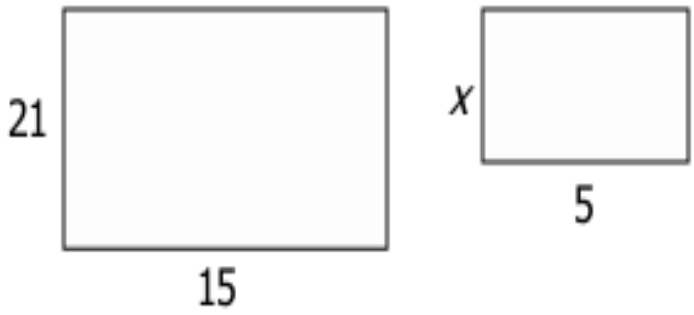
A) Brand A

B) Brand B

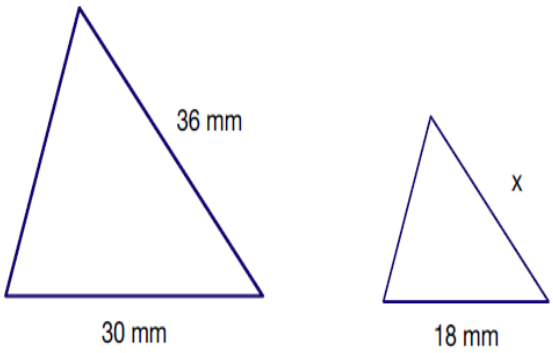
C) Brand C

D) Brand D

21A. The two shapes are similar. Find the value of x.



21B. The two shapes are similar. Find the value of x.



A) 15 mm

B) 21.6 mm

C) 60 mm

D) 87 mm

22A. A farmer knows that of every 50 eggs his chickens lay, only 45 will be marketable. If his chickens lay 1,200 eggs in a week, how many of them will be marketable?

22B. At a certain point of the day, you notice that your house casts a 52 foot shadow and a tree in your yard casts a 70 foot shadow. If your house is 27 feet tall, how tall is the tree rounded to the nearest foot.

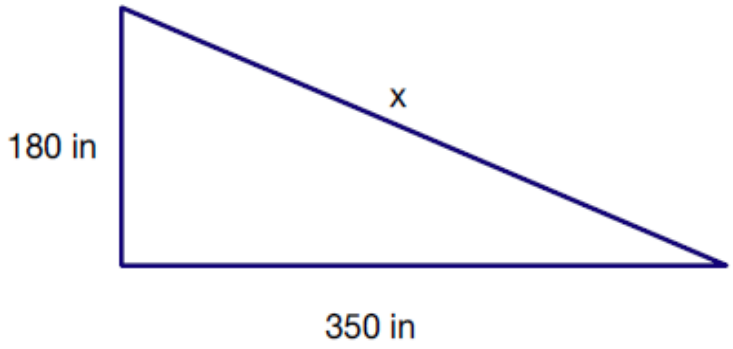
A) 20 ft

B) 36 ft

C) 59 ft

D) 135 ft

23A. Find the length of the side labeled x. Round to the nearest tenth.



23B. A ladder is leaning against the top of a wall. If the ladder is 25 feet long and the base of the ladder is 7 feet from the wall, how far does the ladder reach up the wall?

A) 18 ft

B) $\sqrt{674}$ ft

C) 24 ft

D) 32 ft

24A. Farmer Brown owned 4800 chickens in 2024. In 2025 he owned 5100 chickens. What was the percent increase?

24B. A plasma TV is reduced to \$5,040 from an original price of \$6,000. What is the percent decrease?

A) 16%

B) 19%

C) 84%

D) 960%

25A. If 48% of the students at a certain college are from out-of-state and there are 14,400 out-of-state students at the college what is the total number of students enrolled at that college?

25B. A real estate agent has a commission rate of 3.5%. If a piece of property sells for \$94,000, what is her commission?

A) \$3,290

B) \$26,857

C) \$32,900

D) \$2,785,614

26A. Solve the following equation. Write your answer as an integer or fraction.

$x - 6(x + 2) = -7(x - 3) + 10$

26B. Solve the following equation. Write your answer as an integer or fraction.

$2(x + 3) - 5 = 7x - 3(x - 2)$

A) $x = 0$

B) $x = \frac{7}{2}$

C) $x = 1$

D) $x = -\frac{5}{2}$

27A. Solve the following equation. Write your answer as an integer or fraction.

$\frac{1}{2}x + 2 = \frac{1}{3}x - \frac{5}{6}$

27B. Solve the following equation. Write your answer as an integer or fraction.

$\frac{1}{2}y - 5 = \frac{2}{5}y - 2$

A) $y = 3$

B) $y = 0$

C) $y = 30$

D) $y = -70$

28A. Solve the following equation for c.

$a + b + c = 180$

28B. Solve the following equation for x.

$B = \frac{1}{3}xy$

A) $x = B - \frac{1}{3}y$

B) $x = 3B - y$

C) $x = \frac{3B}{y}$

D) $x = \frac{B}{3y}$

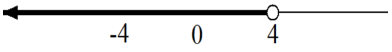
29A. Solve the following inequality, then graph the solution set.

$1 - 0.5x < -4.5x + 8$

29B. Solve the following inequality, then select the correct solution set.

$-3.5x - 2.2 < 11.8$

A)



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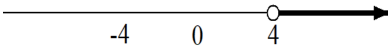
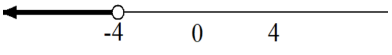
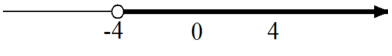


C)



D)



30A. Use the square root property to solve the following equation.

$9x^2 = 7$

30B. Use the square root property to solve the following equation.

$(5x + 4)^2 = 36$

A) $x = 6, x = -6$

B) $x = 2, x = -\frac{2}{5}$

C) $x = \frac{2}{5}, x = -2$

D) $x = \frac{2}{5}, x = 0$

31A. Use the quadratic formula to solve $2x^2 + 7x + 5 = 0$

31B. Use the quadratic formula to solve $3x^2 - 5x + 1 = 0$

A) $x = \dfrac{5 \pm \sqrt{13}}{6}$

B) $x = \dfrac{-5 \pm \sqrt{13}}{6}$

C) $x = \dfrac{-5 \pm \sqrt{37}}{6}$

D) $x = \dfrac{5 \pm \sqrt{37}}{6}$

32A. One side of a triangle is three times the shortest side. The third side is 7 feet more than the shortest side. The perimeter is 124 feet. Find all three sides.

32B. The length of a rectangle is 2 inches more than three times the width. The perimeter is 52 inches. Find the length.

A) 6 inches

B) 10 inches

C) 20 inches

D) 32 inches

33A. Suppose you invest money in two accounts. One of the accounts pays 8% annual interest, whereas the other pays 10% annual interest. If you have $7,000 more invested at 10% than you invested at 8%, how much do you have invested in each account if the total amount of interest you earn in a year is $1,600?

33B. Part of a $16,000 inheritance was invested at 13% annual simple interest and the rest was invested at 7% annual simple interest. At the end of one year the interest earned by the two investments was equal. How much was invested at 7%?

A) $5,600

B) $10,400

C) $8,000

D) $1,120

34A. Find the accuracy and precision of each of the following numbers.

Number	6,300	90,000	200.4	1.06	19.450
Accuracy					
Precision					

34B. A surveyor measures the distance in a plot of land to be 430 feet. He repeats the measurement again and finds it to be 430 feet. Find the accuracy and precision in the measurement.

A) Accuracy: 3 Precision: Tens

B) Accuracy: 2 Precision: Tens

C) Accuracy: 3 Precision: Ones

D) Accuracy: 2 Precision: Ones

35A. A surveyor measures the distance in a plot of land to be 23.6 ft. He repeats the measurement again and finds it to be 23.6 ft. Find the uncertainty and tolerance in the measurement.

35B. A ruler is used to measure a bicycle crankshaft diameter. The measurement is 31 mm, and it is repeated to yield 31 mm. Find the tolerance in the measurement.

A) Between 30 mm and 40 mm

B) Between 30 mm and 31 mm

C) Between 30 mm and 32 mm

D) Between 30.5 mm and 31.5 mm

36A. Convert 1.2 miles to yards.

36B. Convert 64 fluid ounces to quarts.

A) 2 qts

B) 4 qts

C) 16 qts

D) 128 qts

37A. Convert 4.2 g to mg.

37B. Convert 300 mL to liters.

A) 0.03 L

B) 0.3 L

C) 3 L

D) 30 L

38A. Convert 187 lb to kilograms. Use 1 kg = 2.20 lb.

38B. Convert 60 mph to kilometers per hour. Use 1 mile = 1.61 km.

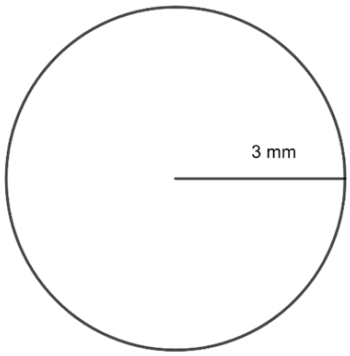
A) 0.03 kph

B) 37.27 kph

C) 96.6 kph

D) 1.61 kph

39A. Find the circumference. Use 3.14 for π and include units.



39B. An above ground pool has a diameter of 32 feet. What is the circumference of the pool? Use 3.14 for π and round to the nearest tenth, if necessary.

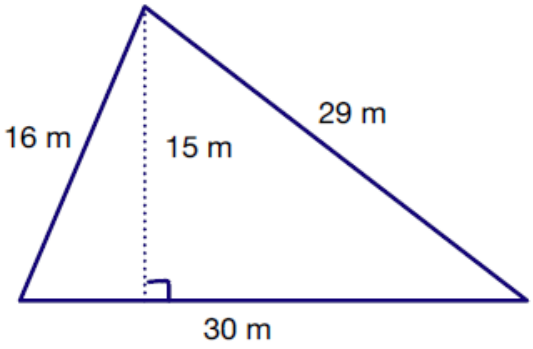
A) 100.5 ft

B) 201.0 ft

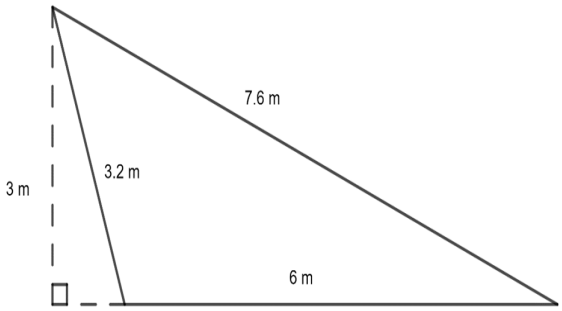
C) 803.8 ft

D) 1607.7 ft

40A. Find the area. Include units.



40B. Find the area of the triangle.



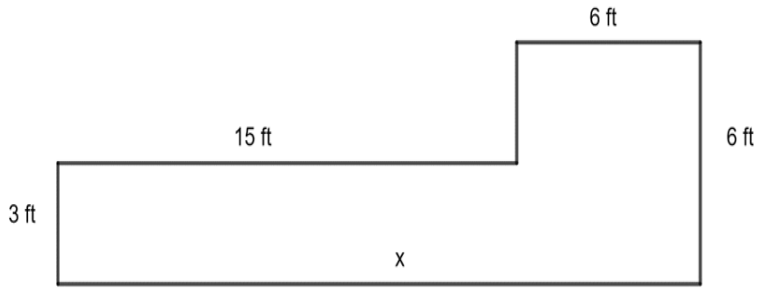
A) 18 m^2

B) 16.8 m^2

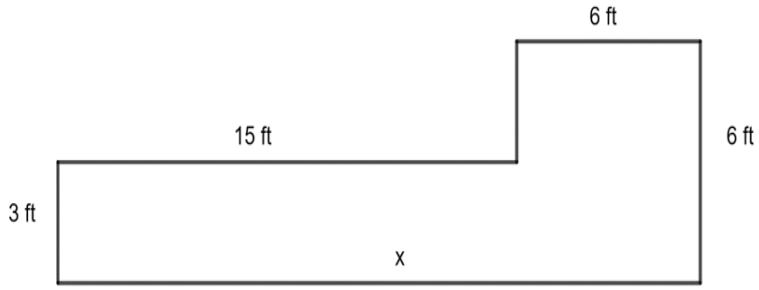
C) 9.6 m^2

D) 9 m^2

41A. Find the perimeter. Include units.



41B. Find the area. Include units.



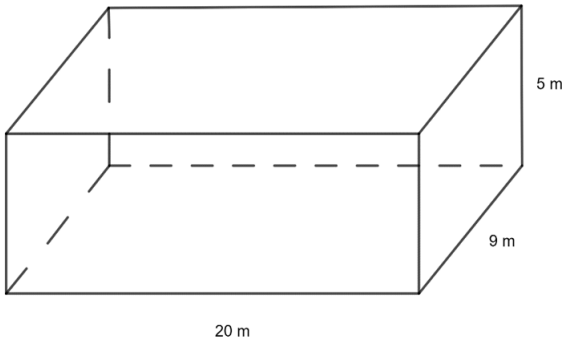
A) 60 ft^2

B) 81 ft^2

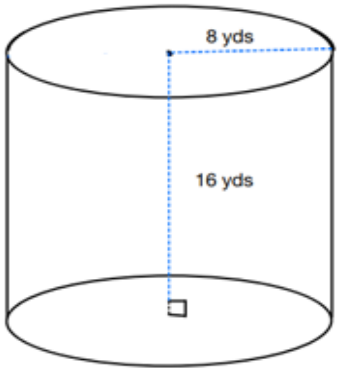
C) 126 ft^2

D) 1620 ft^2

42A. Find the surface area. Include units.



42B. Find the surface area. Use 3.14 for π.



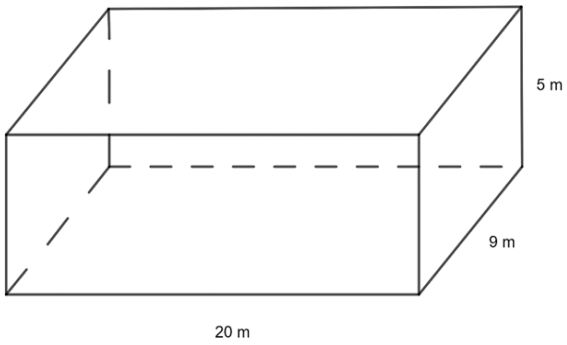
A) 804 yd^2

B) 1005 yd^2

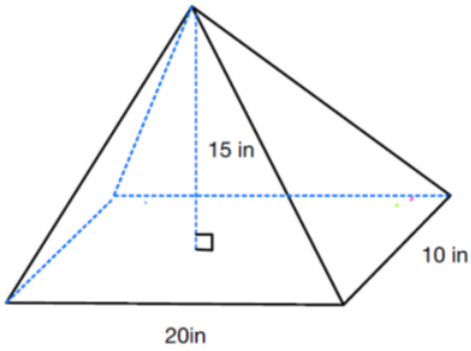
C) 1206 yd^2

D) 15,847 yd^2

43A. Find the volume. Include units.



43B. Find the volume.



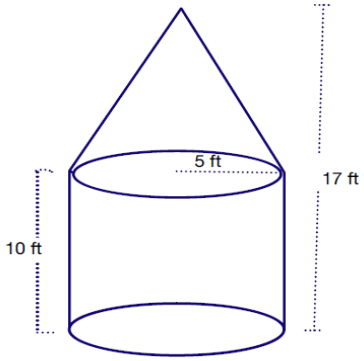
A) 100 in^3

B) 1000 in^3

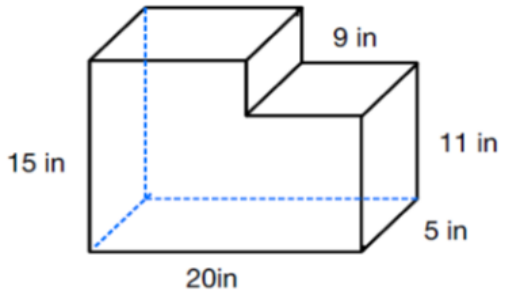
C) 1500 in^3

D) 3000 in^3

44A. Find the volume. Use 3.14 for π and round to the nearest tenth. Include units.



44B. Find the volume.



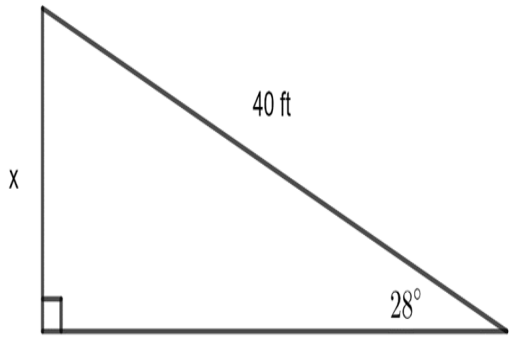
A) 60 in^3

B) 1320 in^3

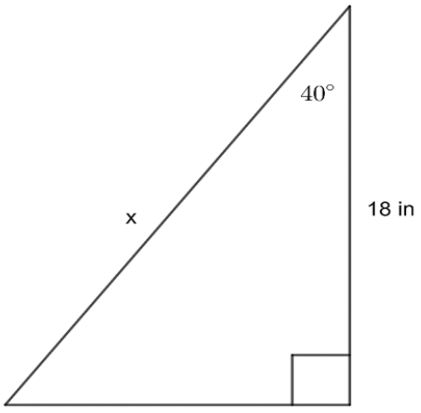
C) 1995 in^3

D) 148,500 in^3

45A. Find the value of x. Round to the nearest tenth.



45B. Find the value of x.



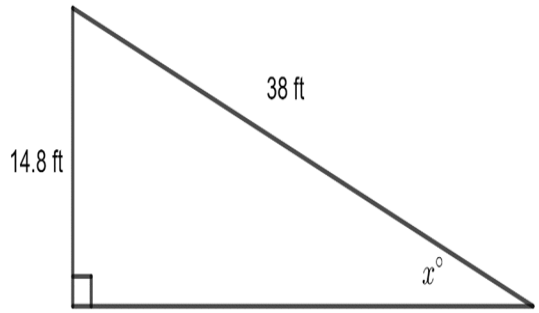
A) 13.8 in

B) 15.1 in

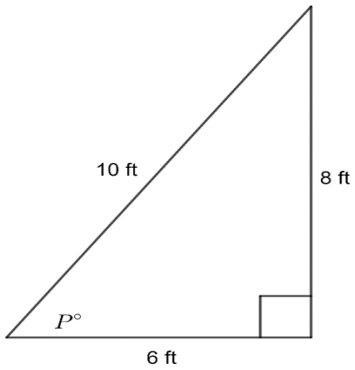
C) 23.5 in

D) 28.0 in

46A. Find the measure of angle x. Round to the nearest tenth of a degree.



46B. Find the measure of angle P.



A) 14.0°

B) 36.9°

C) 38.7°

D) 53.1°

47A. A mixing blade on a food processor extends out 3 inches away from the center. If the blade is turning at 800 revolutions per minute, what is the linear velocity of the tip of the blade in feet per minute? Use 3.14 for π.

47B. The pendulum on a grandfather clock swings from side to side once every 5 seconds. If the length of the pendulum is 5 feet and the angle through which it swings is 40°, how far does the tip of the pendulum travel in 5 seconds?

A) 2.8 ft

B) 3.5 ft

C) 5 ft

D) 17.5 ft

48A. A 42-foot-long piece of wire is attached to the top of a pole at one end and nailed to the ground at the other end. If the angle of elevation from the ground to the top of the pole is 40°, find the height of the pole.

48B. From the basket of a hot air balloon 100 feet above the ground, the angle of depression to a point A on the ground is 10.5°. What is the distance from point A to the basket of the balloon?

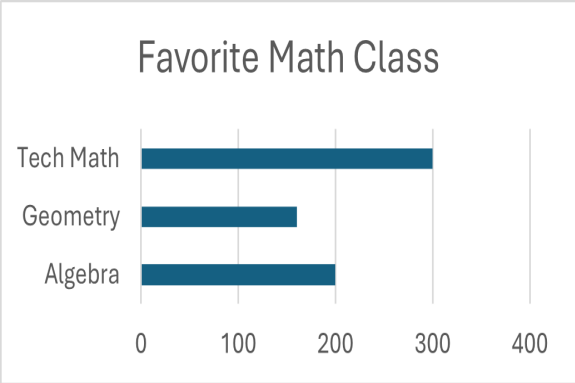
A) 18 ft

B) 102 ft

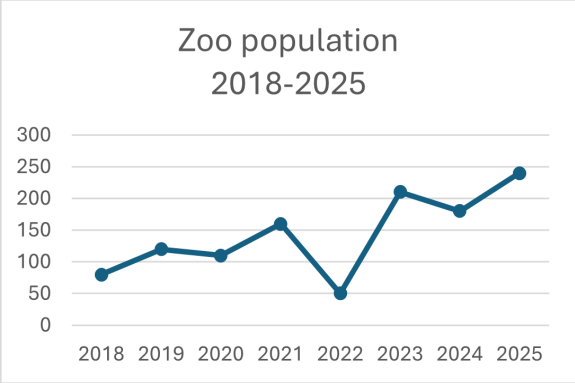
C) 540 ft

D) 549 ft

49A. A group of students were asked their favorite math class and the bar graph is displayed below. Approximately how many students were surveyed?



49B. Estimate the difference between the highest population and lowest population in the time period.



A) 50

B) 100

C) 190

D) 240

50A. Given the data set {70,75,78,80,85,90,90,96}, find the a) mean, b) median and c) mode Round to the tenths place.

50B. Find the mean, rounded to the nearest tenth, for the data set described in this frequency chart.

Data	Frequency
1	8
2	6
3	12
4	9
5	0

A) 3

B) 2.5

C) 2.6

D) 7

Answer Key:

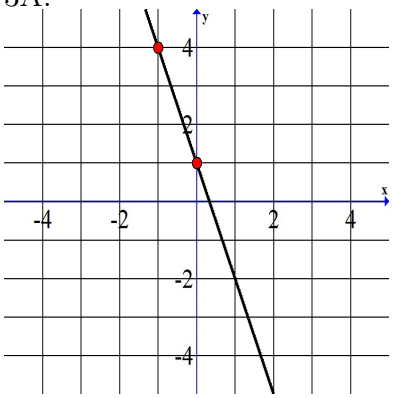
1A. -10

1B. A

2A. 2

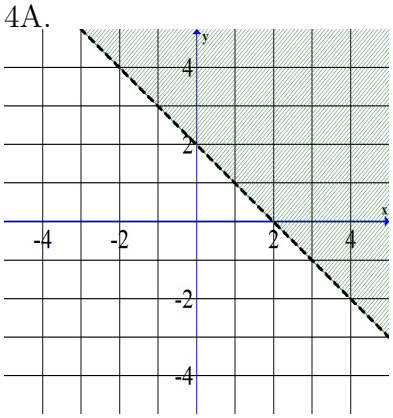
2B. B

3A.



3B. B

4A.



4B. C

5A. $-\frac{1}{2}$

5B. C

6A. $7\frac{4}{5}$ inches

6B. B

7A. $\frac{2}{3}$

7B. C

8A. $7\frac{2}{3}$ miles

8B. D

9A. 13.9578

9B. B

10A. 190.2 mg

10B. C

11A. 18.75%

11B. B

12A. 0.047

12B. D

13A. 0.0000902

13B. D

14A. $x = 16$

14B. C

15A. 54

15B. B

16A. $\frac{2y^5}{3x^4}$

16B. D

17A. $8y^7$

17B. B

18A. $4x^3 + 11x^2 - 11x - 6$

18B. B

19A. 58.7 mph

19B. A

20A. a) \$0.25/oz b) \$1.15/muffin

20B. D

21A. 7

21B. B

22A. 1,080

22B. B

23A. 393.6 in

23B. C

24A. 6.25%

24B. A

25A. 30,000 students

25B. A

26A. $x = \frac{43}{2}$

26B. D

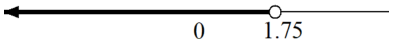
27A. $x = -17$

27B. C

28A. $c = 180 - a - b$

28B. C

29A. $x < 1.75$



29B. D

30A. $x = \pm\frac{\sqrt{7}}{3}$

30B. C

31A. $x = -\frac{5}{2}$ or $x = -1$

31B. A

32A. 23.4 ft, 30.4 ft, 70.2 ft

32B. C

33A. \$5,000 at 8%, \$12,000 at 10%

33B. B

34A.

Number	6,300	90,000	200.4
Accuracy	2	1	4
Precision	hundreds	ten-thousands	tenths

Number	1.06	19.450
Accuracy	3	5
Precision	hundredths	thousandths

34B. B

35A. 0.05 ft, between 23.55 ft and 23.65 ft

35B. D

36A. 2112 yds

36B. A

37A. 4200 mg
37B. B

38A. 85 kg
38B. C

39A. 18.84 mm
39B. A

40A. 225 m^2
40B. D

41A. 54 ft
41B. B

42A. 650 m^2
42B. C

43A. 900 m^3
43B. B

44A. 968.2 ft^3
44B. B

45A. 18.8 ft
45B. C

46A. 22.9°
46B. D

47A. 1256 ft/min
47B. B

48A. 27 ft
48B. D

49A. 660 students
49B. C

50A. Mean=83, Median=82.5, Mode=90
50B. C