

1. Which has the greatest ratio?

- a. 20 to 40 0.5
- b. 12 to 18 $.6$
- c. 15 to 35 $.43$
- d. 26 to 42 $.62$

2. What fraction is between $\frac{1}{3}$ and $\frac{5}{6}$?

$.3$ $.8\bar{3}$
Anything between those decimals

3. Which expression is equivalent to $12x-4$?

- a. $-4(3x-1)$
 $-12x+4$
- b. $4(3x-1)$
- c. $4x(3x-1)$
- d. $12(x-1)$

4. Angela brought $3\frac{2}{3}$ pounds of pizza. Sarah brought $2\frac{1}{4}$ pounds of pizza. How many more pounds of pizza did Angela bring?

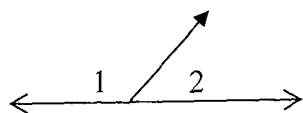
$$3\frac{2}{3} - 2\frac{1}{4} = \frac{44}{12} - \frac{27}{12} = \frac{17}{12} = 1\frac{5}{12}$$

$$\frac{11}{3} - \frac{9}{4}$$

5. What two angles are complementary? = 90

- a. 63 and 30
 93
- b. 50 and 130
 180
- c. 45 and 45
 90
- d. 36 and 14
 50

6. What type of angle is created by $\angle 1$ and $\angle 2$?



Supplementary

7. A swing set cost \$730 and sales tax is 6.25%. What is the total cost of the swing set?

$$\begin{array}{l} 730(.0625) = 45.63 \\ 730 + 45.63 \\ \hline \$775.63 \end{array} \quad \left\{ \quad \begin{array}{l} 730(1.0625) \\ \hline \$775.63 \end{array} \right.$$

8. Jordyn reads 33 pages in 30 minutes. How many pages can she read in 45 minutes?

pg
min

$$\frac{33}{30} = \frac{x}{45}$$

$$\frac{30x}{30} = \frac{1485}{30}$$

$$x = 49.5$$

49.5 pages

9. In a survey, 100 students were asked to name their favorite vegetable. The results are shown in the table. What is the experimental probability of carrots being someone's favorite vegetable? Express as a fraction in simplest form.

Favorite Vegetable	
Vegetable	Frequency
Carrots	24
Broccoli	55
Corn	12
Peas	9

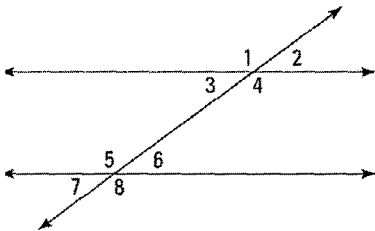
$$\frac{24}{100} = \frac{6}{25}$$

total = 100

10. Write a rational number that is equivalent to a repeating decimal.

$$\frac{1}{3}$$

11. What type of angles are 5 and 8?



Vertical &'s

12. Scale $\frac{1}{2}$ in = 10 feet

A house model is 13 inches tall. Write and solve a proportion to find x, the height in feet of the actual house.

$$\frac{13 \text{ in}}{1 \text{ ft}} \cdot \frac{1}{2} = \frac{13}{x}$$

$$x = 260$$

260 feet

$$\left(\frac{2}{1}\right) \frac{1}{2} x = 130 \left(\frac{2}{1}\right)$$

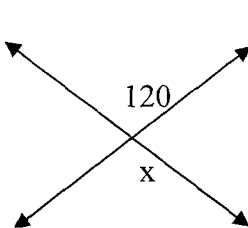
13. Two complementary angles are in a ratio 1:2. What is the measure of the smaller angle?

$$x + 2x = 90$$

$$\frac{3x}{3} = \frac{90}{3}$$

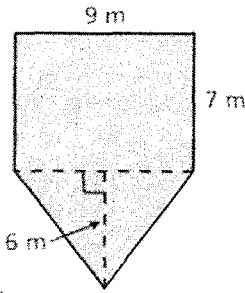
$$x = 30$$

14. Two lines intersect, what is the value of x?



$$x = 120^\circ$$

15. Find the area of the figure.



Rectangle

$$A = lW$$

$$A = 9(7)$$

$$A = 63m^2$$

Triangle

$$A = \frac{1}{2}bh$$

$$A = \frac{1}{2}(9)(6)$$

$$A = 27m^2$$

$$63 + 27 = 90m^2$$

16. The temperature drops 3 degrees per hour for 8 hours. Which expression does not describe the change in temperature?

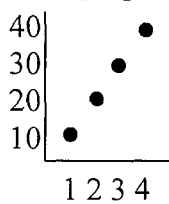
a. $-3(8)$

c. $-3-3-3-3-3-3-3-3$

b. $-3+-3+-3+-3+-3+-3+-3+-3$

d. $3(8)$
not negative

17. What is the constant of proportionality?



$$K = \frac{y}{x}$$

$$K = \frac{20}{2}$$

$$K = 10$$

18. Which has the greatest absolute value?

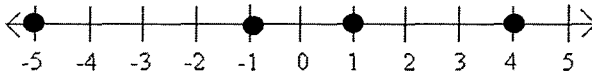
M

A

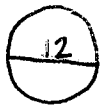
T

H

M



19. A circle has a diameter of 12, What is the circumference of the circle in terms of π ?



$$C = \pi d$$

$$C = 12\pi \text{ units}$$

$$C = \pi 12$$

20. A car has 5 types of colors, 2 types of engines, 4 model types. How many different cars can be made?

$$5 \times 2 \times 4 = 40$$

21. A sweatshirt is on sale for \$70. If the price represents a 30% discount, what is the original price of the sweatshirt?

$$100 - 30 = 70\%$$

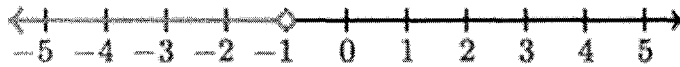
$$\frac{70}{x} = \frac{70}{100}$$

$$x = 100$$

$$\frac{7000}{70} = \frac{70x}{70}$$

$$\$100$$

22. Write inequality shown below?



$$x > -1$$

23. Favorite desserts. Predict how many people out of 2,500 would choose brownies as their favorite dessert?

Type	Percent
Cookies	38
Cake	32
Brownies	40

$$\text{Total} = 110$$

$$\frac{40}{110} = \frac{x}{2500}$$

$$\frac{110x}{110} = \frac{1000000}{110}$$

$$x = 909.09$$

$$x = 909 \text{ people}$$

24. Which table shows a proportional relationship between x and y ?

x	y
25	5
30	6
40	8

A

x	y
25	5
30	4
40	3

B

x	y
25	5
30	10
40	20

C

x	y
25	35
30	40
40	50

D

25. Jordyn invests \$670 in an account that earns 3.7% simple interest. How much will she have in 8 years?

$$I = Prt$$

$$I = 670(.037)(8)$$

$$I = 198.32$$

*change to a decimal

$$670 + 198.32$$

$$\$868.32$$

total

26. What is the probability of tossing tails on a nickel and tossing an odd number on a number cube with faces numbered 1 through 6?

$$\frac{1}{2} \left(\frac{3}{6} \right) = \frac{1}{4}$$

27. What is the unit price if 8 pencils cost \$10.45

$$\frac{8 \text{ pencils}}{10.45} = \frac{10.45}{8} = 1.30625$$

\$1.31 per pencil

28. What is the GCF of $36x^2y^4$ and $6y^3$?

$$\begin{array}{l} 6 \overline{) 36x^2y^4, 6y^3} \\ \underline{6 \mid 6x^2y^4, y^3} \\ 6x^2y, 1 \end{array}$$

$$6y^3$$

29. Solve for x :

$$6(x-4) = 48$$

$$6x - 24 = 48$$

$$\begin{array}{r} +24 \quad +24 \\ \hline 6x = 72 \end{array}$$

$$\frac{6x}{6} = \frac{72}{6}$$

$$x = 12$$

30. Which measure of central tendency best describes the data if there is an outlier? Median

31. Solve for x: $\frac{16}{a} = \frac{2}{3}$

$$\frac{2a}{2} = \frac{48}{2}$$
$$a = 24$$

32. Graph the solution to the inequality $\frac{5x}{5} > \frac{45}{5}$ $x > 9$



33. If the circumference of a circle is expressed as 48π ft, what is the radius? Round to the nearest whole number if necessary.

$$C = 2\pi r$$
$$\frac{48\pi}{2\pi} = \frac{2\pi r}{2\pi}$$
$$r = 24 \text{ ft}$$

34. If the probability that it will be sunny on Thursday is $\frac{3}{7}$, what is the probability that it will *not* be sunny on Thursday?

$$\frac{7}{7} - \frac{3}{7} = \frac{4}{7}$$

35. What is the solution: $3x + 19 < 49$

$$\frac{-19}{-19} \quad \frac{-19}{-19}$$
$$\frac{3x}{3} < \frac{30}{3}$$
$$x < 10$$

36. Solve for x: $6x - 4x + 35 = 17$

$$2x + 35 = 17$$
$$\frac{-35}{-35} \quad \frac{-35}{-35}$$
$$\frac{2x}{2} = \frac{-18}{2}$$
$$x = -9$$

37. Simplify the following expression: $(16a) + 4b(-3a) + 9b$

$$13a + 13b$$

38. John has a bag of marbles. There are 16 blue marbles, 4 yellow marbles, and 3 red marbles. John reaches into the bag without looking and picks a marble. What is the probability he picks a red marble?

$$\text{Total} = 23$$
$$\frac{3}{23}$$

39. A map has a scale of 2 inches : 300 miles. If the distance from New York City to Los Angeles is 13 inches on the map, what is the actual distance between the cities?

$$\frac{\text{in}}{\text{mi}} \frac{2}{300} = \frac{13}{x} \quad \frac{2x}{2} = \frac{3900}{2}$$

$$x = 1950 \text{ miles}$$

40. On February 18, from 9 a.m. until 2 p.m., the temperature rose from -13 degrees F to 18 degrees F. What was the total increase in temperature during this time period?

$$18 - -13 = 31^\circ$$

41. Solve for x: $-\frac{2}{5}x + \frac{3}{5} = -\frac{13}{15}$?

$$-\frac{3}{5} - \frac{3}{5} = -\frac{9}{5}$$

$$x = \frac{11}{3}$$

$$\left(-\frac{5}{2}\right) - \frac{2}{5}x = \frac{-22}{-315} \left(-\frac{5}{2}\right)$$

42. Which of the following linear expressions **cannot** be factored?

a. $6x - 12$

b. $10x^2 - x$

c. $3x + 13$

d. $27x + 81$

43. Sarah bought food for herself and two of her friends. She paid \$8.50 for each meal. If Sarah has \$17.50 left, how much money did she have before she bought the food? 3 people

$$8.50(3) = 25.5$$

$$25.5 + 17.50 = 43$$

$$\$43$$

44. Sam biked 158 miles in 3 hours. What was her average speed in miles per hour?

$$\frac{\text{mi}}{\text{hr}} \frac{158}{3} = 52.\bar{6}$$

$$52.\bar{6} \text{ mph}$$

45. Which property is illustrated by the equations below

$13 + (-13) = 0$ Additive Inverse

$6 + 3 + 2 = 2 + 6 + 3$ Commutative prop. of addition

$3(4 \times 5) = 5(3 \times 4)$ Associative property of Mult.

46. 6 more than twice a number is 33. What is the number?

$$\begin{array}{r} 6 + 2x = 33 \\ -6 \quad -6 \\ \hline 2x = 27 \end{array}$$

$$\frac{2x}{2} = \frac{27}{2}$$

$$x = 13.5$$

47. A video game that normally sells for \$52 is on sale for \$40. What is the percent of discount for the sale price?

$$\frac{52-40}{52} = \frac{12}{52} = .2307$$

23%

PART 2

Directions: Answer all questions in this part. Clearly show all work, including all formulas to receive full credit.

1. Jason bought 6 pencils for \$2.39 each. He had a coupon for 15% off. The sales tax was 8.36%. Find the total cost of the 6 pencils after the discount and sales tax are applied.

$$2.39(6) = 14.34$$

$$14.34(.85) = 12.19$$

$$12.19(1.0836) = 13.209084$$

\$13.21

2. Calculate the area of the shaded region.

parallelogram

$$A = bh$$

$$A = 8(11)$$

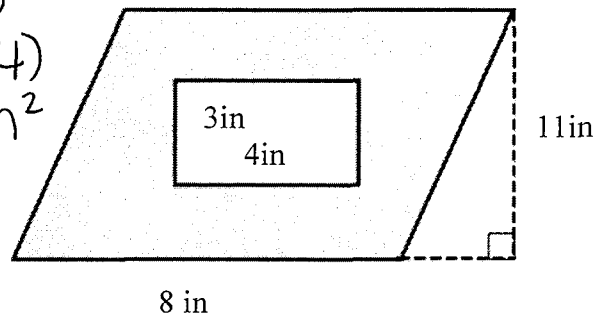
$$A = 88 \text{ in}^2$$

Rect

$$A = lw$$

$$A = 3(4)$$

$$A = 12 \text{ in}^2$$



$$88 - 12 = 76$$

$$76 \text{ in}^2$$

3. Aubrey wants to join a movie program to receive new movies each month. There is an initiation fee of \$25.99 and each month of membership costs \$12.50. If Aubrey pays \$138.49, write and solve an equation to determine how long his membership will last. Let $x = \#$ of months

$$12.50x + 25.99 = 138.49$$

$$\begin{array}{r} - 25.99 \\ \hline 12.50x = 112.5 \end{array}$$

$$\frac{12.50x}{12.50} = \frac{112.5}{12.50}$$

$$x = 9$$

9 months

4. Juan's cell phone company charges \$35 a month for phone service plus \$0.50 for each text message. How many text messages does Juan send in a month if his bill was \$52?

$L + x = \# \text{ of text messages}$

$$\begin{array}{r}
 50x + 35 = 52 \\
 -35 \quad -35 \\
 \hline
 5x = 17 \\
 \cdot 5 \quad \cdot 5 \\
 \hline
 x = 34
 \end{array}$$

34 text messages

5. Sam is painting a box to place on the table for decoration. The box is a rectangular prism with edges measuring 15cm, 20cm, and 10cm. What is the surface area of the box?

Front & Back

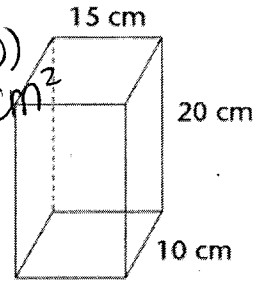
$$\begin{aligned}
 A &= lW \\
 A &= 15(20) \\
 A &= 300\text{cm}^2
 \end{aligned}$$

Top & Bottom

$$\begin{aligned}
 A &= lW \\
 A &= 15(10) \\
 A &= 150\text{cm}^2
 \end{aligned}$$

Sides

$$\begin{aligned}
 A &= lW \\
 A &= 20(10) \\
 A &= 200\text{cm}^2
 \end{aligned}$$



$$\begin{aligned}
 SA &= 300 + 300 + 150 + 150 + 200 + 200 \\
 SA &= 1300\text{cm}^2
 \end{aligned}$$

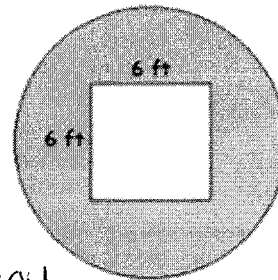
6. Calculate the area of the shaded region.

Circle

$$\begin{aligned}
 A &= \pi r^2 \\
 A &= \pi 7^2 \\
 A &= 153.93804\text{ft}^2
 \end{aligned}$$

Square

$$\begin{aligned}
 A &= s^2 \\
 A &= 6^2 \\
 A &= 36\text{ft}^2
 \end{aligned}$$



$$\begin{aligned}
 d &= 14 \\
 r &= 7
 \end{aligned}$$

$$\begin{aligned}
 153.93804 - 36 &= 117.93804 \\
 117.9
 \end{aligned}$$

7. Jonathan counted the people that entered a children's soccer game. On the first day, 18 out of 23 people were men.

- a) What is the experimental probability that a person entering the soccer game will be a man, in simplest form?

$$\frac{18}{23}$$

- b) If 580 people enter a soccer field, how many people should Jonathan expect to be men?

$$\frac{18}{23} = \frac{x}{580}$$

$$\frac{23x}{23} = \frac{10440}{23}$$

$$x = 453.9130435$$

454 men

8. The following data shows the test scores for two different classes:

Class A	Class B
72	57
76	65
80	83
80	94
81	95
83	96
84	98
85	93
85	71
89	63

(a) Find the mean

CLASS A = 81.5

CLASS B = 81.5

(b) Find the median for each class.

CLASS A = 82

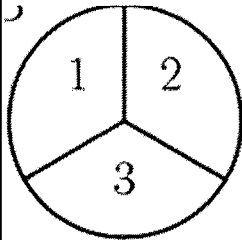
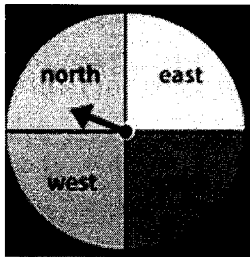
CLASS B = 88

57, 63, 65, 71, 83 ↑
83 → 82
83, 84, 85, 94, 98

(c) Write a statement comparing the test scores for Class A to the test scores for Class B.

- CLASS B has a higher median than CLASS A (by 6 points)
- CLASS B has higher test scores
- CLASS B has a greater spread of data.

9.



(a) Draw a tree diagram or list the sample space to find the total number of outcomes if each spinner is spun once.

North $\leftarrow \frac{1}{3}$

South $\leftarrow \frac{1}{3}$

East $\leftarrow \frac{1}{3}$

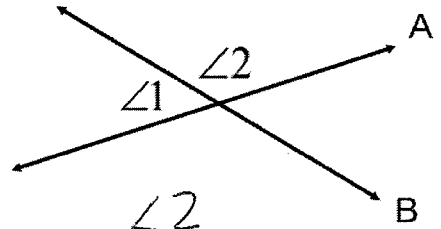
West $\leftarrow \frac{1}{3}$

(b) How many possible outcomes there are if each spinner is spun once? 12

(c) Find P(north or south, 3) $\frac{2}{12} = \frac{1}{6}$

10. Line A intersects Line B. If $m\angle 1 = (x - 4)^\circ$ and $m\angle 2 = (2x + 50)^\circ$ find:

- (a) the value of x 44.7
 (b) The measure of angle 1 40.7°
 (c) The measure of angle 2 139.4



Only an algebraic solution will be accepted.

$$\begin{aligned} x - 4 + 2x + 50 &= 180 \\ 3x + 46 &= 180 \\ -46 \quad -46 & \\ \hline 3x &= 134 \\ \frac{3x}{3} &= \frac{134}{3} \\ x &= 44.7 \end{aligned}$$

$$\begin{aligned} \angle 1 \\ x - 4 \\ 44.7 - 4 \\ 40.7 \end{aligned}$$

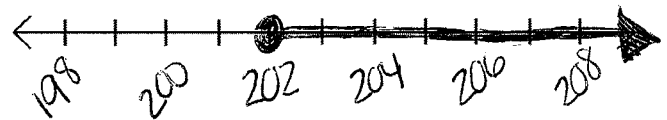
$$\begin{aligned} \angle 2 \\ 2x + 50 \\ 2(44.7) + 50 \\ 139.4 \end{aligned}$$

11. The soccer team needs to score at least 300 points this season to set a new school record. They have already scored 98 points. Write an inequality to represent this situation, solve the inequality, and then graph the solution on the number line.

(a) Write an inequality: $x + 98 \geq 300$

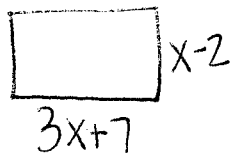
(b) Solve the inequality:
$$\begin{aligned} x + 98 &\geq 300 \\ -98 \quad -98 & \\ \hline x &\geq 202 \end{aligned}$$

(c) Graph the solution on the number line:



10. A rectangle has side lengths $(3x + 7)$ and $(x - 2)$.

(a) Write an expression that represents the perimeter of the rectangle. Express your answer in simplest form.



$$\begin{aligned} 3x + 7 + 3x + 7 + x - 2 + x - 2 \\ 8x + 10 \end{aligned}$$

(b) Factor the expression you found in part a.

$$\begin{array}{r} 2 \overline{) 8x + 10} \\ 4x + 5 \end{array}$$

$$2(4x + 5)$$