1) A person picks one card and then 1 coin from the group above. How many different combinations are possible? 

24

2) A right triangular prism is shown above. If the area of the shaded rectangle is 793, what is the value of x to the nearest tenth?

First find the length (L) of the rectangle.

Area_{rectangle} = \text{length} \cdot \text{width}

793 = 13L

L = 61

Now find x with Pythagorean Theorem:

\[ x^2 + 57^2 = 61^2 \]

\[ x^2 + 3249 = 3721 \]

\[ x^2 = 472 \]

\[ x = \sqrt{472} \approx 21.7 \]
3) Which of the following is equivalent to $16x^2$? Choose all correct answers.

- a) $10x^2 + 9x^2 - 3x^2$

- b) $(2x)(8x)$

- c) $\frac{48x^3}{3x}$

- d) $10x^2 + 9x^2 - 3x^2 = 19x^2 - 3x^2 = 16x^2$

- e) $(2x^1)(8x^1) = 16x^2$ (add the exponents)

- f) $\frac{48x^3}{3x^1} = 16x^2$ (subtract the exponents)

4) A company has a budget of $250$ million dollars. If employee salaries are represented by a 225 degree central angle in a circle graph of the budget, how much is budgeted for employee salaries (in millions of dollars)?

- a) $156.25$

- b) $\frac{225^\circ}{360^\circ} = .625$

- c) $.625(250) = 156.25$

5) The circumference of a circular rug is $97.3$ in. What is the approximate diameter of the rug?

- d) $31$

- e) Circumference $= d \cdot \pi$

- f) $97.3 = 3.14d$

- g) $d = 30.987$

- h) $d \approx 31$
6) \( \frac{3}{5} \) is less than which of the following?

\[
\frac{3}{5} = .60 \text{ which is less than } \frac{2}{3} = .67 \quad \text{d) } \frac{2}{3}
\]

7) A packet contains 8 cups. On the packet, it states that a serving is 3/2 cup. How many servings are in the packet? Write your answer as a fraction.

\[
8 \text{ cups divided by } \frac{3}{2} \text{ cup per serving:} \\
8 \div \frac{3}{2} = \frac{8 \cdot 2}{1 \cdot 3} = \frac{16}{3}
\]

8) What is the greatest common divisor of 855 and 1575?

\[
\text{d) } 45 \quad \text{Find the greatest (largest) number in the list that will go into 855 and 1575 evenly (no remainder).} \\
\frac{855}{45} = 19 \quad \frac{1575}{45} = 35
\]
9) Given the right triangle above, what are the possible values of $a$ and $b$?

b) 15  20

\[
\begin{array}{c}
3 - 4 - 5 \\
x5 \quad x5 \quad x5 \\
15 - 20 - 25
\end{array}
\]

10) Two right cones have the same height. If the radius of cone A is 3/4 the radius of cone B, what is the ratio of the volumes of cone A to cone B? The formula for volume of a cone is $\frac{1}{3} \pi r^2 h$.
Express your answer as a fraction.

\[
\text{Cancel the } \frac{1}{3}, \text{ the } \pi, \text{ and the } h \text{ since they are the same in both.}
\]

\[
\begin{align*}
\text{Volume } A &= \frac{1}{3} \pi r_A^2 h \\
\text{Volume } B &= \frac{1}{3} \pi r_B^2 h
\end{align*}
\]

\[
\frac{\text{Volume } A}{\text{Volume } B} = \frac{r_A^2}{r_B^2}
\]

Since the radius of A is 3/4 the radius of B, we can call them 3/4 and 1.

\[
\begin{align*}
\frac{V_A}{V_B} &= \left(\frac{3}{4}\right)^2 \\
&= \frac{3 \cdot 3}{4 \cdot 1} \\
&= \frac{9}{16} \\
&= \frac{9}{16}
\end{align*}
\]
11) If the measure of angle p is 123 degrees, what is the measure of angle q?

\[ q = 72 \]

Two angles that form a straight line have a sum of 180.
\[ 108 + q = 108 \]
\[ q = 72 \]

12) John bought $49.56 worth of purchases at his local Target. If he gave the clerk a $50 bill, what is the minimum number of coins (quarters, dimes, nickels, and pennies) he can receive in change?

\[ $50 - $49.56 = .44 \text{ or } 44 \text{ cents in change.} \]

1 quarter: 44 cents – 25 cents = 19 cents
1 dime: 19 cents – 10 cents = 9 cents
1 nickel: 9 cents – 5 cents = 4 cents
4 pennies: 4 cents
1 quarter, 1 dime, 1 nickel, and 4 pennies = 7 coins

13) The chart above shows the number of raffle tickets bought by seventy-five patrons of a fair. Approximately what percent of the 75 people bought fewer than 4 tickets?

c) 41
14) Which shows the numbers above in order from smallest to largest?

\[
\frac{1}{9}, \left(\frac{1}{9}\right)^2, (-9)^2
\]

e) \(\left(\frac{1}{9}\right)^2, \frac{1}{9}, (-9)^2\)

\[
\frac{1}{81} < \frac{1}{9} < 81
\]

15) \(30 \left(\frac{3x}{5} - \frac{1}{6}\right) = \) ?

\[
30 \left(\frac{3x}{5} - \frac{1}{6}\right) \\
= 90 \cdot \frac{3x}{5} - 30 \cdot \frac{1}{6} \\
= 18x - 5x \\
= 13x
\]

16) A number “n” is squared. Then the result is multiplied by 8. Next, the result is divided by 68. If the number that results is 34, then what is the value of n?

\[
\frac{n^2 \cdot 8}{68} = 34 \\
8n^2 = 2312 \\
n^2 = 289 \\
n = \sqrt{289} \\
n = 17
\]
17) Josh says he is 70 units tall. Which of the following could be the units?

c) in.

70 inches divided by 12 inches in a foot = 5.8 ft. tall. This is a normal height.

18) The volume of a rectangular solid is 1200. If the height of the solid is 8 and the width is 10, what is the length?

\[
\begin{align*}
\text{Volume} &= L \cdot W \cdot H \\
1200 &= L(10)(8) \\
1200 &= 80L \\
15 &= L
\end{align*}
\]

19) In a Spanish class of 48 students, the probability of a female (girl) student being called on is 7/16. How many boys are in the class?

\[
\begin{align*}
\frac{7}{16} &= \frac{\text{number of girls}}{\text{total}} \\
7 &= G \\
16 &= 48 \\
16G &= 336 \\
G &= 21 \\
48 - 21 &= 27 \text{ boys}
\end{align*}
\]
20) Which numbers can replace the blanks above to make the statement true? Choose all correct answers.

- a) \( \frac{15}{8}, \frac{5}{2} \)
- b) \( \frac{3}{2}, 2 \)

a) \( \frac{15 \div 5}{8 \div 2} = \frac{15 \cdot 2}{8 \cdot 5} = \frac{30}{40} = \frac{3}{4} \)

b) \( \frac{3 \div 2}{1 \div 1} = \frac{3 \cdot 1}{2 \cdot 2} = \frac{3}{4} \)

c) \( 4 \div 3 = \frac{4 \cdot 1}{1 \cdot 3} = \frac{4}{3} \) not \( \frac{3}{4} \)

21) If 300 people polled out of a group of 520 said they would vote for Hillary, then approximately how many people out of a group of 1550 would be expected to vote for Hillary?

\[
\frac{\text{people vote for Hillary}}{300} = \frac{\text{people vote for Hillary}}{1550} \Rightarrow 520 \cdot x = 1550 \cdot 300 \Rightarrow x = 465000 \Rightarrow x \approx 894
\]

22) To solve the equation \( 19x - 3 = 24 \), the first step should be:

a) Add 3 to both sides of the equation.
23) If 17 children and 8 adults spent $1,235 at a fair and \( c \) represents the cost of a child’s ticket, which of the following would represent the cost of an adult ticket?

**b)** \( \frac{1235 - 17c}{8} \)

Let \( a \) = cost of an adult ticket
Let \( c \) = cost of child ticket
Solve for \( a \):

\[
17c + 8a = 1235 \\
8a = 1235 - 17c \\
a = \frac{1235 - 17c}{8}
\]

24) If 25 cupcakes can be made in \( \frac{2}{3} \) hour, how many hours will it take to make 200 cupcakes at the same rate?

**c)** 5.3

\[
\frac{\text{cupcakes}}{\text{hours}} = \frac{\text{cupcakes}}{\text{hours}} \\
\frac{25}{2/3} = \frac{200}{x} \quad \text{cross-multiply} \\
25x = \frac{2}{3}(200) \\
25x = 133.33 \\
x = 5.3
\]

25) Which of the following is true?

**d)** \( 4 < \sqrt[3]{70} < 5 \)

Raise everything to the 3rd power until you find one that is true.

\( (4)^3 < (\sqrt[3]{70})^3 < (5)^3 \)

\( 64 < 70 < 125 \)
26) Given the numbers 25, 28, 31, 35, and 37. If 24 is added as the sixth number, which of the following will be true?

**e) The mean will decrease and the range will increase.**

Adding in a number lower than all the rest will decrease the mean (average). The range will change from 37 – 25 to 37 – 24. Therefore, the range will increase. You don’t really need to calculate the mean or the range to answer the question.

27) The graph above shows the rainfall for 5 days. How many days were below the average of the five days?

**c) 3**

\[
\frac{2.5 + 2.5 + 2.6 + 3.2 + 3.0}{5} - \frac{13.8}{5} = 2.76 \text{ average}
\]

There are 3 days that are below 2.76.
28) If the sum of the numbers in column A is equal to the sum of the numbers in row B, then find the value of Y.

\[
\begin{align*}
12 + 5 + x + 1 + 2 &= 6 + 9 + X + Y + 3 \\
20 + X &= 18 + X + Y \\
20 &= 18 + Y \\
2 &= Y
\end{align*}
\]
Subtract X from both sides.

29) Which of the following is the graph of \(3x + y = 3\)?

If \(x = 0\), \(y = 3\).
If \(y = 0\), \(3x = 3\)
\(x = 1\)
So the intercepts are \((0,3)\) and \((1,0)\)

30) Jake found the area of a rectangle to be 9 square feet. What is that equal to in square inches?

\[
9 \text{ square feet} \times \frac{144 \text{ sq. inches}}{\text{square foot}} = 1296 \text{ sq. ft.}
\]
31) Solve for x: \[ 2(3x - 1) - 2(-5x + 1) = 10 \]
\[ 6x - 2 + 10x - 2 = 10 \]
\[ 16x - 4 = 10 \]
\[ 16x = 14 \]
\[ x = \frac{14}{16} = \frac{7}{8} \]

32) The expression \(2T + 3P + 1D\) represents the total cost of a purchase. If \(T\) represents the number of rolls of toilet paper, \(P\) represents the number of rolls of paper towels, and \(D\) represents the number of boxes of dryer sheets, what does the 3 represent?

C) cost of a roll of paper towels

33) What is the median of the following numbers?
6, 0, 3, 9, 14, 11, 13

Put the numbers in order.
0, 3, 6, 9, 11, 13, 14
The median is the middle number when the numbers are in order. Median = 9

34) A house value increased from $140,000 to $210,000. What is the percent increase?

\[
\frac{210000 - 140000}{140000} = \frac{70000}{140000} = \frac{x}{100}
\]
\[ \frac{1}{2} = \frac{x}{100} \]
\[ 2x = 100 \]
\[ x = 50 \]
35) A store sold 8 Cokes for every 3 Sprites in a day. Which of the following could be the total number of Cokes and Sprites sold that day?

\[8x + 3x = 11x\]

So, the total must be a multiple of 11. Choice e) 341 is the only number that 11 goes into evenly.

e) 341

\[2, 3, 5, 9, 11, 15, 18, 21\]

36) If a number is picked at random from the list above, what is the probability that the number will be prime? Express your answer as a fraction.

\[2, 3, 5 \text{ & 11 are prime numbers}\]

\[P_{\text{prime}} = \frac{\# \text{ of primes}}{\text{total}} = \frac{4}{8} = \frac{1}{2}\]

37) In the sequence 6, 20, 62, 188, x, ... each number is two more than three times the preceding number. What is the value of x?

\[188(3) + 2 = 566\]

\[566\]
38) This is a table showing the number of zebras in Uganda at the end of each year.

<table>
<thead>
<tr>
<th>Year</th>
<th>Zebras</th>
</tr>
</thead>
<tbody>
<tr>
<td>1989</td>
<td><img src="image" alt="Zebras" /></td>
</tr>
<tr>
<td>1990</td>
<td><img src="image" alt="Zebras" /></td>
</tr>
<tr>
<td>1991</td>
<td><img src="image" alt="Zebras" /></td>
</tr>
<tr>
<td>1992</td>
<td><img src="image" alt="Zebras" /></td>
</tr>
</tbody>
</table>

If the number of zebras in Uganda at the end of 1990 was 160, then how many more zebras were there in 1992 than in 1991?

Since 4 zebra pictures = 160 zebras, then each picture = 160/4 = 40.

1992 = 6 zebra pictures = 6(40) = 240 zebras
1991 = 4.5 zebra pictures = 4.5(40) = 180 zebras

39) A path is made up of ten identical trapezoidal stones. If the dimensions of one stone are as follows, find the area of the entire set of stones.

![Trapezoid](image)

\[
\text{Area}_{\text{trapezoid}} = \frac{1}{2} h(b_1 + b_2)
\]

\[
A = \frac{1}{2} (12)(16 + 22) = 6(38) = 228
\]

Since there are 10 stones we multiply 228 by 10 = 2280.
40) What is the difference between the greatest amount of type B fertilizer and the least amount of type A sold during the week?

\[ \text{The greatest amount of type B (white) is 35.} \]

\[ \text{The least amount of type A (black) is 15.} \]

\[ 35 - 15 = 20 \]

c) \[ 20 \]

41) Given the side of each square above is \( x \).
Which shows the area of the shaded region if each side of each square is increased by 2?

\[ \text{a) } 5000 - 3(x + 2)^2 \]

The area of the large black rectangle is \( 200(25) = 5000 \).

The shaded region can be obtained by subtracting the area of the 3 squares from the area of the rectangle.

Each of the 3 new squares will have a side of \( (x + 2) \) and so will have an area of \( (x + 2)^2 \).

\[ \text{Answer: } 5000 - 3(x + 2)^2 \]
42) The figure above consists of nine squares of side 2. What is the shortest distance from A to B?

\[ a) \ 2\sqrt{10} \]

43) Find the approximate volume of the cone above. \[ V = \frac{1}{3} \pi r^2 h \]

\[ c) \ 198\pi \]

First we have to find the height.

\[ h^2 + 7^2 = 14^2 \]
\[ h^2 + 49 = 196 \]
\[ h^2 = 147 \]
\[ h = \sqrt{147} \approx 12.1 \]

\[ V = \frac{1}{3} \pi r^2 h \]

\[ V = \frac{1}{3} (\pi) (7)^2 (12.1) \]

Leave \( \pi \) alone!

\[ V \approx 198\pi \]
44) What is $1.23 \times 10^{13}$ multiplied by 450?

\[
1.23 \times 10^{13} \times 450 = 553.5 \times 10^{13} = 5.54 \times 10^{15}
\]

d) $5.54 \times 10^{15}$

45) If you can travel 30 miles in 3/4 hour, how long will it take you to travel 50 miles traveling at the same rate?

\[
\begin{align*}
\frac{\text{miles}}{\text{hours}} &= \frac{\text{miles}}{\text{hours}} \\
\frac{3}{4} &= .75 \\
30 &= \frac{50}{.75} \\
30x &= 37.5 \\
x &= 1.25 = 1\frac{1}{4}
\end{align*}
\]

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

46) Candice, Teri, and Katherine decided to go out to lunch. The menu of sandwiches that they had to choose from is listed below. Each person chose a different sandwich.

<table>
<thead>
<tr>
<th>Sandwich</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>BLT</td>
<td>6.50</td>
</tr>
<tr>
<td>Salami</td>
<td>6.50</td>
</tr>
<tr>
<td>Turkey</td>
<td>7.00</td>
</tr>
<tr>
<td>Grilled Cheese</td>
<td>6.75</td>
</tr>
<tr>
<td>Egg Salad</td>
<td>6.25</td>
</tr>
</tbody>
</table>

Which of the following could not be the total of the three sandwiches?

\[
\text{In order to end in .50, we would need to order one of the $6.50 sandwiches and then the $6.75 and $6.25 sandwiches. This adds up to $19.50. There is no way to get a total of 3 sandwiches to equal $20.50.}
\]

\[
e) \ $20.50
\]
47) Jennifer deposits $3,600 in her bank. It is all in tens and twenties. If \( z \) represents the number of ten dollar bills, which of the following represents the number of twenty dollar bills?

\[
\text{Let } \ t = \# \text{ of twenty dollar bills} \\
10t + 20z = 3600 \quad \text{Solve for } t \\
10t = 3600 - 20z \\
\frac{t}{10} = \frac{3600 - 20z}{10}
\]

\[c) \quad \frac{3600 - 20z}{10}\]

48) If \( 3x + 5y = 21 \) and \( y = 4 \), find \( x \). Express your answer as a fraction.

\[
\text{Replace } y \text{ with 4:} \\
3x + 5y = 21 \\
3x + 5(4) = 21 \\
3x + 20 = 21 \\
3x = 1 \\
x = \frac{1}{3}
\]

49) Where does \( \sqrt{6} \) lie on the number line?

\[\text{a) between W and X}\]

\[
\sqrt{6} \approx 2.4 \\
\frac{11}{5} = 2.2 \quad \text{and} \quad \frac{35}{11} = 3.2
\]

So, \( \sqrt{6} \) lies between \( W \) and \( X \).
50) Five hundred and thirty salmon were taken from a lake and tagged. Several weeks later, 100 salmon were caught and 20 of them were found to be tagged. What is the best estimate of the number of salmon in the lake?

\[
\frac{\text{salmon tagged}}{\text{tagged}} = \frac{x}{530}
\]

\[
\frac{100}{20} = \frac{x}{530}
\]

\[
20x = 53000
\]

\[
x = 2650
\]

d) 2650

51) Solve for \(x\):

\[
\sqrt{x - 0.9} - 21 = 5
\]

\[
\sqrt{x - 0.9} = 26
\]

\[
(\sqrt{x - 0.9})^2 = (26)^2
\]

\[
x - 0.9 = 676
\]

\[
x = 676.9
\]

52) A car was originally sold for $32,085. After 6 years, it is now worth $9,300. What is the ratio of the original cost to its current value?

\[
\frac{\text{original cost}}{\text{current value}} = \frac{32085}{9300} = 3.45
\]

d) 3.45

53) For every 5 hamburgers Randy put on the grill, he put on 6 hotdogs. Which could be the total number of hamburgers and hotdogs he put on the grill?

b) 22

\[
5 + 6 = 11 \text{ so the total must be a multiple of 11. Choice b) 22 is the only multiple of 11.} 
\]
54) In the triangle above, which of the following could be the value of x?
Choose all correct answers.

- b) 5
- c) 18
- d) 27
- e) 38

The third side of a triangle must be between the difference and the sum of the other two sides.

\[21 - 18 < x < 21 + 18\]
\[3 < x < 39\]
The third side must be between 3 and 39.

55) Which of the following represents a function?
Choose all correct answers.

- a) [Diagram]
- b) [Diagram]
- c) [Diagram]

To be a function, the x-value can't be repeated.
In choice d we have (8,0) and (8,11).
In choice e we have (7,1) and (7,5).

56) Solve the inequality for x. Choose all correct answers.

\[-3x + 7 < -26\]
\[-3x < -33\] Divide by -3 and reverse the symbol!
\[x > 11\]
The choices that are greater than 11 are c, d, and e.