1

In a farm, there are 30 rabbits of two sizes "small and big" and three colors "white, brown, and gray" as shown in the table below.

Color / Size	White	Brown	Gray
Small	4	4	6
Big	10	2	4

One rabbit is selected at random from this farm.

Suppose that the selected rabbit is not of white color, what is the probability for this rabbit to be from the big size?

A. $\frac{3}{5}$
B. $\frac{3}{7}$
C. $\frac{3}{8}$
D. $\frac{16}{30}$

Prob. = Part / Total = $\frac{2+4}{4+6+2+4}$ = $\frac{6}{16}$ = $\frac{3}{8}$

2

In a bag, there are 12 identical tokens numbered from 1 to 12. A token is drawn at random. What is the probability to obtain an even multiple of 3?

A. $\frac{1}{4}$
B. $\frac{1}{3}$
C. $\frac{1}{2}$
D. $\frac{1}{6}$

0, 3, 6, 9, 12, 15, ...

Part / Total = $\frac{2}{12}$ = $\frac{1}{6}$

3

In a farm, there are 30 rabbits of two sizes "small and big" and three colors "white, brown, and gray" as shown in the table below.

Color / Size	White	Brown	Gray
Small	4	4	6
Big	10	2	4

One rabbit is selected at random from this farm.

What is the probability that the selected rabbit is white?

A. $\frac{4}{14}$
B. $\frac{7}{15}$
C. 1
D. $\frac{10}{30}$

Part / Total = $\frac{4+10}{30}$

4

In a bag there are 14 identical tokens numbered from 0 to 13. A token is drawn at random. What is the probability to obtain an odd multiple of 3?

A. $\frac{3}{14}$
B. $\frac{2}{5}$
C. $\frac{1}{7}$
D. $\frac{2}{13}$

0, 3, 6, 9, 12, 15, 18, ...

Part / Total = $\frac{2}{14}$ = $\frac{1}{7}$

5

Ice Cream and Topping Selections

		Flavor	
		Vanilla	Chocolate
Topping	Hot fudge	8	6
	Caramel	5	6

The table above shows the flavors of ice cream and the toppings chosen by the people at a party. Each person chose one flavor of ice cream and one topping. Of the people who chose vanilla ice cream, what fraction chose hot fudge as a topping?

$\frac{\text{Part}}{\text{Total}} = \frac{8}{8+5}$

A) $\frac{8}{25}$

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

C) $\frac{13}{25}$

D) $\frac{8}{13}$

6

Employees at the PQM Corporation

Specialist level	Salary grade A	B	C	Total
I	10	1	0	11
II	6	10	8	24
III	0	6	15	21
Total	16	17	23	56

What fraction of employees who are level II specialists are in either salary grade B or C?

$\frac{\text{Part}}{\text{Total}} = \frac{10+8}{24} = \frac{3}{4}$

7

Class	Native continent: Australia	Africa
Mammals	8	6
Reptiles	9	17
Birds	27	23

The table above shows the numbers of animals classified by class and native continent for all 90 animals at a local zoo. What fraction of the reptiles are native to Australia?

$\frac{\text{Part}}{\text{Total}} = \frac{9}{9+17}$

A) $\frac{1}{10}$

B) $\frac{9}{44}$

C) $\frac{13}{45}$

D) $\frac{9}{26}$

8

Number of Flight Arrivals at Centerville Airport in a Month

	On time	Delayed	Total
Airline A	2,029	861	2,890
Airline B	1,150	700	1,850
Total	3,179	1,561	4,740

Based on the table above, what fraction of the flights for Airline A were delayed?

A. $\frac{700}{1,850}$

B. $\frac{861}{1,561}$

C. $\frac{861}{2,890}$

D. $\frac{2,029}{2,890}$

$\frac{\text{Part}}{\text{total}} = \frac{861}{2890}$

$\frac{n}{2} + \frac{1}{2}$

$\frac{7}{2} + \frac{1}{2} = 4$

1

Data Set A	11.54	23.06	32.52	7.72	15.13	15.77	34.20
Data Set B	25.20	8.39	15.19	6.48	12.83	13.30	13.60

A complete list of values for each of two separate data sets is shown in the table above. What is the positive difference between the median of Data Set A and the median of Data Set B?

15.77 − 13.30 = 2.47

2

The bar graph below shows the age distribution of the employees in a multi-branched bank.

In which interval does the median age lie?

A. [20;30[
B. [30;40[
C. [40;50[
D. [50;60[

3

137, 163, 115, 137, 179, 155, 171

A geologist recorded the heights, in feet, of a geyser's eruptions over a twelve-hour period. The heights are given in the list above. What is the median height recorded by the geologist?

A) 115
B) 137
C) 151
D) 155

4

Number of States with 10 or More Electoral Votes in 2008

Electoral votes	Frequency
10	4
11	4
12	1
13	1
15	3
17	1
20	1
21	2
27	1
31	1
34	1
55	1

In 2008, there were 21 states with 10 or more electoral votes, as shown in the table above. Based on the table, what was the median number of electoral votes for the 21 states?

A) 13
B) 15
C) 17
D) 20

5

The above bar chart shows the scores of a philosophy test over 100.

What is the range of the scores?

A. 40
B. 3
C. 10
D. 20

90 − 50 = 40

6

The table below shows the distance Amir walked every day during the first week of April, 2021.

	Distance (in m)
Thursday, April 1st	1678
Friday, April 2nd	2091
Saturday, April 3rd	1245
Sunday, April 4th	1566
Monday, April 5th	2100
Tuesday, April 6th	1989
Wednesday, April 7th	1888

What is the average (arithmetic mean) of the data shown in the table?

A. 2511.4
B. 1888
C. 1793.9
D. 1672.5

Mean = Sum / no

7

The graph above shows the number of push-ups Bob did last week.

What was the average number of push-ups?

8

Gold is one of the most important items in the world. Its price increases and decreases every day. The average closing price for the past 8 years is shown in the table below.

Year	Average Closing Price ($)
2020	1,771.9
2019	1,393.34
2018	1,268.93
2017	1,251.92
2016	1,158.86
2015	1,266.06
2014	1,409.51
2013	1,668.86

What is the mean of the average closing price of the last 5 years according to the given table?

A. 1,137.2
B. 1,351.82
C. 1,368.99
D. 1,622.18

9

A survey is done on 80 families from two cities **A** and **B**, separated into groups based on the number of cars they own. The results are shown in the table below.

Number of cars	City A	City B
45 = 1 X 45	= 25	+ 20
100 = 2 X 50	= 31	+ 19
111 = 3 X 37	= 14	+ 23
80 = 4 X 20	= 8	+ 12
40 = 5 X 8	= 2	+ 6

What is the mean number of cars owned by citizens in both cities A & B combined?

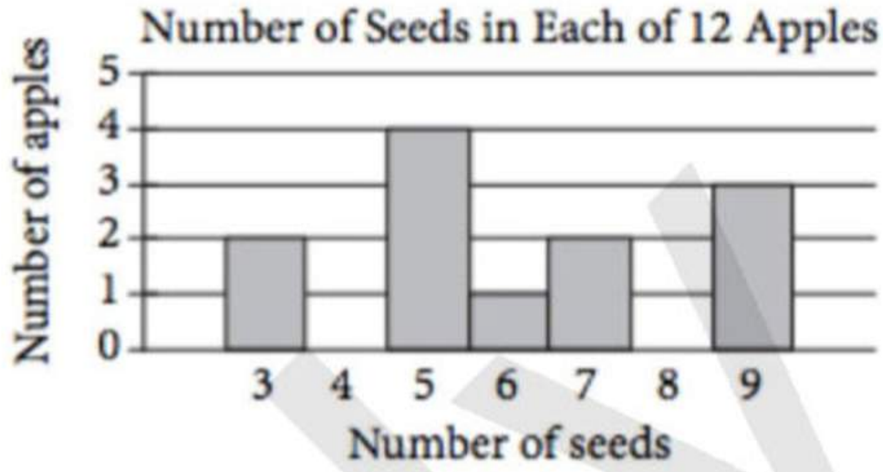
A. Between 1 and 2
B. Between 2 and 3
C. Between 3 and 4
D. Between 4 and 5

Mean = $\frac{\text{Sum}}{\text{no}}$

$= \frac{45+100+111+80+46}{86+80}$

$= 2.3$

10



Based on the histogram above, of the following, which is closest to the average (arithmetic mean) number of seeds per apple?

A) 4
B) 5
C) 6
D) 7

1

What is the abscissa of the vertex of the function $f(x) = 3x^2 - 18x + 4$? (grid-in)

(x, y)

x_v axis of symm

y_v ordinate

abscissa

$-\frac{b}{2a}$

$x_v = -\frac{b}{2a}$

$= \frac{+18}{2(3)}$

$= \frac{18}{6}$

$= 3$

$a = 3$

$b = -18$

$c = 4$

2

Employees at the PQM Corporation

Specialist level	Salary grade			
	A	B	C	Total
I	10	1	0	11
II	6	10	8	24
III	0	6	15	21
Total	16	17	23	56

What fraction of employees who are level II specialists are in either salary grade B or C?

$\frac{\text{Part}}{\text{Total}} = \frac{10+8}{24} = \frac{3}{4}$

3

We survey 125 employees at random from each of two companies labeled **A** and **B**, and separated into groups based on how many siblings do they have. The results are shown in the table below.

$\frac{n}{2} + \frac{1}{2}$

$\frac{125}{2} + \frac{1}{2}$

$= 63$

Number of siblings	Company A	Company B
0	15	25
1	45	40 = 65
2	30	25
3	25	15
4	10	20

125

80

What is the median number of siblings of the sample of employees in company B?

A. 1
B. 2
C. 3
D. 4

4

If the speed of an airplane is now 127% of its previous speed, which of the following must also be true?

A) The speed of the airplane has increased by 27% from its previous speed.

B) The speed of the airplane has increased by 73% from its previous speed.

C) The speed of the airplane is now 127 miles per hour.

D) The speed of the airplane is now 27 miles per hour faster than its previous speed.

5

In a bag there are 14 identical tokens numbered from 0 to 13. A token is drawn at random. What is the probability to obtain an odd multiple of 3?

A. $\frac{3}{14}$
B. $\frac{2}{5}$
C. $\frac{1}{7}$
D. $\frac{2}{13}$

6

The graph above shows the number of push-ups Bob did last week.

What was the average number of push-ups?

1

Maria downloaded to her music library a total of 350 pop and rock songs. If the ratio of pop to rock song is 3 to 11. How many rock songs are there in Maria's library?

P : R : Total
3 : 11 : 14
x : 350

$\frac{11 \times 350}{14} = 275$

A. 75
B. 125
C. 175
D. 275

2

Cross X

If y varies directly as the cube of $2x$, and $y = 8$ when $x = 2$, what is y when x is equal to 4 ? (grid-in)

$y \quad (2x)^3$

$8 \quad (2 \times 2)^3$

$y \quad (2 \times 4)^3$

$\frac{8 \times (2 \times 4)^3}{(2 \times 2)^3} = 64$

3

A magazine article on video game habits in the United States reported that in 2012 gamers spent an average of 5.6 hours per week playing games. The article also reported the average for 2013 to be 6.3 hours per week. Based on the article, how did the average number of hours that gamers spent playing games per week change from 2012 to 2013?

A. It decreased by 12.5%.
B. It increased by 7.0%.
C. It increased by 11.1%.
D. It increased by 12.5%.

0

N

% change $= \frac{N - O}{O} \times 100$

$= \frac{6.3 - 5.6}{5.6} \times 100$

4

The height of a launched cannonball can be described as a function of time according to the following quadratic equation:

$$h(t) = -2t^2 + 14t + 36$$

What is the maximum height attained by the cannonball?

A. 60.5
B. 36
C. 9
D. 2

5

A local supermarket offered a discount of 15% on its items after the government raised all the prices by 25%. Overall, by what percentage were the original prices raised in this supermarket in particular?

A. 8.625%
B. 7.250%
C. 6.250%
D. 5.625%

6

How much money would you need to deposit today at 8% annual interest compounded monthly to have $10,000 in the account after 5 years?

A. $6,500.5
B. $6,680.13
C. $6,712.10
D. $5,989.3

$\frac{2}{5} + \frac{1}{5} = \frac{2+1}{5} = \frac{3}{5}$

$\frac{2}{5} \times 4 - \frac{1}{4} \times 5 = \frac{8}{20} - \frac{5}{20} = \frac{3}{20}$

$\frac{2}{5} \times \frac{1}{4} = \frac{2}{20}$

$\frac{2}{5} \div \frac{1}{4} = \frac{2}{5} \times \frac{4}{1} = \frac{8}{5}$

$\frac{x+2}{x-5}$ is undefined

Down = 0

$x - 5 = 0$

$x = 5$

Remainder of division of $x^2 - 5x + 7$ by $x - 2$

$x - 2 = 0$

$x = 2$

$R = (2)^2 - 5(2) + 7 = 1$

1

What is the remainder of the division of $k(x) = 3x^3 + 8x^2 - 2x - 7$ by x+2?

$x+2=0$

$x=-2$

$R = 3(-2)^3 + 8(-2)^2 - 2(-2) - 7$

$= 5$

2

For what values of x is

$$f(x) = \frac{2x^2 - 3}{(x-3)(2x+5)}$$ undefined?

$x-3=0$ $\quad 2x+5=0$

A. $x = 2.5$ and $x = 3$

B. $x = -2.5$ and $x = -3$

C. $x = 2.5$ and $x = -3$

D. $x = -2.5$ and $x = 3$

$x=3$

$2x=-5$

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

$x=-2.5$

3

$$y = \frac{x^3 - 3x^2 + 2x - 1}{x-3}$$

Which of the following expressions is equivalent to y?

$x-3=0$

$x=3$

$R=(3)^3-3(3)^2+2(3)-1$

$=5$

A. $y = x^2 + 2 + \frac{5}{x-3}$

B. $y = x^2 - 2x + 2 + \frac{3}{x-3}$

C. $y = x^2 - 3 - \frac{8}{x-3}$

D. $y = x^2 + 2$

4

In the polynomial function $P(x) = 3x^3 + (a-1)x + 7$, what is the value of the constant number a if -1 is a root of P?

5

What is twice the remainder of the division of $(2x^3 - 1 + 3x^2)$ by $(2x - 3)$?

A. 4.5
B. 12.5
C. 25
D. 26

6

$$\frac{2x+1}{x+3} - 1$$

What of the following is equivalent to the given expression?

A) $\frac{2x}{x+2}$

B) $\frac{2x}{x+3}$

C) $\frac{x+4}{x+3}$

D) $\frac{x-2}{x+3}$