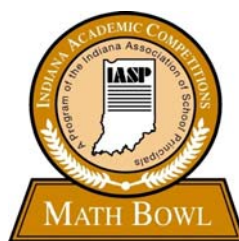


**PURDUE**  
UNIVERSITY

**Indiana Academic  
M.A.T.H. Bowl**



**AREA April 14, 2020**



2020 MATH Area Practice Round

30 seconds

$$2000 + 20 = ?$$

- A. 2,002
- B. 2,200
- C. 40,000
- D. 2,020



2020 MATH Area Practice Round

$$2000 + 20 = ?$$



D. 2,020



2020 MATH Area Round 1 Number 1

30 seconds

Simplify

$$20 + 5 \div 5 \times 80$$

- A. 1,680
- B. 400
- C. 100
- D. 16



2020 MATH Area Round 1 Number 1

Simplify

$$20 + 5 \div 5 \times 80$$

C. 100



$$\begin{aligned} 20 + 5 \div 5 \times 80 \\ 20 + 1 \times 80 \\ 20 + 80 \\ 100 \end{aligned}$$

2020 MATH Area Round 1 Number 2

30 seconds

Change  $\frac{3}{8}$  to a decimal and a percent.

- A. 0.38 and 38%
- B. 0.375 and  $37\frac{1}{2}\%$
- C. 0.392 and  $39\frac{1}{4}\%$
- D. 0.839 and 84%



2020 MATH Area Round 1 Number 2

Change  $\frac{3}{8}$  to a decimal and a percent.

B. 0.375 and  $37\frac{1}{2}\%$

$\frac{3}{8}$  means  $3 \div 8$  so  
 $\frac{3}{8} = 0.375$   
Adding a % sign moves the decimal point 2 places to the right  
 $0.375 = 37.5\%$





2020 MATH Area Round 1 Number 3

30 seconds

Farmer Brown has 20 hens. Each hen laid 5 eggs. One fourth of the eggs cracked. How many eggs did not crack?

- A. 100
- B. 96
- C. 25
- D. 75



2020 MATH Area Round 1 Number 3

Farmer Brown has 20 hens. Each hen laid 5 eggs. One fourth of the eggs cracked. How many eggs did not crack?

D. 75

$20(5) = 100$  eggs  
 $\frac{1}{4}$  of 100 = 25 cracked eggs  
 $100 - 25 = 75$  eggs not cracked



2020 MATH Area Round 1 Number 4

45 seconds

There are 6 red, 3 green, 4 blue and 2 orange marbles in a bag. What is the probability that Anaya will draw either a blue or a red marble?

- A.  $1/3$
- B.  $1/4$
- C.  $2/3$
- D.  $1/2$



2020 MATH Area Round 1 Number 4

There are 6 red, 3 green, 4 blue and 2 orange marbles in a bag. What is the probability that Anaya will draw either a blue or a red marble?



Total  $6 + 3 + 4 + 2 = 15$  marbles

Prob(blue or red)

$$\frac{4 + 6}{15}$$

$10/15$  or  $2/3$

C.  $2/3$

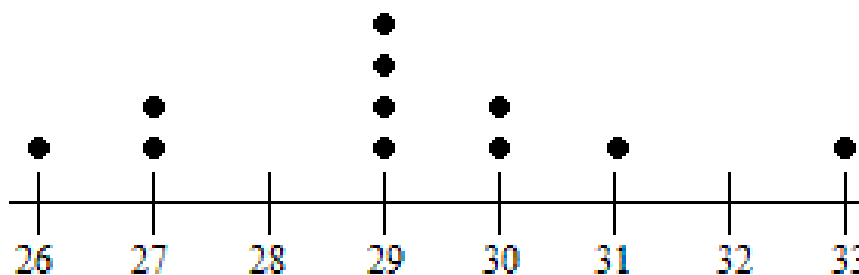
2020 MATH Area Round 1 Number 5

45 seconds

Using the information in the line plot, how many classrooms have a prime number of students in them?

Line Plot: Number of Students per Classroom

- A. 6
- B. 4
- C. 7
- D. 5

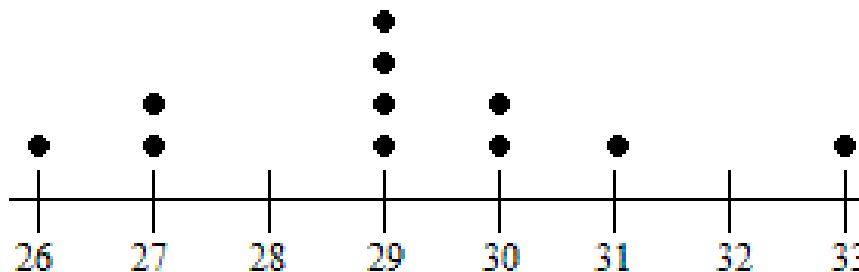


2020 MATH Area Round 1 Number 5

Using the information in the line plot, how many classrooms have a prime number of students in them?

Line Plot: Number of Students per Classroom

D. 5



Only 29 and 31 are prime numbers.

There are 4 classrooms with 29 students and 1 classroom with 31 students.

2020 MATH Area Round 1 Number 6

45 seconds

Calvin gets to choose 4 model cars from his grandfather's collection of 12 model cars. How many different combinations are possible?

- A. 48
- B. 11,880
- C. 2,970
- D. 495



2020 MATH Area Round 1 Number 6

Calvin gets to choose 4 model cars from his grandfather's collection of 12 model cars. How many different combinations are possible?

D. 495



Calvin can choose  $12 \times 11 \times 10 \times 9$  ways if order matters, or 11,880 ways.

Since order doesn't matter, each group of 4 can be chosen  $4 \times 3 \times 2 \times 1$  are 24 ways.

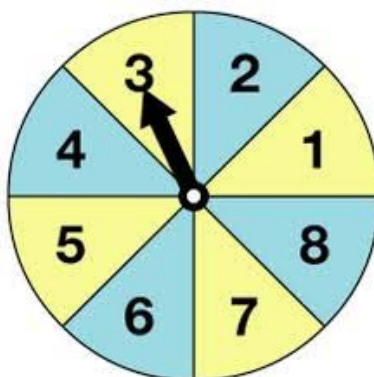
$11,880 \div 24 = 495$  combinations because order of choosing does not matter.



2020 MATH Area Round 1 Number 7

30 seconds

Using the spinner, what is the probability of spinning an even number on the first spin and then a multiple of 4 on the second spin?



- A.  $1/16$
- B.  $1/6$
- C.  $1/8$
- D.  $3/4$

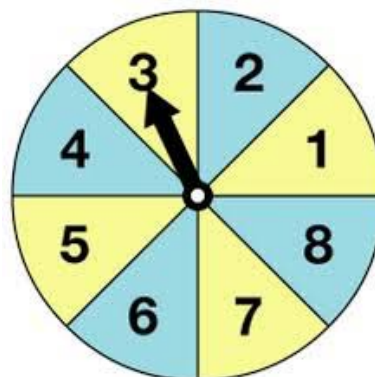
2020 MATH Area Round 1 Number 7

Using the spinner, what is the probability of spinning an even number on the first spin and then a multiple of 4 on the second spin?

C.  $1/8$

The two spins are independent events.  
Thus, we can multiply the probabilities.  
 $1/2$  of the numbers are even.  
Only 4 and 8 are multiples of 4.

$$\text{Prob}(\text{even, then 4 or 8}) = (1/2)(2/8)$$

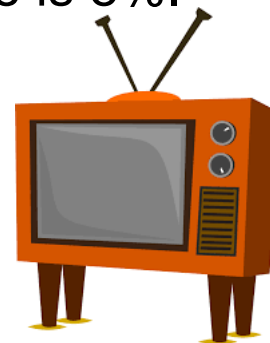


2020 MATH Area Round 1 Number 8

60 seconds

If a television that normally sells for \$180 is on sale for 15% off, what is the total price for the television including sales tax? The sales tax rate is 8%.

- A. \$122.40
- B. \$158.50
- C. \$165.24
- D. \$170.56



2020 MATH Area Round 1 Number 8

If a television that normally sells for \$180 is on sale for 15% off, what is the total price for the television including sales tax? The sales tax rate is 8%.

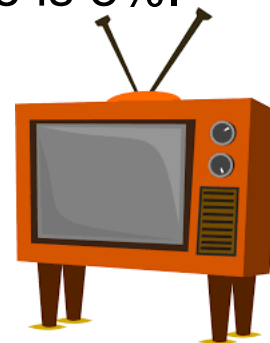
**C. \$165.24**

$$\$180(0.15) = \$27 \text{ savings}$$

$$\$180 - \$27 = \$153 \text{ sale price}$$

$$\$153(0.08) = \$12.24 \text{ sales tax}$$

$$\$153 + \$12.24 = \$165.24$$



2020 MATH Area Round 2 Number 1

30 seconds

Compare  
 $8,131,313$  ?  $8,313,131$

- A.  $<$
- B.  $>$
- C.  $=$
- D.  $\geq$



2020 MATH Area Round 2 Number 1

Compare  
 $8,131,313$  ?  $8,313,131$

A.  $<$  read “is less than”

8 million 100 thousand is less than 8 million 300 thousand.  
The hundred thousand's place is the largest place value that is different.



2020 MATH Area Round 2 Number 2

30 seconds

Find the probability of landing on a purple wedge with a prime number.

- A. 0
- B.  $\frac{1}{8}$
- C.  $\frac{1}{4}$
- D.  $\frac{5}{8}$



2020 MATH Area Round 2 Number 2

Find the probability of landing on a purple wedge with a prime number.

A. 0

The purple wedges contain the numbers 1 and 8.  
1 is neither prime nor composite.  
8 is composite with a factors of 1, 2, and 8.





2020 MATH Area Round 2 Number 3

30 seconds

Sally makes peanut butter and jelly sandwiches to sell. Each sandwich uses two slices of bread. Sally has seven loaves of bread. If each loaf contains 18 slices, how many sandwiches can she make?

- A. 18
- B. 54
- C. 60
- D. 63



2020 MATH Area Round 2 Number 3

Sally makes peanut butter and jelly sandwiches to sell. Each sandwich uses two slices of bread. Sally has seven loaves of bread. If each loaf contains 18 slices, how many sandwiches can she make?

D. 63

$18 \div 2 = 9$  sandwiches per loaf  
 $7$  loaves  $\times$   $9$  sandwiches each =  $63$  sandwiches



2020 MATH Area Round 2 Number 4

45 seconds

How much peanut butter will be needed to make 45 cookies?

- A. 2 cups
- B. 3 cups
- C.  $2 \frac{1}{2}$  cups
- D.  $3 \frac{1}{3}$  cups

### 3 ingredient cookies

1 cup peanut butter  
1 egg  
1 cup sugar

Mix and roll into balls.  
Press with a fork.  
Bake at 350°F.  
Yield 18 cookies.



2020 MATH Area Round 2 Number 4

How much peanut butter will be needed to make 45 cookies?

C.  $2 \frac{1}{2}$  cups

Peanut Butter	Number of cookies
1 cup	18
2 cups	36
$\frac{1}{2}$ cup	9
$2 \frac{1}{2}$ cups	$36 + 9 = 45$

### 3 ingredient cookies

1 cup peanut butter  
1 egg  
1 cup sugar

Mix and roll into balls.  
Press with a fork.  
Bake at 350°F.  
Yield 18 cookies.

2020 MATH Area Round 2 Number 5

30 seconds

If a loaf of bread with 18 slices costs \$2.50, how many slices can you buy for \$7.50?

- A. 18
- B. 36
- C. 54
- D. 72



2020 MATH Area Round 2 Number 5

If a loaf of bread with 18 slices costs \$2.50,  
how many slices can you buy for \$7.50?

C. 54

\$7.50 is 3 times \$2.50.  
So you can buy 3 loaves.  
18 slices per loaf (3) = 54 slices

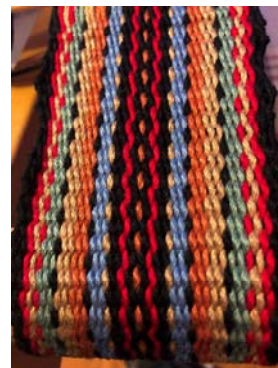


2020 MATH Area Round 2 Number 6

30 seconds

A band is made from 20 black, 7 blue, 15 tan, 8 green, and 10 red strands of yarn. What percentage of the band is made from tan strands?

- A. 15%
- B. 20%
- C. 25%
- D. 33%

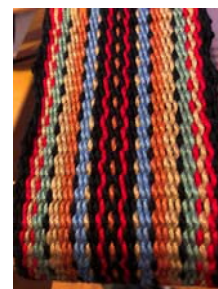


2020 MATH Area Round 2 Number 6

A band is made from 20 black, 7 blue, 15 tan, 8 green, and 10 red strands of yarn. What percentage of the band is made from tan strands?

C. 25%

$$20 + 7 + 15 + 8 + 10 = 60 \text{ total strands}$$
$$15 \text{ tan strands} \div 60 \text{ total strands} = 0.25 \text{ or } 25\%$$





2020 MATH Area Round 2 Number 7

60 seconds

Which statement is accurate based on the stem and leaf plot?

- A. Class A has a range of 14, Class B has a range of 32
- B. The range of Class A is 8 more than the range of Class B
- C. The range of Class B is 8 more than the range of Class A
- D. Class B has a larger range than Class A

Class A Leaves	Stems	Class B Leaves
8 0	6	0 0
5 0	7	0 1 3 3 5 6 7
6 4	8	4 5 6
6 4 4 2 1 0	9	1 2
0 0	10	

2020 MATH Area Round 2 Number 7

Which statement is accurate based on the stem and leaf plot?

B. The range of Class A is 8 more than the range of Class B

Class A range:  $100 - 60 = 40$   
 Class B range:  $92 - 60 = 32$

Class A Leaves	Stems	Class B Leaves
8 0	6	0 0
5 0	7	0 1 3 3 5 6 7
6 4	8	4 5 6
6 4 4 2 1 0	9	1 2
0 0	10	

2020 MATH Area Round 2 Number 8

60 seconds

Thomas is flipping a fair coin. What is the theoretical probability of flipping exactly two heads in 3 tries?

- A.  $2/3$
- B.  $3/4$
- C.  $3/8$
- D.  $1/2$



2020 MATH Area Round 2 Number 8

Thomas is flipping a fair coin. What is the theoretical probability of flipping exactly two heads in 3 tries?

There are 8 possible events for tossing a coin 3 times..

HHH  
HHT  
HTH  
HTT  
THH  
THT  
TTH  
TTT



C.  $\frac{3}{8}$

Three of those have exactly 2 heads.

2020 MATH Area Round 3 Number 1

30 seconds

Simplify:  $3/12 - 2/9$

- A.  $1/36$
- B.  $1/3$
- C.  $1/12$
- D.  $1/9$



2020 MATH Area Round 3 Number 1

Simplify:  $3/12 - 2/9$

A.  $1/36$

$3/12 - 2/9$  use LCD of 36

$9/36 - 8/36$

$1/36$



2020 MATH Area Round 3 Number 2

30 seconds

Mrs. Baker bought 9 pounds of flour. If her recipe calls for 120 ounces, how many ounces will she have left?

- A. 16
- B. 24
- C. 144
- D. 154



16 ounces = 1 pound

2020 MATH Area Round 3 Number 2

Mrs. Baker bought 9 pounds of flour. If her recipe calls for 120 ounces, how many ounces will she have left?

B. 24



$9(16) = 144$  ounces in 9 pounds  
 $144 - 120 = 24$  extra ounces

**16 ounces = 1 pound**



2020 MATH Area Round 3 Number 3

30 seconds

Using the spinner given  
find the complement of  
landing on a red space.



- A.  $1/4$
- B.  $1/2$
- C.  $5/8$
- D.  $3/4$

2020 MATH Area Round 3 Number 3

Using the spinner given  
find the complement of  
landing on a red space.

D.  $\frac{3}{4}$



There are 8 wedges the same size.

2 are red, 6 are not red

The complement is those that do not satisfy the statement.

$\frac{6}{8}$  simplifies to  $\frac{3}{4}$

2020 MATH Area Round 3 Number 4

45 seconds

There are 1,500 students in Ayra's school. She asked 125 randomly chosen students about their favorite drink. Predict the number of students in the entire school whose favorite beverage is a sports drink.

- A. 556
- B. 696
- C. 702
- D. 682

Favorite	Beverage
Sports Drink	58
Soda	36
Water	14
Other	17

2020 MATH Area Round 3 Number 4

There are 1,500 students in Ayra's school. She asked 125 randomly chosen students about their favorite drink. Predict the number of students in the entire school whose favorite beverage is a sports drink.

B.696

$$\frac{58}{125} = 0.464$$

$$0.464(1500) = 696$$

Favorite	Beverage
Sports Drink	58
Soda	36
Water	14
Other	17

2020 MATH Area Round 3 Number 5

60 seconds

Rolling a *Yahtzee* is when all 5 number cubes show the same number. I rolled a *Yahtzee* on my first roll! What is the probability of rolling a *Yahtzee* of any number 1 through 6 on a first roll?

- A.  $1 / 7,776$
- B.  $1 / 3,888$
- C.  $1 / 1,296$
- D.  $1 / 648$

The word "Yahtzee" is written in a stylized, bold, white font with a red outline and a black drop shadow, slanted slightly to the right.

2020 MATH Area Round 3 Number 5

Rolling a *Yahtzee* is when all 5 number cubes show the same number. I rolled a *Yahtzee* on my first roll! What is the probability of rolling a *Yahtzee* of any number 1 through 6 on a first roll?

The first dice rolled can be any number 1 through 6.

Prob(1-6) = 1

Then each probability is 1/6 of matching the first number rolled.

Prob(4 more numbers to match first) =  $(1/6)(1/6)(1/6)(1/6)$

Prob(Yahtzee in one roll) = 1/1,296

C. 1 / 1,296

**Yahtzee**



2020 MATH Area Round 3 Number 6

60 seconds

In a pizza eating contest, Jamie ate  $\frac{2}{3}$ , Bob ate  $\frac{5}{8}$ , Anne ate  $\frac{1}{6}$ , Kelly ate  $\frac{3}{4}$  and Kathy ate  $\frac{1}{2}$  of a pizza. Order the contestants in order from greatest to least amounts of pizza eaten.

- A. Jamie, Bob, Anne, Kelly, Kathy
- B. Kathy, Kelly, Anne, Bob, Jamie
- C. Anne, Kelly, Kathy, Bob, Jamie
- D. Kelly, Jamie, Bob, Kathy, Anne



2020 MATH Area Round 3 Number 6

In a pizza eating contest, Jamie ate  $\frac{2}{3}$ , Bob ate  $\frac{5}{8}$ , Anne ate  $\frac{1}{6}$ , Kelly ate  $\frac{3}{4}$  and Kathy ate  $\frac{1}{2}$  of a pizza. Order the contestants in order from greatest to least amounts of pizza eaten.

D. Kelly, Jamie, Bob, Kathy, Anne



24 is the least common denominator.

Jamie  $\frac{2}{3} = \frac{16}{24}$

Bob  $\frac{5}{8} = \frac{15}{24}$

Anne  $\frac{1}{6} = \frac{4}{24}$  least

Kelly  $\frac{3}{4} = \frac{18}{24}$  greatest

Kathy  $\frac{1}{2} = \frac{12}{24}$

D has the correct greatest and least ordering



2020 MATH Area Round 3 Number 7

60 seconds

Belinda has two children. One is a girl. What is the probability the other is also a girl?

- A.  $1/4$
- B.  $1/3$
- C.  $1/2$
- D. 51%



2020 MATH Area Round 3 Number 7

Belinda has two children. One is a girl. What is the probability the other is also a girl?

B.  $1/3$



Parents may have a boy, then a boy. Or they may have a boy, then a girl. Or a girl, then a boy. Or two girls. Since Belinda has one girl, we rule out the first case but we don't know if the girl listed is the first or second child. Thus, there are 3 possibilities: GB, BG, or GG. Each is equally likely.

2020 MATH Area Round 3 Number 8

60 seconds

Frederico is building a fence around his garden. He will place posts at every 4 ft interval. How many fence posts will he need for a garden that is 32 ft by 44 ft?

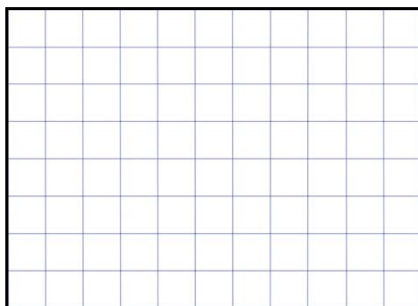


- A. 34
- B. 38
- C. 36
- D. 32

2020 MATH Area Round 3 Number 8

Frederico is building a fence around his garden. He will place posts at every 4 ft interval. How many fence posts will he need for a garden that is 32 ft by 44 ft?

**B. 38**



The sketch shows a grid measuring 4x4 feet over the shape of the garden. Fence posts will be at each grid mark along the perimeter.

Counting shows 38 fence posts.

2020 MATH Area Round 4 Number 1

30 seconds

Each child has one card. One is green, one is yellow, and one is red. Clayton has a green card. Dalton does not have a red card. Trista's card isn't green or yellow. What color does each person have?

- A. Clayton – green, Dalton – yellow, Trista – red
- B. Clayton – yellow, Dalton – red, Trista – green
- C. Clayton – red, Dalton – green, Trista – yellow
- D. Clayton – green, Dalton – red, Trista – yellow



2020 MATH Area Round 4 Number 1

Each child has one card. One is green, one is yellow, and one is red. Clayton has a green card. Dalton does not have a red card. Trista's card isn't green or yellow. What color does each person have?

A. Clayton – green, Dalton – yellow, Trista – red

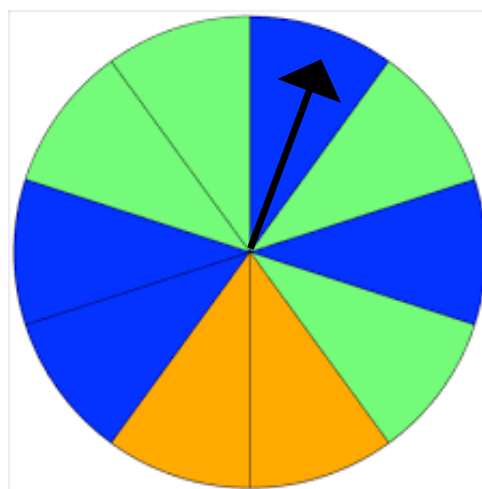


2020 MATH Area Round 4 Number 2

30 seconds

Use the spinner given to find the odds of landing on a green space.

- A. 1:5
- B. 2:3
- C. 3:4
- D. 1:4

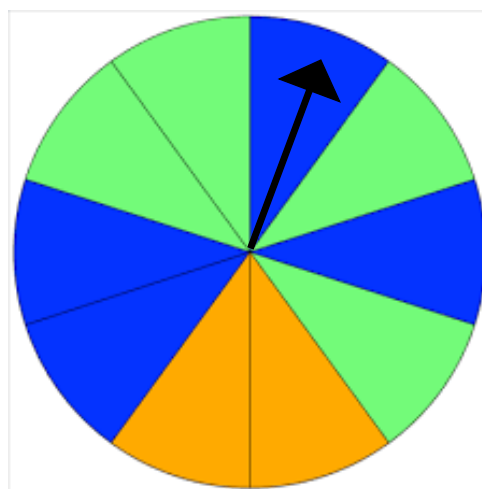


2020 MATH Area Round 4 Number 2

Use the spinner given  
to find the odds of  
landing on a green  
space.

B. 2:3

Odds are those favorable divided by those not favorable.  
There are 4 green and 6 not green.  
 $4/6$  simplifies to  $2:3$ , a more common way to write odds.





2020 MATH Area Round 4 Number 3

30 seconds

The Appleworks Company is picking apples. They can fit 32 apples in a basket. If they pick 6,500 apples, how many full baskets will they end up with?



- A. 203
- B. 204
- C. 205
- D. 208,064

2020 MATH Area Round 4 Number 3

The Appleworks Company is picking apples. They can fit 32 apples in a basket. If they pick 6,500 apples, how many full baskets will they end up with?

A. 203

$6,500 \div 32 = 203.125$   
23 full baskets and 4 extra apples



2020 MATH Area Round 4 Number 4

45 seconds

In middle school, we will learn about a factorial written with an exclamation point. It's a fun short cut for writing a multiplication activity.

2! (read two factorial) means  $1 \times 2$  and simplifies to 2.

3! (read three factorial) means  $1 \times 2 \times 3$  and simplifies to 6.

Find 10!

- A. 3,628,800
- B. 362,880
- C. 40,320
- D. 10

2020 MATH Area Round 4 Number 4

In middle school, we will learn about a factorial written with an exclamation point. It's a fun short cut for writing a multiplication activity.

2! (read two factorial) means  $1 \times 2$  and simplifies to 2.

3! (read three factorial) means  $1 \times 2 \times 3$  and simplifies to 6.

Find 10!

A. 3,628,800

$10! = 10 \times 9 \times 8 \times 7 \times 6 \times 5 \times 4 \times 3 \times 2 \times 1$  or 3,628,800

On this calculator, press 10 then press PRB button. Next scroll to the ! and then press ENTER. Press ENTER again to compute. Other scientific calculators may have similar capabilities.



2020 MATH Area Round 4 Number 5

45 seconds

Jerry needs a five digit pin number. He can use the digits 0 through 9 with no repeats. How many different combinations are possible?

- A. 30,240
- B. 6,048
- C. 252
- D. 15,120



2020 MATH Area Round 4 Number 5

Jerry needs a five digit pin number. He can use the digits 0 through 9 with no repeats. How many different combinations are possible?

A. 30,240

The no-repeat rule means the number of possibilities decrease for each successive digit.

10 ways to choose first digit, 9 for second and so forth.

$$10 \times 9 \times 8 \times 7 \times 6 \times 5 = 30,240$$



2020 MATH Area Round 4 Number 6

45 seconds

Given the spinner and number cube below, find the probability of rolling a prime number on the number cube and then spinning an even number on the spinner.



- A.  $1/3$
- B.  $1/6$
- C.  $1/4$
- D.  $2/3$

2020 MATH Area Round 4 Number 6

Given the spinner and number cube below, find the probability of rolling a prime number on the number cube and then spinning an even number on the spinner.

C.  $1/4$

The primes on the cube are 2, 3, and 5.  
The evens on the spinner are 2 and 4.  
Prob(prime on cube) =  $3/6$   
Prob(even on spinner) =  $2/4$

Prob(prime then even) =  $1/2(1/2)$  or  $1/4$





2020 MATH Area Round 4 Number 7

60 seconds

Marci's first four test scores were 97%, 92%, 96%, and 91%. What percentage would she need to get on her next test to average exactly 95%?

- A. 98%
- B. 99%
- C. 97%
- D. 100%



2020 MATH Area Round 4 Number 7

Marci's first four test scores were 97%, 92%, 96%, and 91%. What percentage would she need to get on her next test to average exactly 95%?

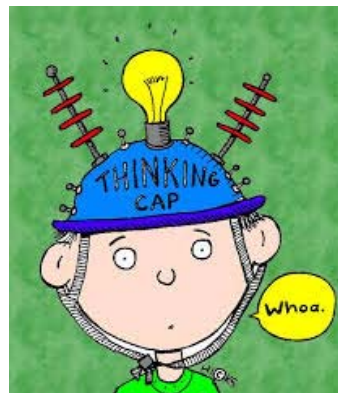
B. 99%

$95(5) = 475$  total score to get exact 95% average

$97 + 92 + 96 + 91 = 376$  total score so far

$475 - 376 = 99$  needed on last test

Getting 100 gives 95.2% which is not exact.  
Similarly, she could score a little less than 99 and the average would round up to 95 but it wouldn't be exact.



2020 MATH Area Round 4 Number 8

60 seconds

Find the 42<sup>nd</sup> term in the following sequence:

2, 5, 10, 17 .....

- A. 675
- B. 1,775
- C. 1,765
- D. 567



2020 MATH Area Round 4 Number 8

Find the 42<sup>nd</sup> term in the following sequence:

2, 5, 10, 17 .....

This is a tough one! It's called a quadratic sequence. It's hard to see the squares at first.

First term	$1 + 1^2$	$1 + 1$
Second term	$1 + 4$	$1 + 2^2$
Third term	$1 + 9$	$1 + 3^2$
Fourth term	$1 + 16$	$1 + 4^2$
...		
42nd term	$1 + 42^2$	1,765

**C.1,765**

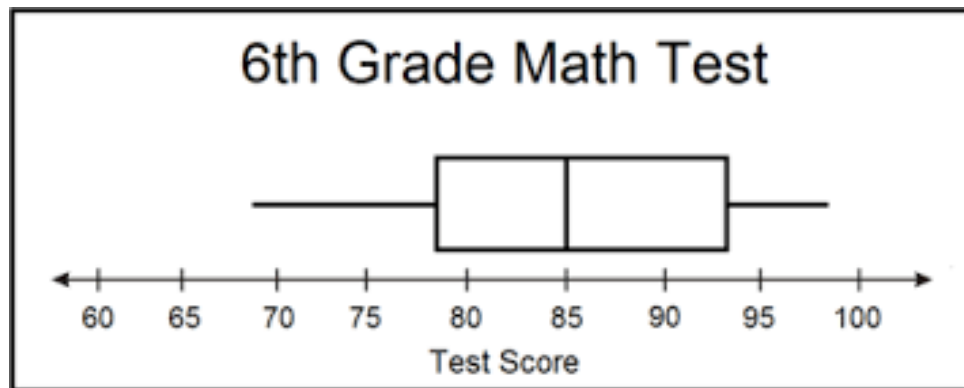


2020 MATH Area Round Alternate Number 1

30 seconds

The results of a math test are shown on the box plot below. Find the median of the test scores.

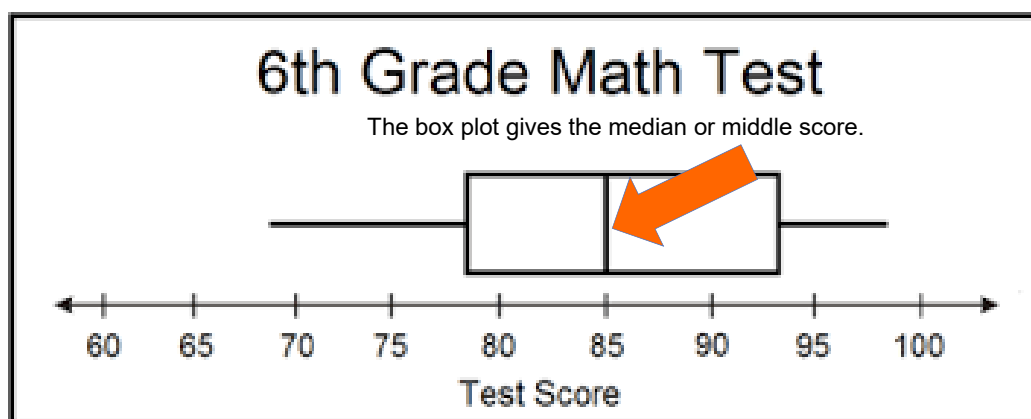
- A. 69
- B. 78
- C. 85
- D. 93



2020 MATH Area Round Alternate Number 1

The results of a math test are shown on the box plot below. Find the median of the test scores.

C. 85



2020 MATH Area Alternate Round Number 2

45 seconds

Use the order of operations and the number 505 four times to get a result of 1,011.

- A.  $505 \times 505 + (505 - 505)$
- B.  $505 \div 505 + 505 + 505$
- C.  $(505 + 505) + 505 - 505$
- D.  $505 \times 505 + (505 \div 505)$

2020 MATH Area Alternate Round Number 2

Use the order of operations and the number 505 four times to get a result of 1,011.

**B.  $505 \div 505 + 505 + 505$**

- A.  $505 \times 505 + (505 - 505) = 255,025$
- B.  $505 \div 505 + 505 + 505 = 1,011$
- C.  $(505 + 505) + 505 - 505 = 1,010$
- D.  $505 \times 505 + (505 \div 505) = 255,026$



2020 MATH Area Alternate Round Number 3

30 seconds

Find the prime factorization of 114.

- A.  $2 \times 57$
- B.  $1 \times 2 \times 3 \times 19$
- C.  $2 \times 3 \times 19$
- D.  $19 \times 6$



2020 MATH Area Alternate Round Number 3

Find the prime factorization of 114.

C.  $2 \times 3 \times 19$

The only choice that included all primes is C.  
1, 6, and 57 are not prime.

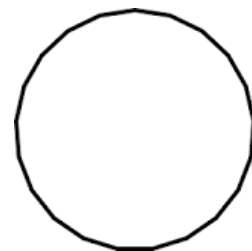
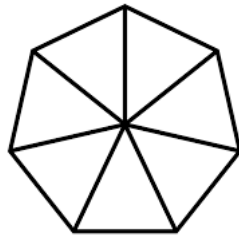


2020 MATH Area Alternate Round Number 4

30 seconds

What is the ninth number in this sequence?  
 7, 14, 21, 28, 35, 42, 49, ...

- A. 56
- B. 63
- C. 70
- D. 77

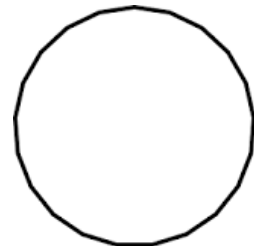
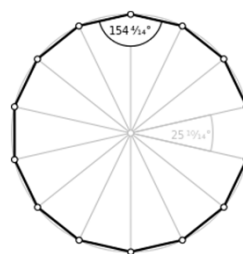
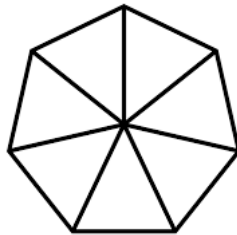


2020 MATH Area Alternate Round Number 4

What is the ninth number in this sequence?  
7, 14, 21, 28, 35, 42, 49, ...

B. 63

$$\begin{aligned} 7 &= 7 \times 1 \\ 14 &= 7 \times 2 \\ 21 &= 7 \times 3 \\ 28 &= 7 \times 4 \\ \dots \\ ? &= 7 \times 9 \\ ? &= 63 \end{aligned}$$



2020 MATH Area Alternate Round Number 5

30 seconds

Jose is visiting his favorite restaurant. He has the choice between 6 appetizers, 8 entrees, 10 drinks and 6 desserts. If he will choose one item from each category, how many different combinations does he have to choose from?

- A. 30
- B. 2,880
- C. 1,440
- D. 720



2020 MATH Area Alternate Round Number 5

Jose is visiting his favorite restaurant. He has the choice between 6 appetizers, 8 entrees, 10 drinks and 6 desserts. If he will choose one item from each category, how many different combinations does he have to choose from?

B.2,880

Each choice is independent of other choices.

$6 \times 8 \times 10 \times 6 = 2,880$  possible meal combinations



2020 MATH Area Alternate Round Number 6

30 seconds

If you have 50 total coins (all nickels and dimes) that total \$3.70, how many of each type would you have?

- A. 25 nickels, 25 dimes
- B. 26 nickels, 24 dimes
- C. 24 nickels, 26 dimes
- D. 23 nickels, 27 dimes



2020 MATH Area Alternate Round Number 6

If you have 50 total coins (all nickels and dimes) that total \$3.70, how many of each type would you have?

B. 26 nickels, 24 dimes



Answers A and D can be ruled out as an odd number of nickels would have a value that ends in 5  
Checking answers confirms final value.

$$\begin{aligned}26(0.05) + 24(0.10) &= \\ \$1.30 + \$2.40 &= \\ \$3.70 &\end{aligned}$$



2020 MATH Area Alternate Round Number 7

45 seconds

How many ways can 9 candidates be selected for treasurer, secretary and president?

- A. 84
- B. 252
- C. 24
- D. 504



2020 MATH Area Alternate Round Number 7

How many ways can 9 candidates be selected for treasurer, secretary and president?

D. 504

Order is important. There are 9 ways to choose the president.  
That leaves 8 ways to choose the secretary.  
Then there are 7 ways left to choose the treasurer.

$$9 \times 8 \times 7 = 504$$



2020 MATH Area Alternate Round Number 8

45 seconds

You flip a coin and roll a 20-sided number cube. Find the compound probability of flipping tails and rolling at least a 14.

- A.  $3/20$
- B.  $7/40$
- C.  $4/5$
- D.  $17/20$



2020 MATH Area Alternate Round Number 8

You flip a coin and roll a 20-sided number cube. Find the compound probability of flipping tails and rolling at least a 14.

**B.  $7/40$**

The coin has 2 events: heads or tails

The cube has 20 events, with 7 favorable events of 14, 15, 16, 17, 18, 19, 20.

Prob(tails on coin) =  $1/2$

Prob(numbers 14 or higher) =  $7/20$

These events are independent, one doesn't impact the other.

Thus we can multiply the results to get the probability of both events.

$1/2(7/20) = 14/40$  which simplifies to  $7/20$

