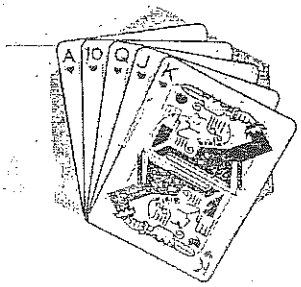


You can use a calculator anywhere on this.

Name _____

Date _____

Period _____

# Probability Take Home and Check

Problems are leveled: A = basic B = moderate C= challenging

1) What is the sample space when 2 coins are tossed? (A)

① 1st event Coin 1: T, H

② 2nd event Coin 2: T, H

Sample space

T, T ; T, H ; H, T ; H, H

Remember that sample space lists all the poss. outcomes.

2) At Kennedy Middle School, 3 out of 5 students make the honor roll. What is the probability that a student does not make the honor roll? Give your answer as a fraction, decimal and percent. (A)

② Since $\frac{3}{5}$ make the honor roll → $\frac{2}{5}$ do not make it.

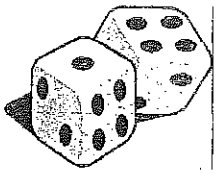
$\frac{2}{5} = .4 = 40\%$

3) A large basket of fruit contains 3 oranges, 2 apples and 5 bananas. If a piece of fruit is chosen at random, what is the probability of getting an orange or a banana? Give your answer as a fraction, decimal and percent. (A)

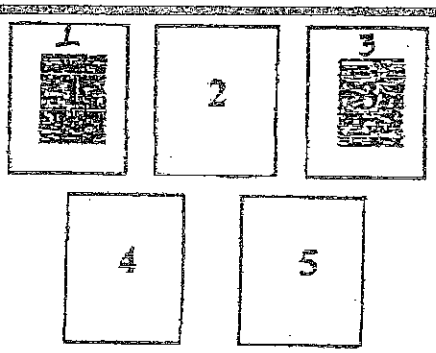
③ $\frac{8}{10} = \frac{4}{5} = .8 = 80\%$

You do not multiply them together because it is not 2 diff events.

4) A pair of dice is rolled. What is the probability of getting a sum of 2? Give your answer as a fraction, decimal and percent.



(4) $\frac{1}{36} = .0278 = 2.78\%$

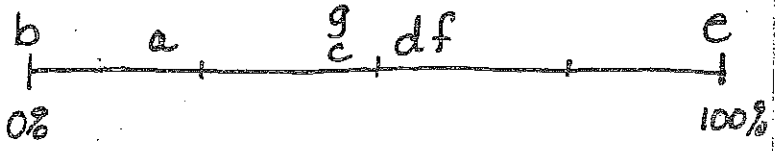



5) A card from above is drawn at random. Write the probabilities as fractions and percents.

a) P (1)
b) P (6)
c) P (shaded)
d) P (not shaded)
e) P (<8)
f) P (odd)
g) P (divisible by 2)

Then make a line of probability and put a-g on the line.

(5) a) $\frac{1}{5} = .2 = 20\%$
b) 0
c) $\frac{2}{5} = .4 = 40\%$
d) $\frac{3}{5} = .6 = 60\%$
e) $\frac{5}{5} = 1 = 100\%$
f) $\frac{3}{5} = .6 = 60\%$
g) $\frac{2}{5} = .4 = 40\%$




) Which best describes a sample space?

a) An event
b) A number of unsuccessful outcomes
c) A set of all possible outcomes of an event
d) A set of successful outcomes

(6) C

7) When traveling from Midland to Houston, a tourist plans to make stops at Austin and San Antonio. There are 2 scenic routes from Midland to Austin. There are 4 scenic routes from Austin to San Antonio, and 2 scenic routes from San Antonio to Houston. How many different scenic routes can the tourist take? Show the work!

(B)

(7) M → A, A → SA, SA → H

$2 \times 4 \times 2 =$ **16 scenic routes**

8) A coin purse contains 3 pennies, a nickel, 3 dimes and 2 quarters. If the first coin is not replaced before the second coin is drawn, what is the probability that the first coin is a dime and the second coin is a quarter?

(A)

(8)

$$\frac{3}{9} \cdot \frac{2}{8}$$

reduce $= \frac{\overset{1}{\cancel{3}}}{\underset{3}{\cancel{9}}} \cdot \frac{\overset{1}{\cancel{2}}}{\underset{4}{\cancel{8}}} = \frac{1}{12} = .0833$

**8.33%**

9) Mr. Potato Head makes chairs. He uses leather, corduroy, vinyl or plastic for the upholstery. The frames are made of oak, maple or ash.

(A)

(9)

a) How many choices does a customer have?

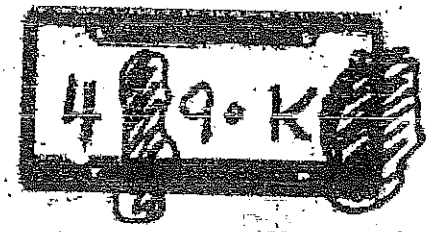
a) $4 \times 3 =$ **12**

b) What is the probability that a choice is oak with leather upholstery?

b) $\frac{1}{3} \cdot \frac{1}{4} =$ **$\frac{1}{12}$**

10) A witness observed the license plate of a speeding car leaving the scene of an accident. One of the three digits and two of the three letters on the license plate were covered with mud. You know that the three digits are followed by three letters on all license plates. What is the greatest number of license plates that you would have to check to find the owner of the car?

(B)




(10)

4 _ 9 . K _ _

↓ ↓ ↓

0 A A

1 ↓ ↓

2 Z Z

3

4

5

6

7

8

9

10 . 26 . 26 =

6760 plates

11) Which word should go in the blank: Sometimes, always or never?

(A)

a) The probability of an event that may occur is _____ expressed as a whole number.

b) The experimental probability of an event is _____ the same as the theoretical or mathematical probability of an event.

c) In an experiment, all possible outcomes are _____ equally likely.

(11)

a) never

b) sometimes

c) sometimes

12) A school found that 9 out of 10 students like pizza. If three students are chosen at random with replacement, what is the probability that all three students like pizza?

(D)

(12)

$$\frac{9}{10} \cdot \frac{9}{10} \cdot \frac{9}{10} = \frac{729}{1000} = .729 = \boxed{72.9\%}$$

13) A multiple choice test has 3 questions. Each question is answered with an a, b, c or d. How many outcomes are possible?

(B)

(13)

a b c d

Quest 1) 4 Quest 2) 4 Quest 3) 4 = 4 · 4 · 4 = 64 ways

14) If a school offers 9 different subjects, how many different schedules of 5 classes are possible? A student can have one subject only once.

(C)

(14)

9 8 7 6 5

$9 \cdot 8 \cdot 7 \cdot 6 \cdot 5 = \boxed{15,120 \text{ schedules}}$

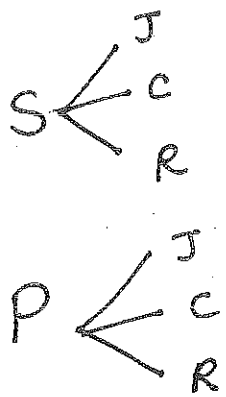
15) Draw a tree diagram and tell how many possible outcomes?

(A)

**Smith or Patel for President**

**Jones, Chin, or Rosen for Vice President**

(15)




6 outcomes

16) *Decide whether the possible resulting events* are equally likely. Write yes or no.

(A)

a) You roll a number cube. You roll an even number, or you roll an odd number.

b) A baby is born. The baby is left-handed, or the baby is right-handed.

c) You toss a marshmallow. The marshmallow lands on its end, or the marshmallow lands on its side.

d) You draw a card from a standard deck of 52 playing cards with no jokers. The card is a heart, the card is a club, the card is a diamond, or the card is a spade.

e) You toss a coin three times. You get three heads, you get two heads and a tail, you get a head and two tails, or you get three tails.

(16)

a) yes

b) No

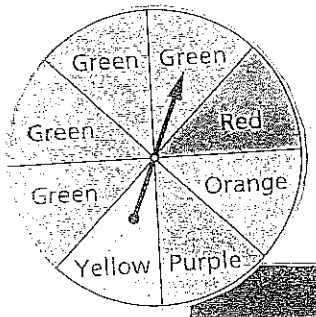
c) NO

d) yes

e) No

17) The spinner below is used in a board game. The table below shows the actual number of times the spinner landed on different colors after being spun 40 times.

(A)




**Spinner Results**

| Color | Number of Spins |
|---|---|
| Purple | 4 |
| Red | 7 |
| Green | 20 |
| Yellow | 6 |
| Orange | 3 |

Which color has the same theoretical and experimental probability of the arrow landing on it? Explain your answer.

(17)

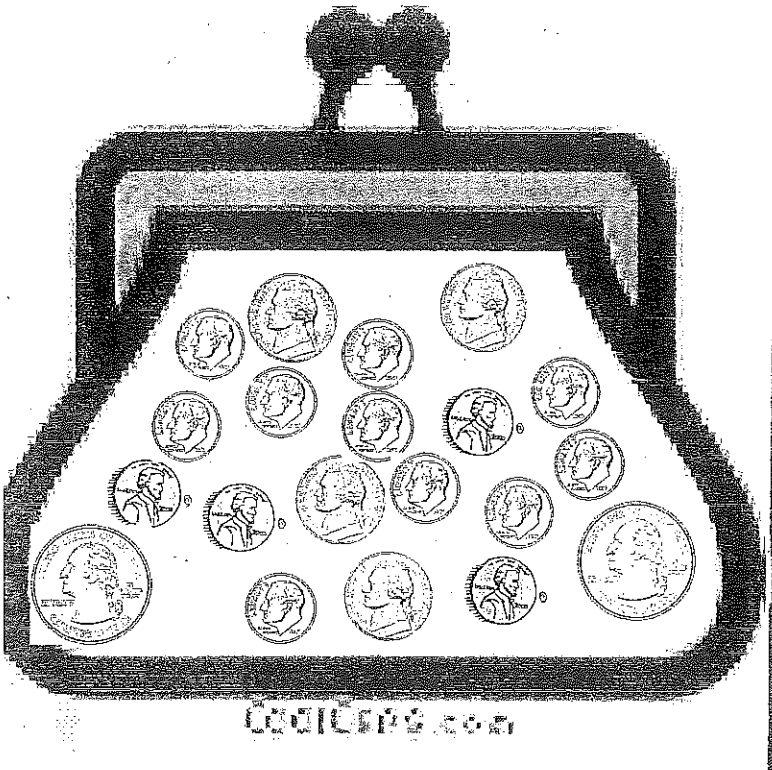
The sample space of the experiment:

4+7+20+6+3 = 40 spins

| | Experimental | Theoretical |
|---|---|---|
| purple | $\frac{4}{40}$ | $\frac{1}{8}$ |
| red | $\frac{7}{40}$ | $\frac{1}{8}$ |
| green | $\frac{20}{40}$ | $\frac{1}{2}$ |
| yellow | $\frac{6}{40}$ | $\frac{1}{8}$ |
| orange | $\frac{3}{40}$ | $\frac{1}{8}$ |

18) *Find the probability of each scenario below if you pick one coin from the purse and then another without replacing the first.*

(A)



a) P (quarter, then dime)
b) P (dime, then penny)
c) P (penny, then penny)
d) P (quarter, then dime, then penny)

(18)

Totals = P = 4, N = 4, D = 10, Q = 2 = 20

a) $\frac{2}{20} \cdot \frac{10}{19} = \frac{1}{19}$

b) $\frac{10}{20} \cdot \frac{4}{19} = \frac{40}{95} = \frac{2}{19}$

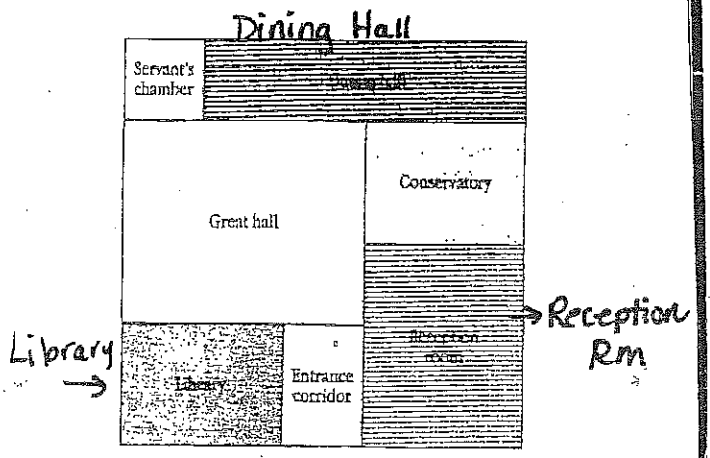
c) $\frac{4}{20} \cdot \frac{3}{19} = \frac{3}{95}$

d) $\frac{2}{20} \cdot \frac{10}{19} \cdot \frac{4}{18} = \frac{2}{171}$

(C)

19) When you play the 1st level of the Treasure Hunt Game, the computer hides a treasure on the 1st floor of the palace. The floor plan is pictured below. The computer gives the player clues about where the treasure is located. After each clue, the player must guess which room the treasure is in. The computer continues to give clues until the player finds the treasure. The first time you play Level1, the treasure is hidden in the library.

Level 1



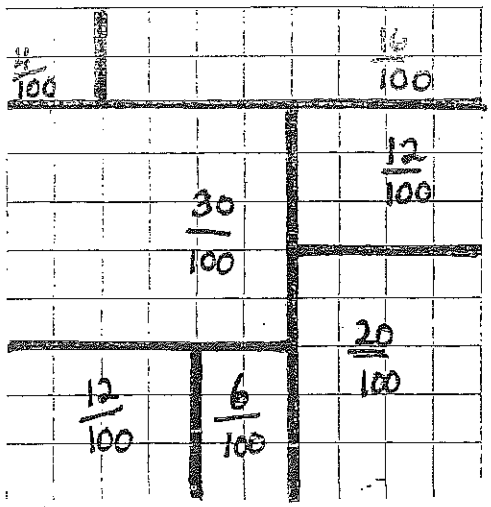

a) On the computer screen, the 1st floor of the palace is 10 inches by 10 inches. Use this information to divide up the 1st floor.

b) What is the probability that the treasure Will be hidden in the library the second time you play Level 1?

c) Bob says, "because the computer randomly picks the location of the treasure, it is just as likely to be hidden in the entrance corridor as in the great hall." Is Bob correct?

d) NEW GAME: (Note: Treasure cannot land in the same area during the same game.)
What is the probability that the treasure will land in the servant's chamber and then in the conservatory?

19) a) Use a grid. It helps to see the sections.




b)

$$\frac{12}{100} = .12 = 12\%$$

c) No, because the probability of the treasure being in the entrance would be 6% whereas the great hall would be 30%.

d) $\frac{1}{4} \cdot \frac{12}{96} = \frac{1}{200} = .005 =$ **.5%**

20) (15) *Julie develops a new carnival game for the fair at Dale Street School. A bucket contains four blue marbles and one orange marble. Without looking, a player draws one marble from the bucket, replaces it, and then draws a second marble. If the marble is orange on both draws, the player wins.*

The Carnival Committee has decided to charge players four 50 cent tickets to play the game. Prizes awarded to the winners will cost the school $5 each.

a) If 100 people play Julie's game, how much money will the school collect? How much money can they expect to pay out in prizes?

b) If 5 people play Julie's game, what are the odds of them ALL winning?

(20)

a) Bucket = $\begin{matrix} B=4 \\ O=1 \end{matrix}$

\$2.00 → play × 100 peo = \$200

prizes = \$5

$\frac{1}{25} = \frac{1}{5} \cdot \frac{1}{5}$ Chance of winning

$\frac{1}{25} = \frac{4}{100}$ Chances of winning

$4 \cdot \$5 = \$20$

School collects \$200

Pays \$20

\$180 profit

b) $\frac{1}{25} \cdot \frac{1}{25} \cdot \frac{1}{25} \cdot \frac{1}{25} \cdot \frac{1}{25} = \frac{1^5}{25^5} = \frac{1}{9,765,625}$

21) Dependent or Independent? (D or I?)

(A)

a) I choose a stick from the cup for a refresh question. I do not put it back in and then choose someone to answer the next question.

b) You choose a member of a baseball team to be the pitcher. You then choose a different member of the team to be the catcher.

c) You roll an odd number on a number cube. You then roll the number cube again and roll an even number.

d) A teacher is randomly assigning you, your friend, and 4 other students to 6 different seats. You are assigned the first seat. Your friend is assigned the second seat.

(21)

a) D

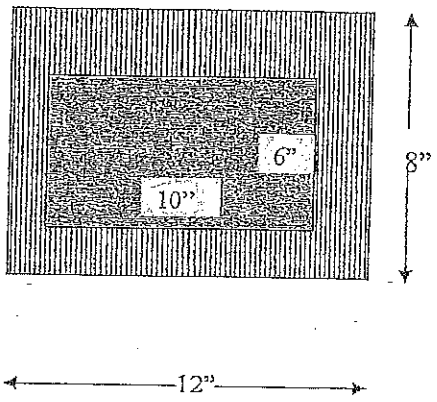
b) D

c) I

d) D

22) *You win $10 in the Toss-A-Penny game at an amusement park if you toss a penny which lands in the shaded area below. You win $20 if you toss a penny which lands in the striped area.*

(B)




a) Find P (landing in a shaded area)
b) Find P (landing in a striped area)
c) *If you toss 200 pennies one after the other, in which area do you think more pennies will land? Give a reason for your answer.*

(22)

Total Area = $12 \times 8 = 96''$
Area Shaded = $6 \times 10 = 60$
Area Striped = $96 - 60 = 36''$

a) $\frac{60}{96} = \frac{5}{8} = .625 = 62.5\%$

b) $\frac{36}{96} = \frac{3}{8} = .375 = 37.5\%$

c) Shaded, because it covers more area.

23) A coin is tossed and a 6 sided die is rolled.

(A)

a) *Find the probability of getting a head on the coin and a 6 on the die.*

b) Explain the theoretical and experimental probability using this example.

(23)

a) $\frac{1}{2} \cdot \frac{1}{6} = \frac{1}{12}$

b) The theoretical is $\frac{1}{12}$. The experimental would be actually performing this experiment & recording the results

24) (B) The experimental probability of a penny landing on tails is $\frac{9}{16}$. If the penny landed on heads 21 times, how many times was the coin tossed?

24) Tails $= \frac{9}{16}$ Heads $= \frac{7}{16}$

$\frac{7}{16} = \frac{21}{x}$

$7 \times 3 = 21$
$16 \times 3 = 48$

$x = 48$ times

25) (B) Jordan's sock drawer has 8 white, 5 black, 7 navy, 3 khaki, and 12 other pairs of socks. She randomly selected a pair of socks 20 times, and from these 20 draws she selected a navy pair 6 times. Compare and contrast the theoretical and experimental probability.

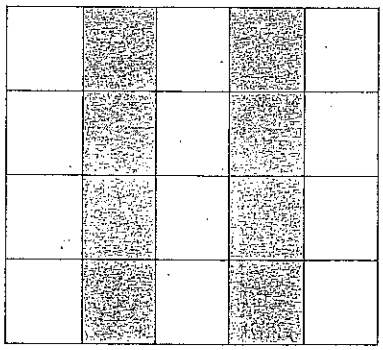
25) Sample Space:
$8+5+7+3+12 = 35$

Theoretical: $\frac{7}{35} = \frac{1}{5} = 20\%$

Experimental: $\frac{6}{20} = \frac{3}{10} = 30\%$

The experimental gave a higher probability of selecting navy socks.

26) (A) Find the probability that a randomly thrown dart will land in a shaded region of the figure below.



26) Sample Space = 20 blocks

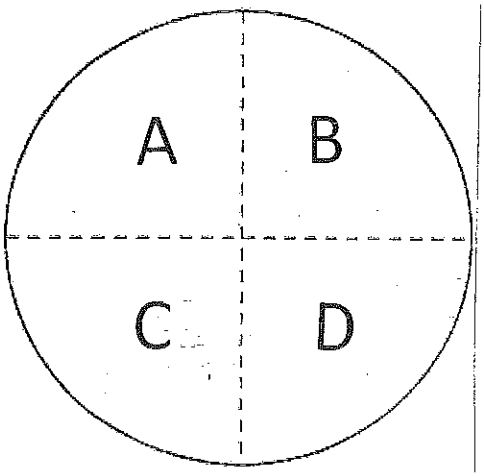
Shaded blocks = 8 (favorable outcome)

Unshaded blocks = 12 (unfavorable outcome)

$\frac{8}{20} = \frac{4}{10} = 40\%$ chance of a favorable outcome.

27) a) Design an experiment to simulate 30 spins of a spinner that has equal sections labeled A, B, C, and D.

(A)




b) Find the experimental probability of each letter.

c) Compare the experimental probabilities with the theoretical probabilities.

Answers will vary.

27)

a) I took 4 index cards and wrote A B C D on them. I shuffled them, turned them face down and drew from the cards 30 times with replacement.

results:

| | | | | |
|---|---|---|---|---|
| B | C | A | B | D |
| C | A | B | B | C |
| C | D | B | C | D |
| D | B | A | D | A |
| D | C | D | B | C |
| D | B | C | D | A |

b) probability of $A = \frac{5}{30}$

$B = \frac{8}{30}$

$C = \frac{8}{30}$

$D = \frac{9}{30}$

c)

| Theory | Experiment |
|---|---|
| $A = \frac{1}{4} = 25\%$ | $\frac{5}{30} = \frac{1}{6} = 16.6\%$ |
| $B = \frac{1}{4} = 25\%$ | $\frac{8}{30} = 26.6$, |
| $C = \frac{1}{4} = 25\%$ | $\frac{8}{30} = \frac{12}{} = 26.6\%$ |
| $D = \frac{1}{4} = 25\%$ | $\frac{9}{30} = 30\%$ |

Answers will vary.

28) (B) At the Midland Middle School, about 2 out of every 6 students are in the school band. Design a simulation and generate 20 trials to estimate the probability that the next 2 students to enter the lunchroom are in the school band.

a) How will you represent 2 out of every 6 students?

20 Trials of 2 students

| | | | |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

b) How will you generate the data?

c) Generate the data and record it in the table.

d) Describe the favorable outcomes.

e) Count the number of favorable outcomes in your data. What is the probability that the next 2 students who enter the lunchroom will be in the school band?

28)

a) I will use a number cube to simulate 2 out of 6 students in the band. Rolling a one or a two equals students in the band (favorable outcome). Rolling a 3,4,5,6 will equal students not in the band (unfavorable outcome).

b) I rolled 2 dice (one for each of the 2 students) 20 times.

c) 20 Trials

| | | | |
|---|---|---|---|
| 2,5 | 5,2 | 2,4 | 5,5 |
| 4,4 | 6,5 | 1,2 | 2,3 |
| 3,5 | 4,1 | 1,6 | 6,2 |
| 1,1 | 5,4 | 5,3 | 3,4 |
| 4,1 | 6,2 | 1,2 | 6,5 |

d) There are 3 favorable outcomes: 1,1 1,2 1,2

e) $\frac{3}{20} = 15\%$

29) John's record shows that he makes $\frac{1}{3}$ of his shots in basketball. He wants to know the probability that he will make at least 2 of his next 3 shots.

(C)

a) Describe a spinner that could be used in a simulation. What spin would represent making a shot?

b) For each trial, how many times will you spin the spinner? What will be a favorable outcome?

c) Show the sample space for the outcomes. Which of the outcomes represent favorable outcomes?

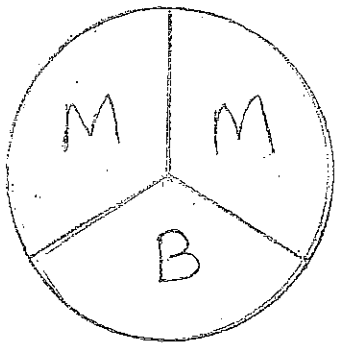
d) Based on the sample space, what is the theoretical probability that John will make at least 2 of his next 3 shots?

e) Predict how many of 50 trials in the simulation will have favorable outcomes.

29)

M = a missed basket
B = a basket scored

a)




b) For each trial I will spin the spinner 3 times.
M = miss (unfavorable) B = a basket (favorable)

c) Organized List:

BBB mmm BMB
BBm mmB mBm
BMm mBB

d) B B m

$\frac{1}{3} \cdot \frac{1}{3} \cdot \frac{2}{3} \cdot 3 = 22.\overline{2}\%$

3 = The number of favorable outcomes.

e) $.22\overline{2} \cdot 50 =$ 11.1 out of 50.

2018

Name: _____

All Tiers
Unit 7 Statistics
**Take Home and Check**

1) An inspector at a beverage company wants to check whether a machine that fills juice boxes is putting in the correct amount of juice. After boxes are filled they are packed in cartons of 32. Which of these methods seems most reasonable? Explain your answer. (7.SP.1)

a) Inspect one juice box every 10 to 20 minutes
b) inspect ~~every~~ box from every carton
c) inspect all juice boxes in one carton at 9 am each day
d) inspect only apple juice boxes.

1) A is most reasonable because it is random and would inspect enough juice boxes.

b) you would need to open each carton would take too long
c) you wouldn't be inspecting enough
d) only 1 kind

2) In 3 different classes in a school students were asked if they plan to attend an upcoming art show. The results are shown in the table below.

| Class | # of Students | Yes | No |
|---|---|---|---|
| A | 28 | 14 | 14 |
| B | 25 | 18 | 7 |
| C | 32 | 20 | 12 |

Suppose the school has 700 students and each row of the table is used to predict the school play attendance. Give three predictions of how many students will attend the school play. Make one based on each row of the table. (7.SP.2)

2)

Class A:

$\frac{14}{28} = \frac{x}{700}$ $x = 350$ students

Class B:

$\frac{18}{25} = \frac{x}{700}$ $x = 504$ stu's

Class C:

$\frac{20}{32} = \frac{x}{700}$ $x = 438$ stu's

**3)** Sixty students out of 900 are chosen at random and asked to name their favorite pizza topping from four choices.

| Topping | Number of Students |
|---|---|
| Pepperoni | 24 |
| Sausage | 20 |
| Mushrooms | 10 |
| Green Peppers | 6 |

Mark the statements that are true about the table above.

___6% of students chose green peppers.

___Twice as many students chose sausage as mushrooms.

___More than half the students chose pepperoni.

___About a third of the 900 students at the school are expected to choose sausage.

3)

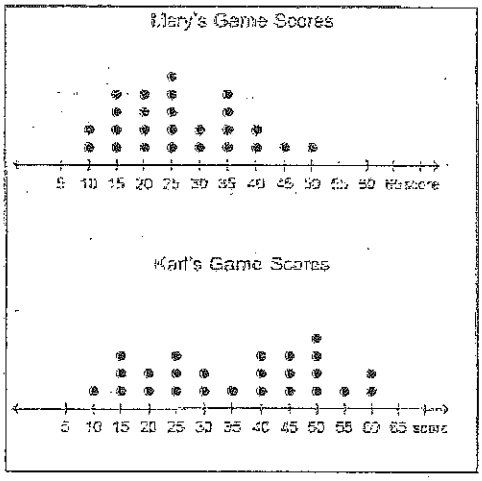
False $\frac{6}{60}$ = 10% not 6%

True: Sausage - 20, Mushroom - 10

False: Pepperoni = $\frac{24}{60}$ less than $\frac{1}{2}$

True: $\frac{20}{60} = \frac{1}{3}$

4) The dot plots ~~at the right~~ below show the game scores of two students, Mary and Karl. Each student has played the game 25 times. Answer the questions about the scores by visually comparing the two dot plots. (7. SP.3) Then calculate part c.




a) Which student's scores had the greatest mean? Why?

b)Which student's scores had a greater mean absolute deviation? Why?

c)Suppose Mary plays the game 50 more times. For how many of the 50 games do you expect the score to be 40 or more? (hint: first find the probability that she scores 40 or more) (7.SP.4)

4)

a) Karl because he had a greater amount of higher scores.

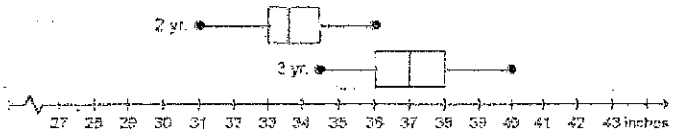
b) Karl because the data is more spread out.

c)

$$\frac{4}{25} = \frac{x}{50}$$

$x = 8$ games

**5)** The box plot shows the height of 50 two-year old girls and 50 three-year old girls.

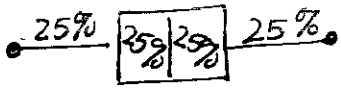



a) What percent of the three-year old girls were taller than the tallest two-year old girl?(7.SP.4).

b) Suppose someone measures the heights of 200 randomly selected three-year old girls. Which is a reasonable estimate for the number of the girls that would be 38 inches or taller?(7.SP.4)

a) 25
b) 40
c) 50
d) 100

5)




a) 75 %

each part of box plot is 25 %

b) 50 girls

25 % of 200

$$\frac{x}{200} = \frac{25}{100}$$

$$100x = 5000$$

$$x = 50$$

6) A cheese company wants to check whether a machine that fills shredded cheese is putting the correct amount in by weight. After the machine fills the bags they are packaged in cartons of 24 bags. Which of these methods will provide the best representative sample of the filled bags? Explain your answer. (7.SP.1)

a. Weigh one bag from every carton of 24 bags.

b. Weigh the first three bags of cheese filled by the machine every day.

c. Weigh a few bags randomly every 2 to 3 hours.

d. Weigh the last 100 bags that are filled.

[A]

a) Best answer

b) not enough bags & machines may break during the day

c) not enough bags for a good sample

d) it's always better to spread it out

7) Two data sets have means that are very far apart and the MADs of the data sets are very small. What can you conclude about the amount of overlap in the data sets? Explain.

7) The MADs are very small which means that the data sets are not spread out very far from the means.

You also know that the means are very far apart. This indicates that there is little or no overlap in the data sets.

8) In three different classes in a school, students were asked if they plan to attend an upcoming school play. The results are shown in the table. (7.SP.2)

| Class | # of Students | Yes | No |
|---|---|---|---|
| A | 22 | 14 | 8 |
| B | 24 | 14 | 10 |
| C | 32 | 15 | 17 |

Suppose the school has 800 students, and each row of the table is used to predict the school play attendance.

Give three predictions of how many students will attend the school play. Make one based on each row of the table.

8)

Class A =

$\frac{14}{22} = \frac{x}{800}$ $22x = 11200$

$x = 509$

Class B

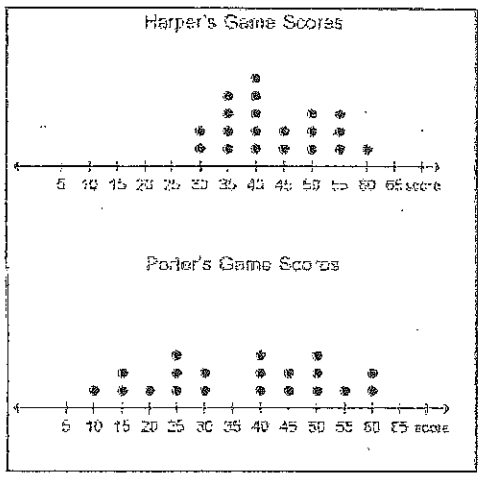
$\frac{14}{24} = \frac{x}{800}$ $x = 466$

Class C

$\frac{15}{32} = \frac{x}{800}$ $32x = 12000$

$x = 375$

9) The dot plots below show the game scores of two students, Harper and Porter. Each student has played the game 20 times. Answer the questions below by visually comparing the two dot plots.
(7.SP.3)




a) Which student's scores had the greater mean?

b) Which student's scores had a greater mean absolute value?

c) Suppose Harper plays the game 50 more times. For how many of the 50 games do you expect the score to be less than 40?

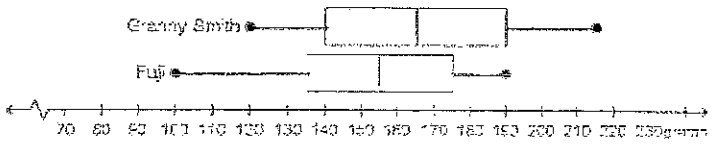
a) Harper - all of her scores are between 30 and 60. Peter's are between 10 and 60.

b) Porter because her data is more spread out with a larger range.

c) $\frac{6}{20} = \frac{x}{50}$ $20x = 300$

$x = 15$ games

10. A family had two species of apples trees, Fuji and Granny Smith. They weighed 50 randomly selected apples from each tree and made this box plot. (7.SP.4)




a) What percent of the Granny Smith apples weighed the same or more than the maximum weight of the Fuji apples?

b) Suppose the family weighs 200 randomly selected Granny Smith apples. Which is a reasonable estimate for the number of apples that would weigh 140 grams or less?

(10)

a) 25 %

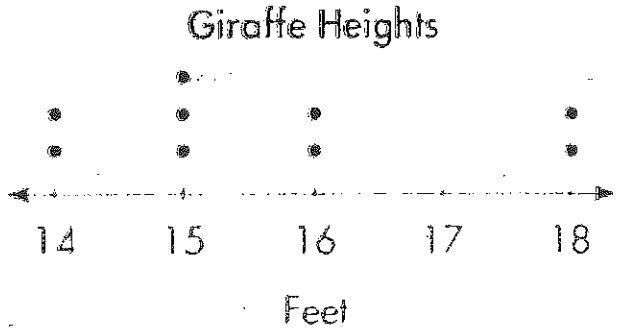
b) 25 %

$\frac{x}{200} = \frac{25}{100}$

$100x = 5000$

$x =$ 50 apples

11) The dot plot below shows the heights of 9 randomly selected giraffes.
Round your mean to the nearest whole #.




a) Calculate the mean.

b) Calculate the median.

c) Calculate the mode.

d) What is the range?

e) Determine the mean absolute deviation.

a)

(11) $14+14+15+15+15+16+16+18+18 = 141 \div 9 =$

$15.\overline{6} \simeq \boxed{16}$

b) 14, 14, 15, 15, **15**, 16, 16, 18, 18

median = $\boxed{15}$

middle #

c) 15 because it appears most often

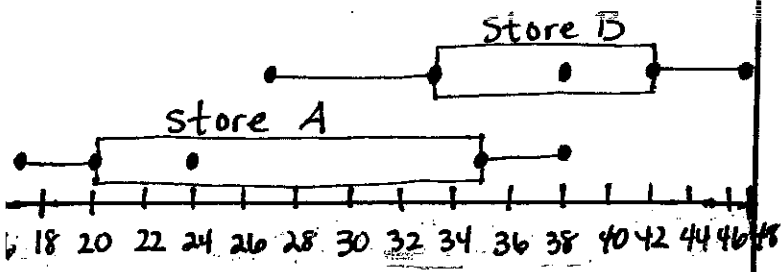
d) $18 - 14 = 4$

e) Mean = 16, so . . .

$14-16 = |-2| = 2$
$14-16 = |-2| = 2$
$15-16 = |-1| = 1$
$15-16 = |-1| = 1$
$15-16 = |-1| = 1$
$16-16 = 0$
$16-16 = 0$
$18-16 = 2$
$18-16 = 2$

$2+2+1+1+1+2+2 = 11 \div 9 = \boxed{1.\overline{2}}$

12) The box and whisker plot shows the prices of shirts at Store A and Store B. Compare each pair of measures for the data sets in the box and whisker plot, and use each comparison to draw an inference.




Compare
a) medians b) IQR's c) greatest prices

12)

a) store A = $24
store B = $38

b) IQR's
store A = $15
store B = $9

c) greatest price
store A = $38
store B = $48