EoT3 coverage -Grade 7-General 2022-2023

Mathematics
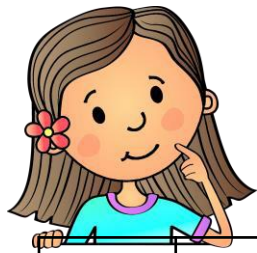
Student Name: Class :

Math teacher :Buthaina Khlaif – AL Reem school C2 -

Wishing you success in your exams

Module 9:Measure Figures

	Learning outcome	QS.	T.B page
1	Find the circumferences of circles given the radius or diameter using the formulas	1 - 6	455
2	Find the area of circles given the radius or diameter using the formulas for the circumference of a circle, and find the radius or diameter of a circle given its circumferences	1 - 8	465
3	find areas of composite figures by decomposing the figures into known shapes, and then adding the areas of	4-8	473
4	find volumes of prisms and pyramids by using formulas for volume of prisms and pyramids	1 - 6	485
5	find volumes of prisms and pyramids by using formulas for volume of prisms and pyramids	7-10	485
6	Find the surface areas of solids by relating the nets of those solids to the formulas for surface area	1-6	495

	MCQ 3 marks per question		MCQ 5 marks per question		FRQ (6 to 8 marks per question)

Part (1): 10 MCQ 3marks per question

Outcome: Find the circumferences of circles given the radius or diameter

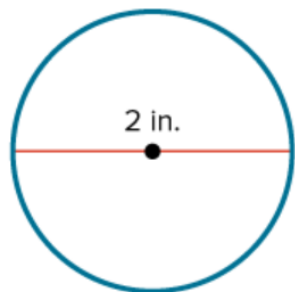1) **Find the circumference** of the watch face. Use 3.14 for π. Round to the nearest hundredth if necessary.

SOLUTION:
$C = \pi d$
$C = \pi(2)$
$C = 2\pi$
$C \approx 2(3.14)$
$C \approx 6.28$ in

2) A circular fence is being used to surround a doghouse. **How much fencing is needed** to build the fence? Use 3.14 for π.

SOLUTION:
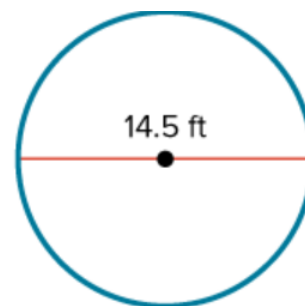$C = \pi d$
$C = \pi(14.5)$
$C = 14.5\pi$
$C \approx 14.5(3.14)$
$C \approx 45.53$ ft

3) **Find the circumference** of a circle with a radius 31 $\frac{1}{2}$ yards. Use 3.14 for π. Round to the nearest hundredth if necessary.

SOLUTION:
$C = 2\pi r$
$C = 2\pi\left(31\frac{1}{2}\right)$
$C = 63\pi$
$C \approx 63(3.14)$
$C \approx 197.82$ yd

4) **Find the circumference** of a circle with a radius of 4.4 inches. Use 3.14 for π. Round to the nearest hundredth .

SOLUTION:
$C = 2\pi r$
$C = 2\pi(4.4)$
$C = 8.8\pi$
$C \approx 8.8(3.14)$
$C \approx 27.63$ in

5) The world's largest flower, the Rafflesia, has a circumference of 286 centimeters. **Find the approximate diameter of the flower.** Use 3.14 for π.

SOLUTION:
$d = \dfrac{C}{\pi}$
$d \approx \dfrac{286}{3.14}$
$d \approx 91.08$ cm

6) A helicopter pad has a circumference of 47 $\frac{1}{2}$ yards. **Find the approximate diameter of the** helicopter pad. Use 3.14 for π. Round to the nearest hundredth.

$d = \dfrac{C}{\pi}$
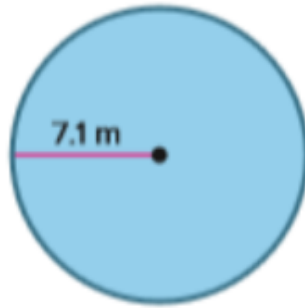$d \approx \dfrac{47.5}{3.14}$
$d \approx 15.13$ yd

Outcome: Find the area of circles given the radius or diameter using the formulas **textbook #465 questions 1-8**

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1) **Find the area** of the circle. Use 3.14 for π. Round to the nearest hundredth.

SOLUTION:

$A = \pi r^2$

$A = \pi (7.1)^2$

$A = 50.41\pi$

$A \approx 50.41(3.14)$

$A \approx 158.29 \ m^2$

7.1 m

---

2) **Find the area** of the circle. Use 3.14 for π. Round to the nearest hundredth.

SOLUTION:

$A = \pi r^2$

$A = \pi (4.25)^2$

$A = 18.0625\pi$

$A \approx 18.0625(3.14)$

$A \approx 56.72 \ in^2$

4.25 in.

---

3) **What is the area** of the drumhead on the drum? Use 3.14 for π. Round to the nearest hundredth.

14 in.

SOLUTION:

$A = \pi r^2$

$A = \pi (7)^2$

$A = 49\pi$

$A \approx 49(3.14)$

$A \approx 153.86 \ in^2$

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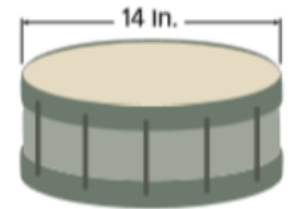
4) **What is the area** of one side of the penny . Use 3.14 for π. Round to the nearest hundredth.

SOLUTION:

The radius is $19 \div 2$ or 9.5 millimeters.

$A = \pi r^2$

$A = \pi (9.5)^2$

$A = 90.25\pi$

$A \approx 90.25(3.14)$

$A \approx 283.39 \ mm^2$

19 mm

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5) Mr. Ling is adding a pond in the shape of a semicircle in his backyard. **What is the area** of the pond? Use 3.14 for π. Round to the nearest hundredth.
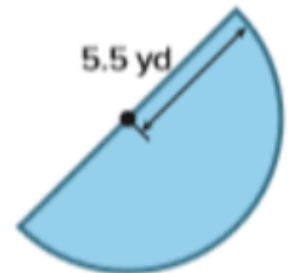
$A = \dfrac{1}{2}\pi r^2$

$A = \dfrac{1}{2}\pi (8.75)^2$

$A = 38.28125\pi$

$A \approx 38.28125(3.14)$

$A \approx 120.20 \ ft^2$

$8\frac{3}{4}$ ft

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6) Vidur needs to buy mulch for his garden. **What is the area** of his garden? Use 3.14 for π. Round to the nearest hundredth if necessary.

SOLUTION:

$A = \dfrac{1}{2}\pi r^2$

$A = \dfrac{1}{2}\pi (5.5)^2$

$A = 15.125\pi$

$A \approx 15.125(3.14)$

$A \approx 47.49 \ yd^2$

5.5 yd

Outcome: Find the area of circles given its circumference.   **textbook #465 questions 1-8**

7) The exact circumference of a circle is 18π inches. **What is the approximate area of the circle?** Use 3.14 for π. Round to the nearest hundredth.

$$C = 2\pi r$$
$$18\pi = 2\pi r$$
$$\frac{18\pi}{2\pi} = \frac{2\pi r}{2\pi}$$
$$9 = r$$

$$A = \pi r^2$$
$$A = \pi(9)^2$$
$$A = 81\pi$$
$$A \approx 81(3.14)$$
$$A \approx 254.34 \ in^2$$

8) The exact circumference of a circle is 34π meters. **What is the approximate area of the circle?** Use 3.14 for π. Round to the nearest hundredth.

$$C = 2\pi r$$
$$34\pi = 2\pi r$$
$$\frac{34\pi}{2\pi} = \frac{2\pi r}{2\pi}$$
$$17 = r$$

$$A = \pi r^2$$
$$A = \pi(17)^2$$
$$A = 289\pi$$
$$A \approx 289(3.14)$$
$$A \approx 907.46 \ m^2$$

Outcome: find areas of composite figures by decomposing the figures .   **textbook #473 questions 4-8**

4) **Find the area of the figure**. If necessary, use 3.14 for π and round to the nearest hundredths.

Triangle	Semicircle
$A = \dfrac{1}{2}bh$	$A = \dfrac{1}{2}\pi r^2$
$= \dfrac{1}{2} \cdot 4 \cdot 10$	$= \dfrac{1}{2} \cdot 3.14$
$= 20$	$= 39.25$

5 ft
4 ft

Find the area of the composite figure.
$20 + 39.25 = 59.25 \ ft^2$

5) **Find the area of the figure**. If necessary, use 3.14 for π and round to the nearest hundredths.

Triangle	Rectangle
$A = \dfrac{1}{2}bh$	$A = \ell w$
	$= 6 \cdot 20$
$= \dfrac{1}{2} \cdot 6 \cdot 4$	$= 120$
$= 12$	

8 m   6 m
10 m   6 m
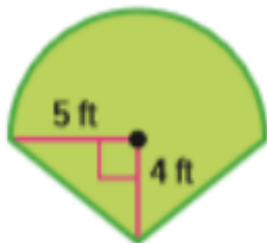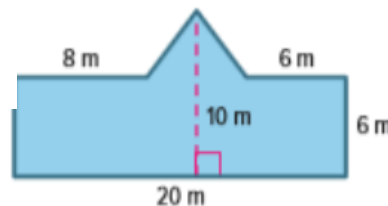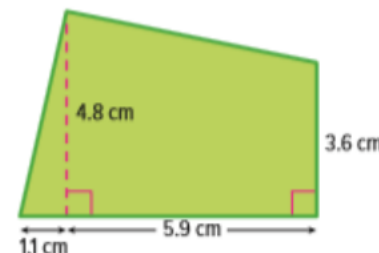20 m

Find the area of the composite figure.
$12 + 120 = 132 \ m^2$

6) **Find the area of the figure**. If necessary, use 3.14 for π and round to the nearest hundredths.

Triangle
$A = \dfrac{1}{2}bh$
$= \dfrac{1}{2} \cdot 1.1 \cdot 4.8$
$= 2.64$

4.8 cm
3.6 cm
1.1 cm
5.9 cm

$A = \dfrac{1}{2}h(b_1 + b_2)$

$= \dfrac{1}{2} \cdot 5.9(4.8 + 3.6)$

$= \dfrac{1}{2} \cdot 5.9(21)$

$= 24.70$

7) **Find the area of the shaded region.**

$A = \ell w$
$= (40)(16)$
$= 640$

8 ft   32 ft
8 ft   8 ft
8 ft   8 ft
8 ft

$A = s^2$
$= 8^2$
$= 64$

The area of the shaded region
=640-64-64=512 ft^2

8) **Find the area of the shaded region.**

$A = \dfrac{1}{2}h(b_1 + b_2)$

$= \dfrac{1}{2}(16)(20 + 40)$

$= \dfrac{1}{2}(16)(60)$

$= 480$

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

$= \dfrac{1}{2} \cdot 40 \cdot 16$

$= 320$

20 cm
16 cm
40 cm

Area of shaded
=480-320=160 cm^2

Find the area of the composite figure.
$2.64 + 24.70 = 27.42 \ cm^2$

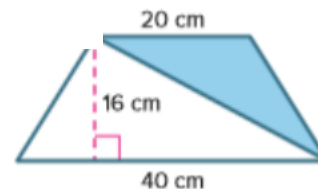**Outcome:** find volumes of prisms and pyramids by using formulas <mark>textbook #485 questions 1-6</mark>

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1) A cooler is in the shape of a rectangular prism. **What is the volume** of the cooler? Round to the nearest tenth if necessary.
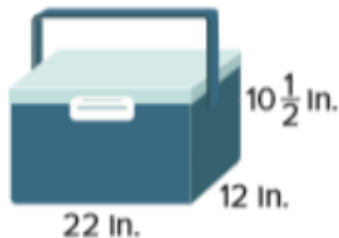
SOLUTION:
$V = Bh$
$V = (\ell w)h$
$V = (22 \cdot 12)10\frac{1}{2}$
$V = 2{,}772 \ in^3$

$10\frac{1}{2}$ In.
12 In.
22 In.

2) A cereal box is in the shape of a rectangular prism. **What is the volume** of the cereal box? Round to the nearest tenth .

SOLUTION:
$V = Bh$
$V = (\ell w)h$
$V = (8 \cdot 1\frac{3}{4})12\frac{1}{8}$
$V = 169.8 \ in^3$

$12\frac{1}{8}$ In.
$1\frac{3}{4}$ in.   8 in.

3) Find the volume of the figure. Round to the nearest tenth if necessary.

SOLUTION:
$V = Bh$
$V = (\frac{1}{2} \cdot 7.2 \cdot 9)h$
9.
$V = (32.4)h$
$V = (32.4)3$
$V = 97.2 \ m^3$

9 m
3 m
7.2 m

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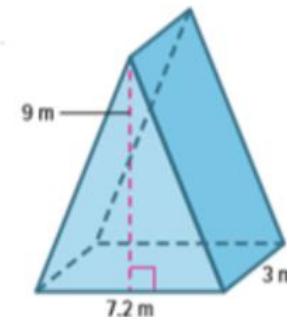
4) Find the volume of the figure. Round to the nearest tenth if necessary

SOLUTION:
$V = Bh$
$V = (\frac{1}{2} \cdot 2.6 \cdot 4.1)h$
4.1.
$V = (5.33)h$
$V = (5.33)5.1$
$V = 27.2 \ m^3$

4.1 m
5.1 m
2.6 m
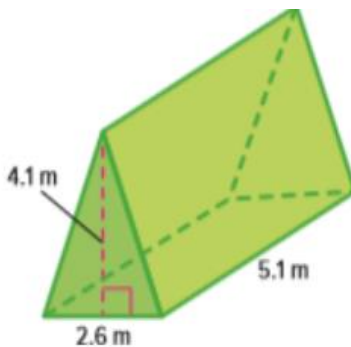
5) Find the volume of the figure. Round to the nearest tenth if necessary.

SOLUTION:
$V = \frac{1}{3}Bh$
$V = \frac{1}{3}(\frac{1}{2} \cdot 1.4 \cdot 1.8)h$
1.8.
$V = \frac{1}{3}(1.26)h$
$V = \frac{1}{3}(1.26)2.4$
$V = 1.0 \ m^3$

2.4 m
1.4 m   1.8 m

6) Find the volume of the figure. Round to the nearest tenth if necessary.

SOLUTION:
$V = \frac{1}{3}Bh$
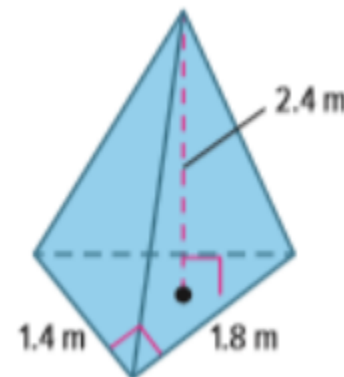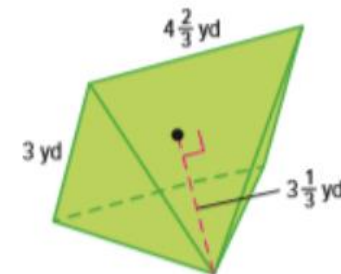$V = \frac{1}{3}(\ell w)h$
$V = \frac{1}{3}(4\frac{2}{3} \cdot 3)3\frac{1}{3}$
$V = 15.6 \ yd^3$

$4\frac{2}{3}$ yd
3 yd
$3\frac{1}{3}$ yd

Outcome: find volumes of prisms and pyramids by using formulas   **textbook #485 questions 7-10**

7) A triangular prism has a height of 5.9 meters and volume of 86.376 cubic meters. **What is the area of the base** of the prism?

SOLUTION:
$$V = Bh$$
$$86.376 = B(5.9)$$
$$86.376 = 5.9B$$
$$\frac{86.376}{5.9} = \frac{5.9B}{5.9}$$
$$14.64 = B$$

Area of the base =14.64 m^2

8) A rectangular pyramid has a height of 9.5 centimeters and a volume of 494 cubic centimeters. **What is the area of the base of the pyramid?**

SOLUTION:
$$V = \frac{1}{3}Bh$$
$$494 = \frac{1}{3}B(9.5)$$
$$156 = B$$

Area of the base =156 cm^2

9) Aglass stand to display a doll is in the shape of a right triangular pyramid as shown. The volume of the stand is 202.5 cubic inches. **What is the height of the stand**?

SOLUTION:
$$V = \frac{1}{3}Bh$$
$$V = \frac{1}{3}(\frac{1}{2} \cdot 9 \cdot 9)h$$

$$202.5 = 13.5h$$
$$\frac{201.5}{13.5} = \frac{13.5h}{13.5}$$
$$15 = h$$

Height =15 in

? in.
9 in.   9 in.
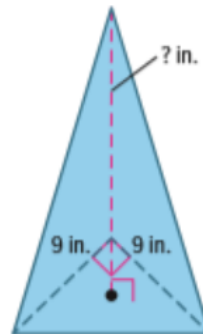
10) A triangular box of sticky notes is shown. The volume of the box of sticky notes is 54.6 cubic inches. **What is the height of the box of sticky notes?**

SOLUTION:
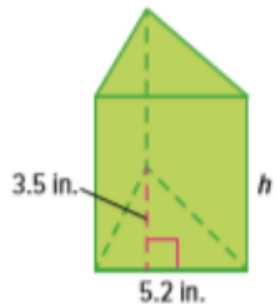$$V = Bh$$
$$V = (\frac{1}{2} \cdot 5.2 \cdot 3.5)h$$

$$V = (9.1)h$$
$$54.6 = (9.1)h$$
$$\frac{54.6}{9.1} = \frac{9.1h}{9.1}$$
$$6 = h$$

Height =6 in

3.5 in.   h   5.2 in.

Outcome: Find the surface areas of solids by relating the nets of those solids   <mark>textbook #495 questions 1-6</mark>

1) Find the surface area of the prism. Round to the nearest tenth if necessary.
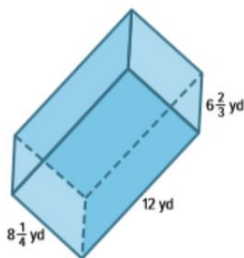
SOLUTION:

$S.A. = 2\ell h + 2\ell w + 2hw$

$= 2(12 \cdot 6\frac{2}{3}) + 2(12 \cdot 8\frac{1}{4}) + 2(6\frac{2}{3} \cdot 8\frac{1}{4})$

$= 160 + 198 + 110$

$= 468$

S.A= 468 yd^2

2) Find the surface area of the prism. Round to the nearest tenth if necessary.

SOLUTION:

$S.A. = 2\ell h + 2\ell w + 2hw$

$= 2(6 \cdot 3.7) + 2(6 \cdot 4.3) + 2(3.7 \cdot 4.3)$

$= 44.4 + 51.6 + 31.82$

$= 127.82$

$= 127.8$

S.A= 127.8 in^2
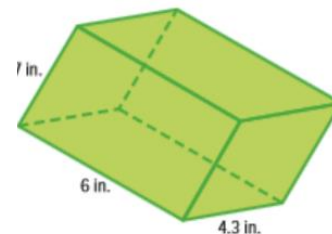
3) How much cardboard is needed to make the single slice of pizza box shown?

Area Bases:

$A = 2(\frac{1}{2} \cdot 6.7 \cdot 11)$

Area of Face 1   Area of Face 2

$A = 6.7 \cdot 1$ $A = 11.5 \cdot 1$

$= 6.7$ in^2 $= 11.5$ in^2

Area of Face 3

$A = 11.5 \cdot 1$

$= 11.5$ in^2

S.A= 73.7+6.7+11.5+11.5

S.A= 103.4 in^2
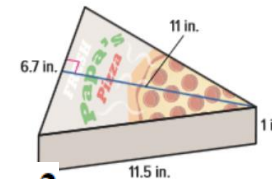
4) What is the surface area of the triangular prism-shaped toy car ramp shown?

Area Bases:

$A = 2(\frac{1}{2} \cdot 8 \cdot 15)$

$= 2(60)$

$= 120$

Area of Face 1   Area of Face 2   Area of Face 3

$A = 8 \cdot 7$ $A = 17 \cdot 7$ $A = 15 \cdot 7$
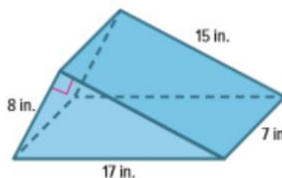
$= 56$ in^2 $= 119$ in^2 $= 105$ in^2

S.A= 120+56+119+105   S.A= 400 in^2

5) Find the surface area of the pyramid. Round to the nearest tenth if necessary.

$A = s^2$

$= 15.75 \cdot 15.75$

$= 248.0625$

$A = 4(\frac{1}{2} bh)$

$= 4(\frac{1}{2} \cdot 15.75 \cdot 12.25)$

$= 4(96.46875)$

$= 385.875$
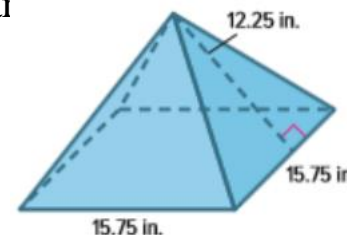
S.A= 248.1+385.9

S.A= 634 in^2

6) Find the surface area of the pyramid. Round to the nearest tenth if necessary.

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

$= \frac{1}{2} \cdot 12.2 \cdot 10.6$

$= 64.66$

$A = 3(\frac{1}{2} bh)$

$= 3(\frac{1}{2} \cdot 12.2 \cdot 16)$

$= 3(97.6)$

$= 292.8$

S.A= 64.7+ 292.8

S.A= 357.5
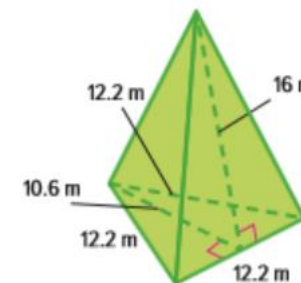
Module 10: Probability

	Learning outcome	QS.	T.B page
1	Describe the likelihood of an event as impossible, unlikely, equally likely to happen as not to happen, likely, or certain.	1 - 6	513
2	find the relative frequency of an event and use it to predict the chance of that event r occurring in the futureing in the future	1 - 5	527
3	Find the theoretical probability of a simple event and its complement, and understand the relationship between them	1-6	537
4	Understand what happens to the long-run relative frequency as the number of trials increases, and compare relative frequencies to theoretical probabilities	1-7	545-546
5	Use organized lists, tables, or tree diagram to find the sample space and probability of a compound event	ex 3,4	552,553
5	Use organized lists, tables, or tree diagrams to find the sample space and probability of a compound event.	1 - 5	557
6	Use organized lists, tables, or tree diagrams to find the sample space and probability of a compound event.	6 -11	558
7	Design a simulation to represent a simple or compound event and use the results of a simulation to find the experimental	1-2	567

Outcome: Describe the likelihood of an event   textbook #513 questions 1-6

1) The spinner shown is spun once. Classify the likelihood of the spinner **landing on dog** as *impossible*, *unlikely*, *equally likely*, *likely*, or *certain*.

the event is equally likely

2) The spinner shown is spun once. Classify the likelihood of the spinner **landing on hamster**.

the event is unlikely

3) The spinner shown is spun once. Classify the likelihood of the spinner **landing on dog or catas .**

the event is likely

4) The spinner shown is spun once. Classify the likelihood of the spinner **landing on bird.**

the event is impossible

5) The spinner shown is spun once. Classify the likelihood of the spinner **landing on an animal.**

the event is certain

6) The spinner shown is spun once. Classify the likelihood of the spinner **landing on cat or hamster.**

the event is equally likely

1) A spinner with four equal sections of blue, green, yellow, and red is spun 100 times. It lands on blue 14 times, green 10 times, yellow 8 times, and red 68 times. **What is the relative frequency of landing on red? green?**

relative frequency of rolling a red $= \dfrac{\text{number of times red occured}}{\text{total number of spins}}$

$$= \frac{68}{100}$$

$$= 68\%$$

relative frequency of rolling a green $= \dfrac{\text{number of times green occured}}{\text{total number of spins}}$

$$= \frac{10}{100}$$

$$= 10\%$$

2) The frequency table shows the results of a survey about favorite exhibits. **Find the relative frequency that a randomly selected student's favorite exhibit was either butterflies or trains, as a percent**

Exhibit	Frequency
Butterfly	12
Dinosaurs	25
Planets	17
Trains	6

$$\frac{\text{number of students that chose butterflies or trains}}{\text{total number of students}} = \frac{18}{60}$$

So, the relative frequency is $\dfrac{18}{60}$, 0.3, or 30%.

3) The graph shows the results of an experiment in which a number cube labeled 1 through 6 is rolled a number of times. **Find the relative frequency of rolling a number greater than 3.**

Number Cube Experiment
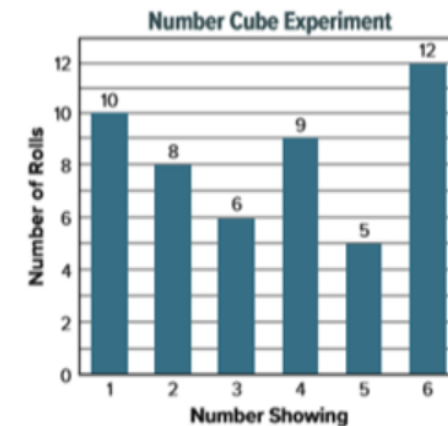
$$\frac{\text{number of rolls of 4 ,5, and 6}}{\text{total number of rolls}} = \frac{26}{50}$$

$$= \frac{13}{25}$$

4) A random selection of students was asked the question "What type of gift did you last receive?" and the results were recorded in the relative frequency bar graph. **What is the experimental probability that a student chosen at random received a gift card or money?**
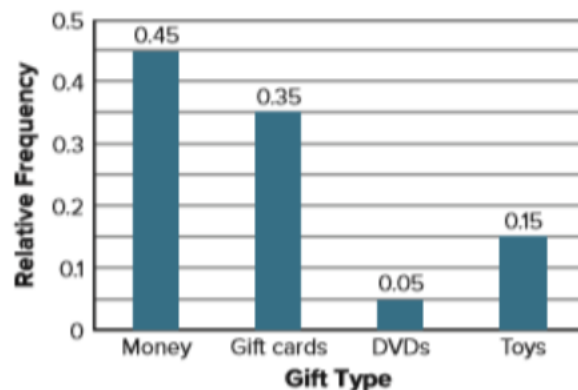
(relative frequency of a gift card) + (relative frequency of money)
       0.35   +   0.45

         = 0.80

5) Based on previous orders, the manager of an ice cream shop determines the probability that a customer will order chocolate sauce is 85%. If there are 240 sundaes ordered in one weekend, **how many sundaes are expected to be ordered with chocolate sauce?**

$$\frac{85}{100} = \frac{s}{240}$$

204 sundaes are expected to be ordered with chocolate sauce

Part (1): 10 MCQ 3marks per question

Outcome: Find the theoretical probability of a simple event and its complement   <mark>textbook #537 questions 1-6</mark>

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1) The spinner shown is spun once. **What is the sample space?**

The sample space is 1, 2, 3, 4, 5.

2) Each letter in the word MISSISSIPPI is written on a piece of paper and placed into a bag. A letter is drawn at random. **What is the sample space?**

The sample space is M, I, S, P.

3) A teacher placed the letter cards E, L, O, R, U, and W in a bag. A card is drawn at random. **Determine the theoretical probability for drawing a card that has a vowel on it?**

$$P(\text{vowel}) = \frac{3}{6}$$
$$= \frac{1}{2}; 0.5, 50\%$$

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4) A player in a board game rolls a six-sided number cube labeled 1 through 6 once. **Determine the theoretical probability of rolling a 1 or 2?**

$$P(1 \text{ or } 2) = \frac{2}{6}$$

are 6 numbers total.

$$= \frac{1}{3}, 0.\overline{3}, 33\frac{1}{3}\%$$

5) The table shows the lengths of time for rides at a fair. Zane will choose a ride at random and wants to find the probability of choosing a ride that lasts less than 200 seconds. **What is the probability of the complement of the event?**

$$P(\text{not lasts less than 200 seconds}) = \frac{3}{8}$$

, the probability of the complement is

$$\frac{3}{8}, 0.37, \text{ or } 37.5\%.$$

Ride	Time (seconds)
Barrel	150
Bumper Cars	195
Circus Carousel	210
Log Ride	120
Roller Coaster	55
Swings	225
Train	300
Zero Gravity Spinner	65

6) Red is spun on a spinner with five equal–size sections labeled red, yellow, blue, green, and purple. **What is the probability of the complement of the event?**

$$P(\text{not red}) = \frac{4}{5}$$

, the probability of the complement is : $\frac{4}{5}$, 0.8, or 80%.

Outcome: compare relative frequencies to theoretical probabilities.   **textbook #545 questions 1-7**

1) Jayden spins a spinner with four equal-size sections labeled red, yellow, green, and blue, 40 times. Micah randomly selects one marble from a bag that contains an equal number of red, yellow, green, and blue marbles. He replaces the marble and selects again. Micah repeats this experiment 40 times. Each student records their results in a frequency bar graph. **Which student's graph best represents the results that can be expected from each experiment?**
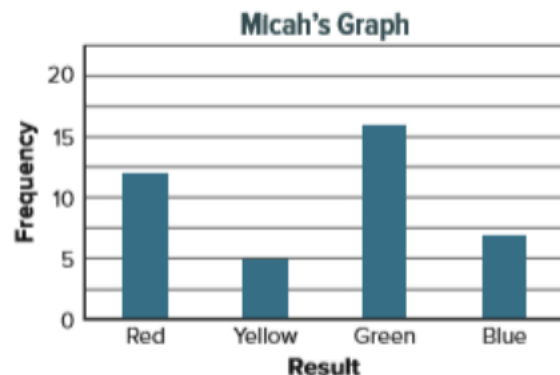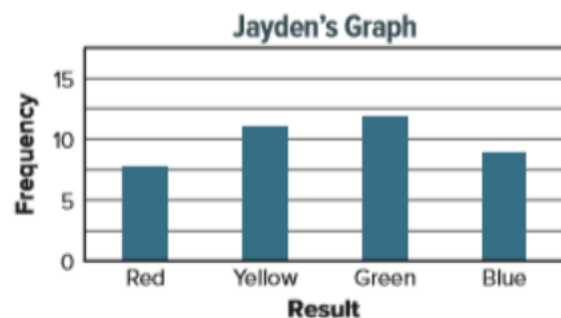
Jayden's graph has results that are more evenly distributed across each possible outcome.

2) Two experiments are conducted and their results are recorded in frequency bar graphs. **Which graph best represents the results that can be expected from Experiment 1? Experiment 2?**

Experiment 1	Experiment 2
A spinner with equal-size sections of A, B, C, D, and E is spun 50 times.	A card is randomly selected from a bag containing five A cards, three B cards, four C cards, one D card, and two E cards. The card is then placed back in the bag. There are 50 trials.
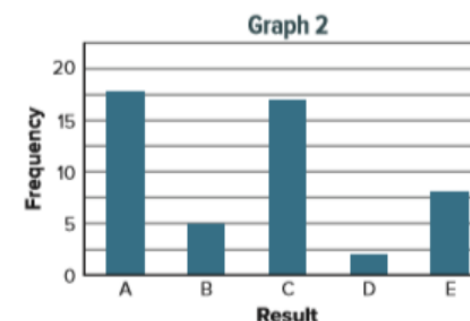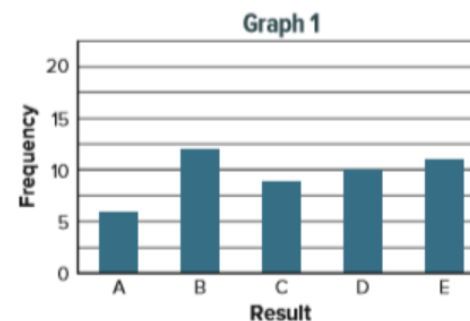
Graph 1 best represents Experiment 1. the spinner has outcomes that are equally likely

Graph 2 best represents Experiment 2. there are more cards labeled A and C than the cards labeled B, D, or E.

3)Suppose the spinner shown is spun 80 times. Another spinner with four equal-size sections labeled red, blue, yellow, and purple is spun 80 times. The results are recorded in the following frequency bar graphs. **Which graph best represents the results that can be expected from the first spinner? the second spinner?**
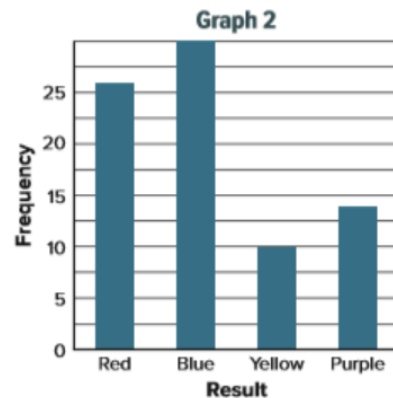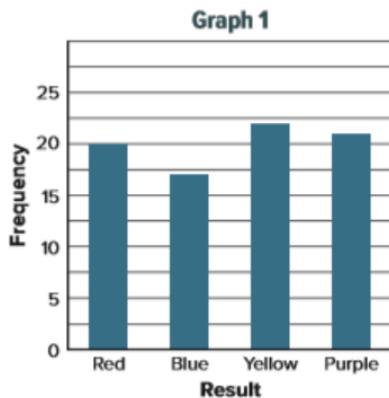
Graph 2 best represents the shown spinner. there are more sections labeled blue and red than the sections labeled purple or yellow

Graph 1 best represents the other spinner. the second spinner, it has outcomes that are equally likely

5) A coin is tossed 30 times. It lands on heads 10 times**. Find the experimental probability and theoretical probability of tossing heads. Are the probabilities close?**

experimental probability: $\dfrac{10}{30}$ or $\dfrac{1}{3}$

theoretical probability: $\dfrac{1}{2}$

$\dfrac{1}{2}$ and $\dfrac{1}{3}$ are not close. More trials should be performed.

Outcome: Use organized lists, tables, or tree diagrams to find the sample space and probability of a compound event

1) An Italian ice shop sells Italian ice in four flavors: lime, cherry, blueberry, and watermelon. The ice can be served plain, mixed with ice cream, or as a drink. **Using an organized list or table, what is the sample space of possible outcomes**

There are 12 outcomes.

Sample space :
lime plain, lime ice cream, lime drink,
cherry plain, cherry ice cream, cherry drink,
blueberry plain, blueberry ice cream, blueberry drink,
watermelon plain, watermelon ice cream, watermelon drink

2) A deli offers a lunch consisting of a soup, salad, and sandwich from the menu shown in the table. A customer randomly chooses lunch consisting of a soup, salad, and sandwich. Construct and use a tree diagram to determine the sample space of the event. **How many possible outcomes are in the sample space ?**

Soup	Salad	Sandwich
Tortellini	Caesar	Roast Beef
Lentil	Macaroni	Ham
		Turkey

There are 12 outcomes.

Sample answer:
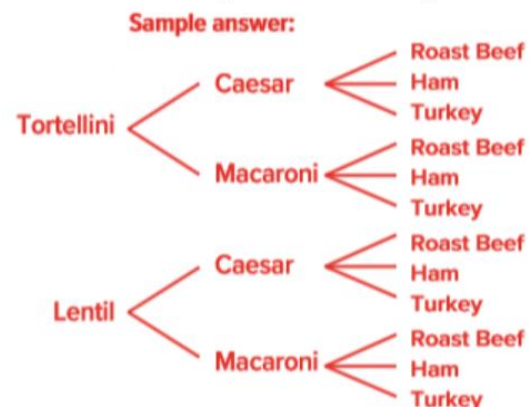
3) The spinner shown has six equal-size sections and is spun twice. **What is the probability that the product of the numbers spun is 12?**

$$P(\text{product of 12}) = \frac{4}{36}$$

$$= \frac{1}{9}$$

11.1%.

Outcome: Use organized lists, tables, or tree diagrams to find the probability of a compound event

textbook #557 questions 1-5

4) A number from 0 to 9 is randomly selected and then a letter from A to D is randomly selected. **What is the probability that the number 3 and a consonant are selected**

$$P(\text{product of 3 and constant}) = \frac{3}{40}$$

0.075, or 7.5%.

5) Lorelei tosses a coin 4 times. **What is the probability of tossing four heads?** Express as a percent

Coin 1	Coin 2	Coin 3	Coin 4	Outcome
			H	HHHH
		H	T	HHHT
	H		H	HHTH
		T	T	HHTT
H			H	HTHH
	H	H	T	HTHT
	T		H	HTTH
		T	T	HTTT
			H	THHH
	H	H	T	THHT
		T	H	THTH
T			T	THTT
			H	TTHH
	H	H	T	TTHT
	T		H	TTTH
		T	T	TTTT
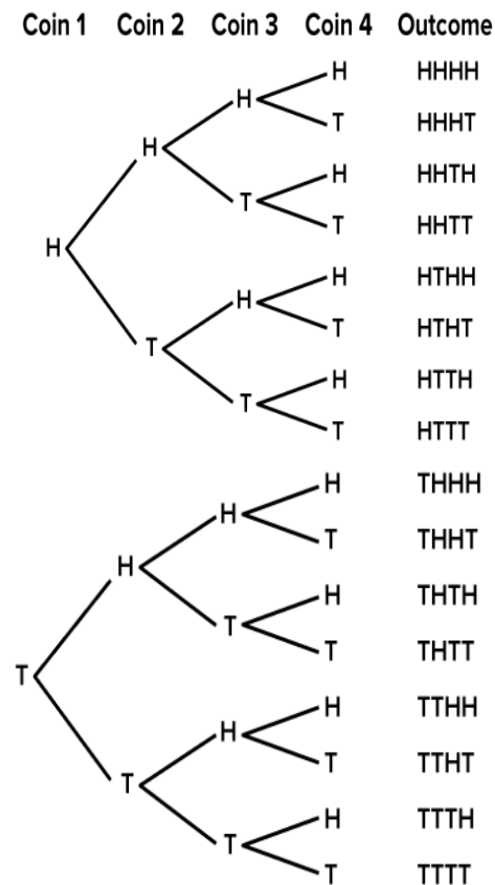
$$P(4 \text{ heads}) = \frac{1}{16}$$

$$= 6.3\%$$

Part (2): 10 MCQ (5 marks per question)

Outcome: Use organized lists, tables, or tree diagrams to find the sample space , of a compound event. .**textbook #558 questions 6-11**

6) A number cube labeled 1 through 6 is rolled and the spinner shown is spun once. The spinner has four equal-size sections. This experiment is repeated 60 times. The relative frequency for getting a sum of 5 was 1/5 .**What is the difference between the number of expected outcomes and the number of actual outcomes?**

Find the theoretical probability.

$$P(\text{sum of 5}) = \frac{4}{24}$$

$$\frac{4}{24} = \frac{x}{60}$$

$$\frac{4}{24} = \frac{10}{60}$$

10 times a sum of 5 is expected.

$$\frac{1}{5} = \frac{x}{60}$$

$$\frac{1}{5} = \frac{12}{60}$$

So, the sum of 5 occurred 12 times.

The difference between the number of expected outcomes and the number of actual outcomes is 12 – 10=2

7) Olivia tosses a two–sided counter and then spins a spinner with six equal–size sections labeled 1 through 6. One side of the counter is red. The other side is yellow. She performs this experiment 80 times. The relative frequency of tossing red and spinning a number greater than three was 2/5 . **What is the difference between the number of expected outcomes and the number of actual outcomes?**

Find all the possible outcomes using a list.

1R, 1Y, 2R, 2Y, 3R, 3Y, 4R, 4Y, 5R, 5Y, 6R, 6Y

$$P(\text{red and number} > 3) = \frac{3}{12}$$

$$\frac{1}{4} = \frac{x}{80}$$ Red and a number greater than 3 exepted 20 times

Find the actual number of times.

$$\frac{2}{5} = \frac{x}{80}$$ Red and a number greater than 3 occurred 32 times

The difference between the number of expected outcomes and the number of actual outcomes is 32 – 20 =12

Outcome: Use organized lists, to find the sample space and probability of a compound event   **textbook #552,553 Examples 3,4**

Ex.3) Two number cubes labeled 1 through 6 are rolled **what is the probability of rolling a sum of 9?**

	1	2	3	4	5	6
1	(1, 1)	(1, 2)	(1, 3)	(1, 4)	(1, 5)	(1, 6)
2	(2, 1)	(2, 2)	(2, 3)	(2, 4)	(2, 5)	(2, 6)
3	(3, 1)	(3, 2)	(3, 3)	(3, 4)	(3, 5)	(3, 6)
4	(4, 1)	(4, 2)	(4, 3)	(4, 4)	(4, 5)	(4, 6)
5	(5, 1)	(5, 2)	(5, 3)	(5, 4)	(5, 5)	(5, 6)
6	(6, 1)	(6, 2)	(6, 3)	(6, 4)	(6, 5)	(6, 6)

Roll 1

$$P(\text{sum of } 9) = \frac{\text{number of outcomes with sum of } 9}{\text{total number of outcomes}}$$

$$= \frac{4}{36}$$

$$= \frac{1}{9}$$

Ex.4) Two coins are tossed and a number cubes labeled 1 - 6 is rolled. **What is the probability of tossing heads at least once ,and rolling an even number?**
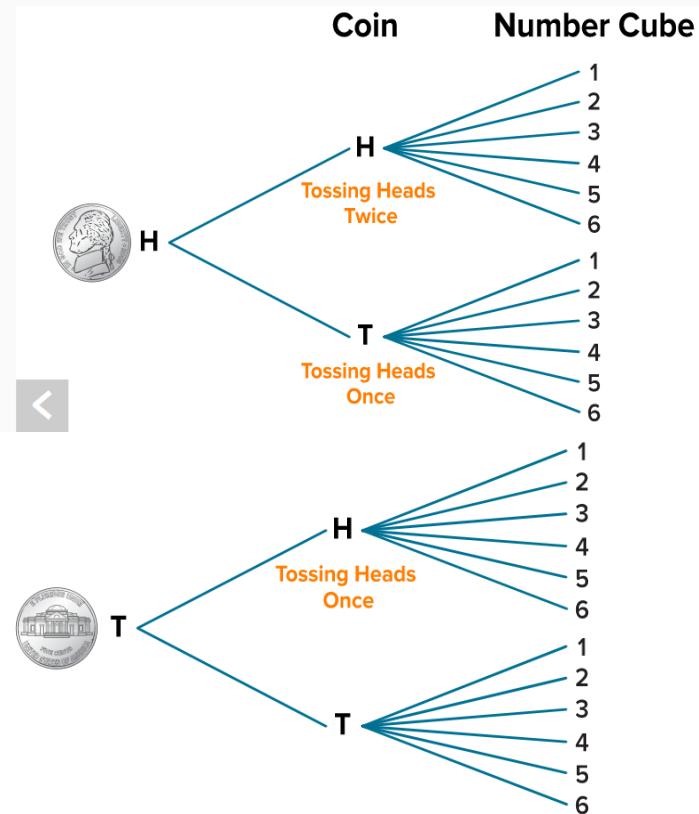
Coin   Number Cube

Tossing Heads Twice

Tossing Heads Once

Tossing Heads Once

$$P(\text{heads} \geq 1 \text{ and even})$$

$$= \frac{9}{24}$$

$$= \frac{3}{8}$$

Outcome: Use organized lists, tables, or tree diagrams to find the sample space , of a compound event. .**textbook #558 questions 6-11**

8) Natalie has a choice of a black, blue, or tan skirt to wear with a red, blue, or white sweater. Without calculating the number of possible outcomes, **how many more outfits can she create if she adds a yellow sweater to her collection?**

he will have three different skirts that she can wear with the yellow sweater.

9) Kimiko and Miko are playing a game in which each person rolls a number cube. If the sum of the numbers is a prime number, then Miko wins. Otherwise, Kimiko wins. **Is this game fair?**

The probability that Kimiko will win is $\dfrac{7}{12}$.

Kimiko has a greater chance of winning

10) Does the algebraic expression x^{10} represent the number of possible outcomes if the spinner shown is spun x times?**?**

The algebraic expression 10^x would represent the number of outcomes. For example, if you spun the spinner 2 times, the total number of outcomes is 10^2 or 100 and not 2^{10} or 1,024

11) Describe a real–world compound event that has a sample space with four possible outcomes. Show the sample space?

Choosing a hamburger or hot dog and then potato salad or macaroni salad.
Sample space: hamburger, potato salad
hamburger, macaroni salad
hot dog, potato salad
hot dog, macaroni salad

Outcome: Design a simulation to represent a simple or compound event   .textbook #567 questions 1-2

1)Suppose the chance of rain on Saturday is 2/5 and the chance of rain on Sunday is also 2/5. A student wants to run a simulation to estimate the probability that it will rain on both days.
A) How can the student model the chance of it raining on each day? Design a simulation.

Use a spinner with five equal–size sections. Label two sections "R" for rain and three sections "N" for no rain. The spinner is spun twice for each trial.

B)Suppose the table shows the results of 10 trials of a simulation. An "R" represents a day that it rained and an "N" represents a day that it did not rain. According to the results of the simulation, what is the experimental probability of having rain on both days?

Trial	1	2	3	4	5	6	7	8	9	10
Saturday	N	R	R	N	N	R	R	N	R	N
Sunday	N	N	R	R	N	R	N	R	R	N

$$P(\text{rain both days}) = \frac{3}{10} \quad 0.3, \text{ or } 30\%.$$

2) Leigh designs and conducts a computer simulation with 30 trials and uses the data from the simulation to create the relative frequency bar graph shown. The graph shows the relative frequency of the number of spins needed for a spinner divided into 6 equal sections labeled A through F to land on each letter at least once. Using the graph, what is the experimental probability that more than 10 spins are needed to land on each letter at least once? Write the probability as a perce
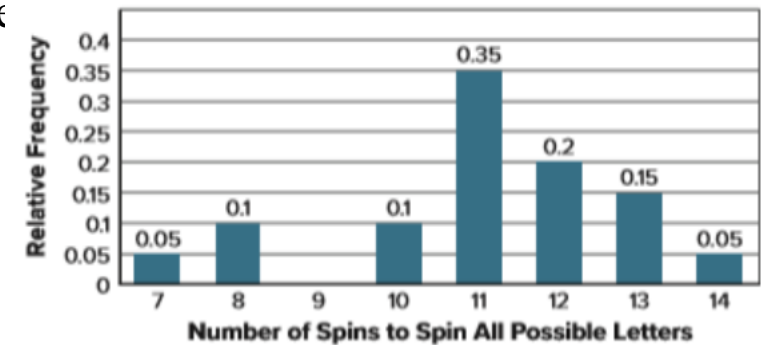
$$P(> 10 \text{ spins}) = P(11) + P(12) + P(13) + P(14)$$

$$= 0.35 + 0.20 + 0.15 + 0.05$$

$$= 0.75 \text{ or } 75\%$$

Module 11: Sampling and Statistics

	Learning outcome	QS.	T.B page
1	Identify biased and unbiased samplingmethods and understand that inferences made are only valid if the sampling method is unbiased.	**1 - 5**	**583**
2	Make predictions about a population based on data from a random sample.	**1 - 6**	**591**
2	Make predictions about a population based on data from a random sample.	**1 - 6**	**591**
3	Understand how collecting multiple samples of data can help determine how predictions about a population might vary	**1-3**	601,602
4	Use the measures of center and measures of variation to compare two samples and make comparative inferences about two populations	**1-3**	611

	MCQ 3 marks per question		MCQ 5 marks per question		FRQ (6 to 8 marks per question)

Outcome: Identify biased and unbiased sampling methods and understand that inferences made. .**textbook #583 questions 1-5**

1) For each sampling description, identify the valid sampling method that best describes it. Choose from *simple random sample, stratified random sample*, or *systematic random sample*

A) To determine if a candidate for state senator is popular with voters, 25% of voters in 160 counties are surveyed.

Because the population is divided into groups and then a simple random sample is then selected from each group **it is a stratified random sample.**

B) To determine whether students think a new school library is needed, a computer generates a list of 100 random students, and they are surveyed.

Because each person in the population is as likely to be chosen as any other **it is a simple random sample.**

C) To determine the freshness of doughnuts, a baker selects a doughnut every 30 minutes and checks it.

Because the sample is selected from the population according to a specific time interval **it is a systematic random sample**

2) Identify the type of biased sample for each situation. Choose from *convenience sample* or *voluntary response sample*.

A) A physical education teacher posts an online survey about whether students would be interested in a 5K race. The responses received determine whether there will be a 5K race.

This sample involves only those who want to, or can, participate in the sampling so **it is a voluntary response sample.**

B) To determine the theme of the school dance, the student council president surveys his homeroom class.

This sample includes members of the population that are easily accessed so **it is a convenience sample.**

Outcome: Identify biased and unbiased sampling methods and understand that inferences made. .**textbook #583 questions 1-5**

3) To evaluate customer satisfaction, a grocery store manager gives double coupons to anyone who completes a survey as they enter the store. The store manager determines that customers are very satisfied with their shopping experience in his store. **Identify the sample method used and whether it is biased or unbiased. Then determine whether the inference is valid.**

This is **a voluntary response sample**. The results **are biased** because the responses will likely favor opinions that come only from people who feel very strongly about that topic. So**, the inference is not valid**

4) A member of the cafeteria staff asks every fifth student leaving the cafeteria to rank 5 entrees from most favorite to least favorite. She finds that pizza is one of the favorite entrees. Identify the sample method used and whether it is biased or unbiased. Then determine whether the inference is valid.

This sample is selected from the population according to a specific number so it is **a systematic random sample**. The results are unbiased because the sample is **unbiased and representative**. So, the **inference is valid**.

5) To evaluate the defect rate of its lenses, a camera lens manufacturer tests every 100th lens off the production line. Out of 1,000 lenses tested, one lens is found to be defective. The manufacturer concludes that 3 lenses out of 3,000 will be defective. Select all of the statements that are true about the sampling method.

- ☑ This scenario is a systematic random sample.

- ☐ The sampling method is biased.

- ☑ The inference is valid.

- ☐ This scenario is a convenience sample.

- ☑ The sampling method is unbiased.

1) A school librarian is purchasing new books for her book clubs in the coming year. In order to determine how many books she needs, she randomly surveys 25 students who plan to participate in one of her book clubs in the coming year. The table shows the results. **Predict how many science fiction books she will need to purchase if 125 students participate in book club next year**

Book Club Type	Number of Students
Autobiography	2
Graphic Novel	7
Mystery	10
Science Fiction	6

$$\frac{6}{25} = \frac{s}{125}$$

The school librarian should buy 30 science fiction books.

2) A smart tablet manufacturer tests 1 out of every 25 screens for flaws. Out of 125 tablets tested, 2 had defective screens. How many defective screens should the manufacturer expect out of 45,000 smart tablet.

$$\frac{2}{125} = \frac{d}{45,000}$$

The manufacturer should expect 720 tablets to be defected

3) The superintendent of a school district wants to project for next year's middle school lunch count. The graph shows the results of a survey of randomly selected middle students. If the district has 5,000 middle school students next year, **about how many students plan to buy lunch 1–2 days a week?**

$$\frac{37}{100} = \frac{n}{5,000}$$

How Many Days Will You Buy Lunch?

- 5 days 25%
- 1-2 days 37%
- 0 days 13%
- 3-4 days 25%

about 1,850 students

Outcome: Make predictions about a population based on data from a random sample.   textbook #591 questions 1-6

4) The guidance department conducted a random survey of the student body and found that 16% of the students plan to volunteer at the school festival. **Predict how many volunteer positions they should plan for a population of 950 students.**

$$\frac{16}{100} = \frac{n}{950}$$

about 152 positions.

5) The owner of a travel agency randomly surveyed its customers. The survey showed that 55% of the company's customers were planning an overseas vacation the following year. **Predict how many of the travel company's 12,400 travelers will vacation overseas the following year.**

$$\frac{55}{100} = \frac{n}{12,400}$$

about 6,820 customers

6) Every 30 minutes, a box of crayons is pulled from the assembly line to check the quality. Of 240 checked boxes of crayons, 2 did not pass inspection. **How many boxes out of 12,000 should the crayon company expect to not pass inspection?.**

$$\frac{2}{240} = \frac{d}{12,000}$$

The manufacturer should expect 100 boxes not to pass

Part (1): 10 MCQ 3 marks per question

Outcome: Understand how collecting multiple samples of data can help determine predictions about a population   **textbook #601 questions 1-3**

1) The dot plot displays data from 14 random samples, each consisting of 30 middle school students. Each dot represents the mean number of sports played per year by students in the sample

Means of Samples

Number of Sports Played
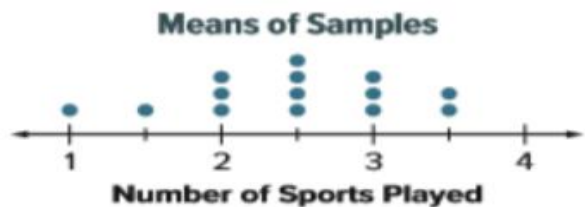
A) Which number best represents the mean number of sports played by middle school students?

the mean of the population should be close to 2.5 sports.

B) Find and interpret the variability in the distribution

MAD=0.54 sports;
The majority of the sample means are within 0.5 sport of the mean. This means our estimate is likely not far off from the true mean.

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2) Below are two dot plots containing sample means from the same population.
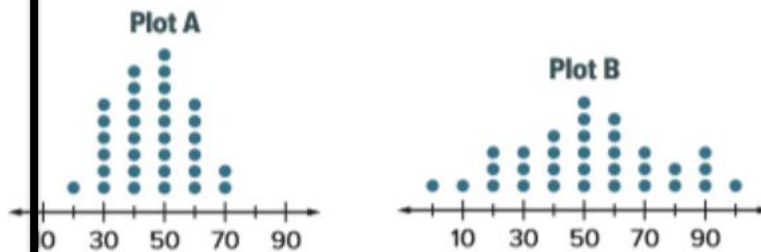
Plot A

Plot B

A) How many samples are represented in each plot?

there are 32 samples for both plot A and Plot B because each dot represents one sample.

B) Which dot plot has higher variability?

Plot B has a higher variability.

C) One plot contains samples of size 25, and the other plot contains samples of size 60. Which dot plot contains the samples of size 60?

Plot A contains the samples of 60. There is less variability between the means among the samples of 60.

---

3) A large company is trying to determine the mean number of pounds of decaf coffee sold per week in its stores. The dot plot shows the mean pounds of decaf coffee sold per week from 32 samples of 50 stores each

Means of Samples

Pounds of Decaf Coffee Sold per Week
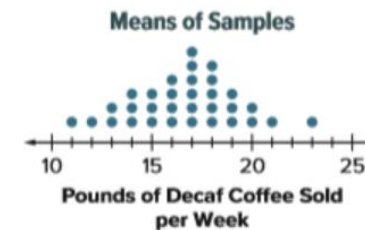
A) Describe the variability of the dot plot.

The majority of the data are clustered between 14 and 19 pounds.

B) How might the dot plot be different if each of the 32 samples contained data from 200 stores.

The data would be more tightly clustered between 15 and 18 pounds.

D) The company samples 200 stores and finds a mean of 17 pounds of decaf coffee sold per week. Based on your answer to Part B, what range of values might describe the mean for all stores in the company
The store might expect to sell between 16 and 18 pounds of decaf coffee

Outcome Use the measures of center and measures of variation to compare two samples and make comparative inferences . <mark>textbook #611 questions 1-3</mark>

1) The double dot plot shows the weights in pounds of several housecats and small dogs. **Compare their centers and variability**. What are some appropriate inferences you can make about the data

Weights (lb)

Housecats

Small Dogs

5 6 7 8 9 10 11 12 13 14
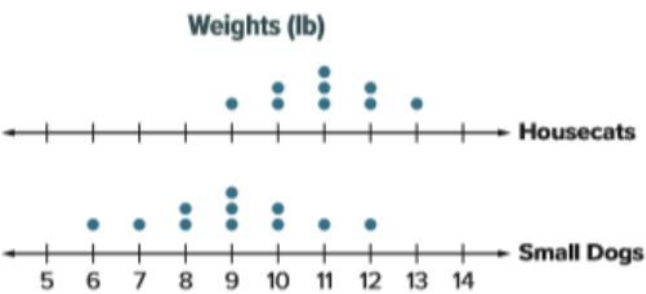
housecat

The mean for the housecat data is 11 lb.

The MAD for the housecat data is 0.9 lb.

small dog

The mean for the small dog data is 9 lb.

The MAD for the small dog data is 1.3 lb.

the housecats weigh more with less variation.

2) The double box plot shows the number of Calories per serving for various fruits and vegetables. **What are some appropriate inferences you can make about the data**
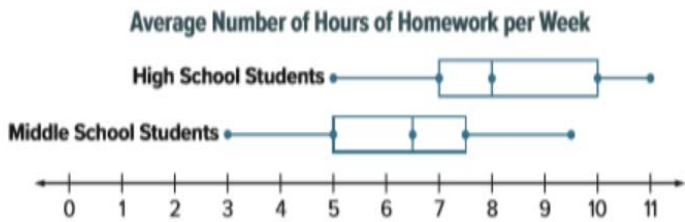
Calories per Serving

Fruits

Vegetables

0   25   50   75   100   125   150   175   200
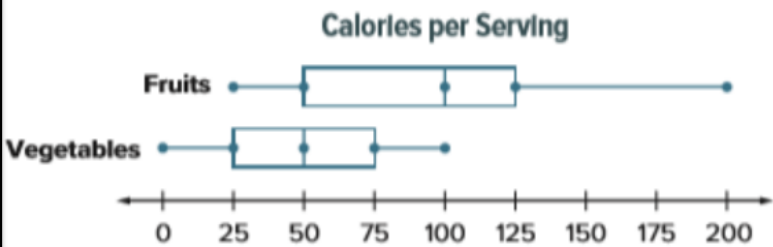
Fruits The median is 100 Calories.

$IQR = 125 - 50$ $IQR = Q_3 - Q_1$
$= 75$

Vegetables The median is 50 Calories.

$IQR = 75 - 25$ $IQR = Q_3 - Q_1$
$= 50$

the fruits have a higher number of Calories with a greater variation

3) The double dot plot represents the average number of hours of homework each week for high school students and middle school students. Use the measures of center and variability of these samples to select the age group(s) to which each statement applies.

Average Number of Hours of Homework per Week

High School Students

Middle School Students

0 1 2 3 4 5 6 7 8 9 10 11

	Middle School	High School
The median is greater.		■
The IQR is 2.5.	■	
The data have greater variability.		■
A person from this sample is more likely to have more than 7 hours of homework a week.		■
The data are more symmetric.	■	