**GRADE 12 APPLIED – PROBABILITY**
**Theoretical and Experimental Probability**

**Name:** _____
**Date:** _____

**Show your work**. Complete the puzzle!

# *Why Is Gigi a Successful Dancer in Paris?*

Find each correct answer in the set of answers under the exercise and cross out the letter above it.

Read instructions! ↑

| I | T | S | O | H | ~~O~~ | T | B | E | C | S | T | A | R | O | F | I | N | E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| $\frac{2}{3}$ | $\frac{1}{8}$ | $\frac{1}{10}$ | 60 | 225 | $\frac{5}{8}$ | 200 | 250 | $\frac{1}{6}$ | 40 | 20 | $\frac{1}{9}$ | 15 | $\frac{1}{2}$ | 50 | 8 | 36 | $\frac{4}{5}$ | $\frac{3}{8}$ |

**Theoretical Probability**. In exercises [questions] 1 – 8, express each probability as a fraction in lowest terms and complete the puzzle above.

**SHOW METHOD:**

**1.** Each time you spin this spinner, how many equally likely outcomes are there?

1)

**2.** Find each probability if you spin the spinner once.


**a.** P(a vowel).

2a) $P(\text{vowel}) = \frac{\#\text{ of vowels}}{\#\text{ total possible}} = \frac{5}{8}$

**b.** P(a consonant).

**c.** P("Q").

**3.** If you spin the spinner 400 times, about how many times would you expect it to stop on:

3a) $\frac{5}{8} = \frac{x}{400}$ ....

$x =$

or $x = P(\text{vowel}) \cdot n(\text{total})$

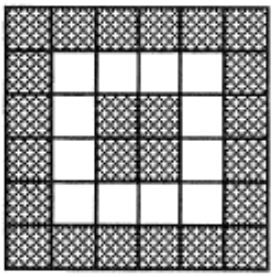
**a.** a vowel? **b.** the letter "N"?

**4.** If you roll a regular 6-faced die 1200 times, about how many times would you expect to get a 5?

**SHOW METHOD: (*always*)**

**5.** If a dart hits this target randomly, how many equally likely outcomes are there?

**6.** If a dart hits the target randomly, what is the probability it will hit:



**a.** The bullseye (one of the center squares)?

**b.** Any shaded square?

**7.** If a dart hits the target randomly 180 times, about how many times would you expect it to hit:

**a.** the bullseye? **b.** a white square?

**8.** Karina tossed a coin 10 times and got heads every time. What is the probability she will get heads on the next toss?

**Tip: Reducing Fractions**

a. Divide numerator and denominator by 'Common Factor':

$\frac{12}{36} = \frac{12 \div 2}{36 \div 2} = \frac{6 \div 2}{18 \div 2} = \frac{3 \div 3}{9 \div 3} = \frac{1}{3}$

b. Convert using 'prime factors':

$\frac{12}{36} = \frac{2 \cdot 6}{2 \cdot 18} = \frac{2 \cdot 2 \cdot 3 \cdot 1}{2 \cdot 2 \cdot 3 \cdot 3} = \frac{1}{3}$

c. Or just use the fraction button on a calculator

$\frac{12}{36} = \frac{1}{3}$

| B | E | D | C | S | T | A | R | U | N | C | E | P | A | T | H | O | P | N |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 30% | 40% | 20% | 375 | 19% | 92% | 5% | 340 | 27% | 36% | 132 | 7% | 8% | 24% | 33% | 120 | 46% | 9% | 15% |

[*Cross out* the letter *above* the answer]

**Experimental Probability**. In exercises [questions] 9 – 14, express each probability as a **percent** (some are rounded) and complete the puzzle above.

**SHOW WORK: (*always*)**

**9.** Whazup Toyz inspected 200 toy robots for defects. There were 16 robots with defects. What is the probability that a robot selected at random has:

**a.** a defect? **b.** no defect?

**10.** Whazup Toyz has 1500 toy robots in its warehouse. Based on the data above, about how many of the robots are likely to have a defect?

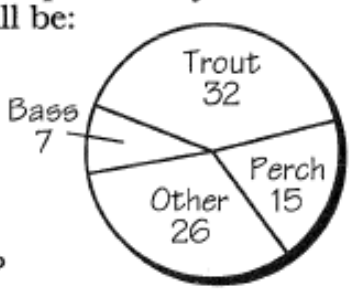
**11.** The circle graph shows the fish caught in Lost Lake over the last week. Based on this data, what is the probability that the next fish caught will be:

**a.** a trout?

**b.** a bass?

**c.** a perch?

**d.** another species?



**SHOW METHOD: (*always*)**

**12.** Checking his database, a meteorologist finds 192 days that had weather patterns similar to those he observes today. On 57 of those days, it rained. Based on this data, what is the probability of rain today?

**13.** Twila Zone asked students at her school to name their favorite radio station. The results are given in the table. Based on this data, what is the probability that a student selected at random would name:

**a.** WROK?

**b.** WRAP?

**c.** WHIT?

**d.** another station?

| Station | Number |
|---|---|
| WROK | 33 |
| WRAP | 56 |
| WHIT | 9 |
| Other | 24 |

**14.** If there are 1260 students at Twila's school, about how many of them would you expect to choose WROK?

**Notes:**

Probability of Outcome '*A*': $\boldsymbol{P(A)} = \frac{number\ of\ favoured\ outcomes}{total\ number\ of\ possible\ outcomes} = \frac{n(A)}{n(total)}$

(when calculating 'Theoretical' Probability each outcome must be equally likely)

Consequently ( re-arranging ): $n(A) = P(A) * n(total)$