STEPs Math Quiz 1

Monday, July 14, 2025   Class time: 8:00 AM – 9:00 AM
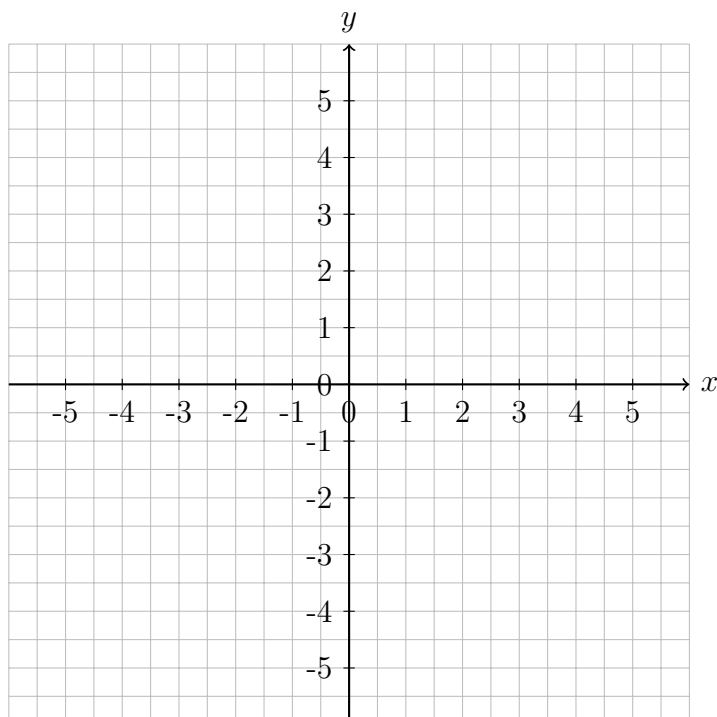
Name: _____ National ID: _____

Select your section instructor: ☐ Majid/Hamza ☐ Asaad

1. From a standard 52-card deck, we are drawing two cards *without replacement*:
   (A standard deck has 4 shapes: ♡ hearts, ◇ diamonds, ♣ clubs, ♠ spades, and 13 numbers: A, 2, 3, 4, 5, 6, 7, 8, 9, 10, J, Q, K).

   (a) What is the probability the first card is a face card (J, Q, or K)? _____

   (b) Given the first card drawn was a face card, what is the probability the second card is also a face card? _____

2. Two island bird populations grow exponentially at different rates. Species X doubles every 3 years; Species Y doubles every 5 years. Currently, both populations have the same number of birds. After how many years will Species X population be twice that of Species Y?

   ⇒ number of years: _____

3. **Sketch** the graph of
$$r(x) \;=\; -\frac{2}{x-1} \;+\; 3$$
   on the grid below, and state: the **domain** and **range**, the vertical and horizontal **asymptotes** (in the form $x = a$ or $y = b$) based on the graph.

4. Let
$$f(x) = x^2 - x \quad \text{and} \quad k(x) = \sqrt{x - 2}.$$

(a) Evaluate $(f \circ k)(3) =$ _____

(b)   i. Compute $(k \circ f)(x) =$ _____

     ii. Write its domain: _____

     iii. Write its range: _____

5. Solve for the unknowns:

(a) $2 \cdot 4^{x+1} - 10 = 6.$ $x =$ _____

(b) $\log_3(y + 3) - \log_3(y - 1) = 2.$ $y =$ _____

(c) $2^{\log_8(27)} =$ _____

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Name: _____ National ID: _____

Select your section instructor: ☐ Majid/Hamza ☐ Asaad

1. From a standard 52-card deck, we are drawing two cards *without replacement*:
   (A standard deck has 4 shapes: ♡ hearts, ◇ diamonds, ♣ clubs, ♠ spades, and 13 numbers: A, 2, 3, 4, 5, 6, 7, 8, 9, 10, J, Q, K).

   (a) What is the probability that the first card is a ◇ diamond card? _____

   (b) Given that the first card drawn was a ◇ diamond card, what is the probability the second card is a ♡ heart card?

   _____

2. City A population doubles every 90 years. City B population doubles every 100 years. In the current year, the two cities have the same population count. When will city A have twice as many inhabitants as city B ?   ⇒ number of years: _____

3. **Sketch** the graph of

$$f(x) = \frac{1}{x - 2} + 4$$

   on the grid below, and state: the **domain** and **range**, the vertical and horizontal **asymptotes** (in the form $x = a$ or $y = b$) based on the graph.
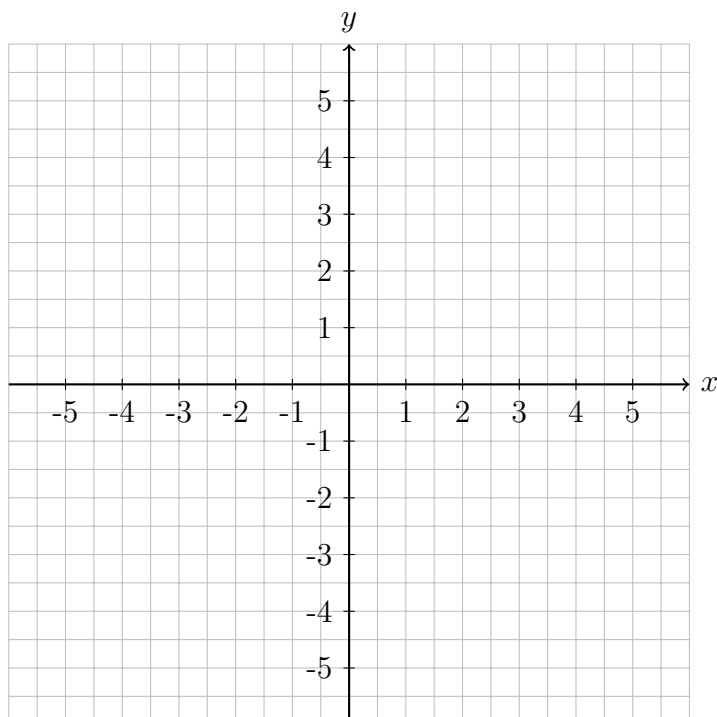
4. Let $f(x) = \sqrt{x+2}$ and $g(x) = x^2 - 3x$. Compute the following:

   (a) Evaluate $(g \circ f)(14) = $ _____

   (b)   i. Compute $(f \circ g)(x) = $ _____

        ii. Domain of $(f \circ g)(x) = $ _____

       iii. Range of $(f \circ g)(x) = $ _____

5. Solve the following equations:

   (a) Solve for x in: $3 \cdot 5^{2x} - 8 = 7$ $\Rightarrow x = $ _____

   (b) Solve for y in: $\log_{10}(y+1) - \log_{10}(y) = 2$ $\Rightarrow y = $ _____

   (c) $2^{\log_4(7)} = $ _____

STEPs Math Quiz 1

Monday, July 14, 2025   Class time: 10:30 AM - 11:30 AM

Name: _____ National ID: _____

Select your section instructor: ☐ Majid/Hamza ☐ Asaad

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1. From a standard 52-card deck, we are drawing two cards *without replacement*:
   (A standard deck has 4 shapes: ♡ hearts, ◇ diamonds, ♣ clubs, ♠ spades, and 13 numbers: A, 2, 3, 4, 5, 6, 7, 8, 9, 10, J, Q, K).

   (a) What is the probability the first card is a 4? _____

   (b) Given the first card drawn was a 4, what is the probability the second card is a 7? _____

2. Two bacterial cultures have different doubling times. Culture A doubles every 4 hours; Culture B doubles every 6 hours. At time $t = 0$, both cultures have the same number of cells. After how many hours will Culture A have four times as many cells as Culture B?
   $\Rightarrow$ number of hours = _____

3. **Sketch** the graph of
$$g(x) \;=\; \frac{2}{x+3} \;-\; 2$$
   on the grid below, and state: the **domain** and **range**, the vertical and horizontal **asymptotes** (in the form $x = a$ or $y = b$) based on the graph.
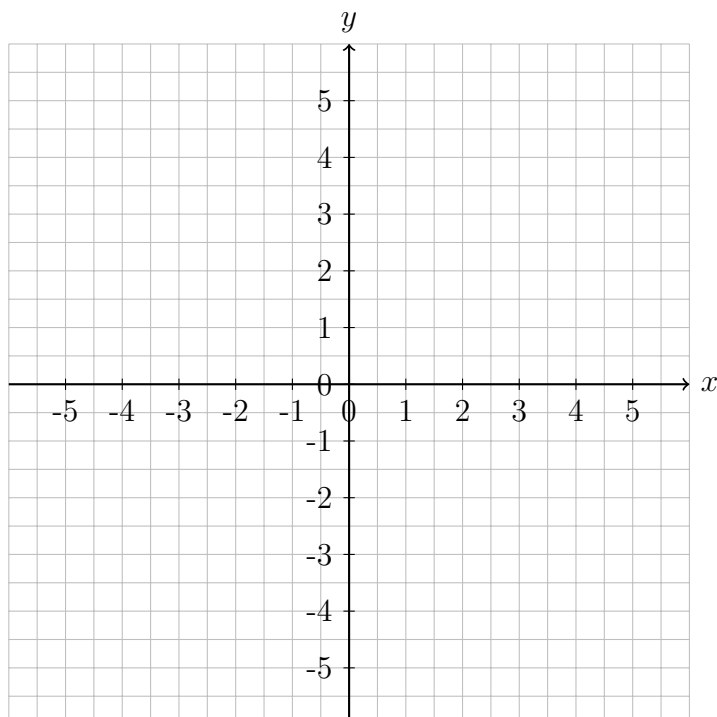
4. Let
$$f(x) = x^2 + 2x \quad \text{and} \quad h(x) = \sqrt{x - 3}.$$

(a) Evaluate $(f \circ h)(7) = $ _____

(b) i. Compute $(h \circ f)(x) = $ _____

ii. Write its domain: _____

iii. Write its range: _____

5. Solve for the unknowns:

(a) $4 \cdot 3^{x-1} - 29 = 7.$ $x = $ _____

(b) $\log_2(2y) - \log_2(y - 1) = 2.$ $y = $ _____

(c) $3^{\log_9(8)} = $ _____