Show calculation for all problems. Circle your final answer.

**U7S1:** I can use the fundamental counting principle to find the number of outcomes for an event.

1. Darian packs 7 shirts, 3 pairs of pants, and 2 jackets for a trip. How many different outfits could she wear if all of the clothes are interchangeable? \( \frac{7 \cdot 3 \cdot 2}{\text{shirts \cdot pants \cdot jackets}} = 42 \) possible outfits

2. How many 7 digit phone numbers are there that begin 863-__? \( \frac{10 \cdot 10 \cdot 10 \cdot 10}{\text{first \ 4 \ digits}} = 10,000 \) possible numbers

3. How many passwords exist that are made up of 3 letters and a 2 digit even number? \( \frac{26 \cdot 26 \cdot 26 \cdot 5 \cdot 5}{\text{letters \cdot letters \cdot letters \cdot digits}} = 878,800 \) or \( \frac{26 \cdot 26 \cdot 26 \cdot 10 \cdot 5}{\text{letters \cdot letters \cdot letters \cdot digits}} = 790,920 \)

4. How many ways are there to perform 4 songs for the ice cream concert if the chorus has practiced 7 songs? \( \frac{7 \cdot 6 \cdot 5 \cdot 4}{\text{first \ 4 \ songs}} = 840 \) or \( 7 \text{P}_4 \)

**U7S2:** I can use permutations and combinations to count the number of outcomes for an event.

5. If 15 runners are in a race. How many possible ways are there to award 1st, 2nd, and 3rd place trophies? \( 15 \text{P}_3 = 2,730 \)

6. A lacrosse team with 14 members selects 2 team captains. How many ways can the 2 members be chosen? \( \frac{14 \text{C}_2}{\text{members \ can \ be \ chosen}} = 91 \)

7. In a class of 28, 6 students will present their projects tomorrow. How many ways are there to select the 6 students to present tomorrow? \( \frac{28 \text{C}_6}{\text{doesn't matter \ in \ what \ order \ they \ present}} = 370,790 \)

8. In a senior class of 135 students, how many ways are there to select a president, vice-president, and treasurer? \( \frac{135 \text{P}_3}{\text{different \ positions}} = 2,405,970 \)

9. Shawn finds 8 of his favorite DVD’s on sale. He only has enough money to buy 5. How many ways can he select 5 DVD’s? \( \frac{8 \text{C}_5}{\text{order \ does \ not \ matter}} = 56 \)

10. 4 out of 10 pictures of a team are selected to go in the yearbook. How many ways can the pictures be selected? \( \frac{10 \text{C}_4}{\text{order \ doesn't \ matter}} = 210 \)

**U7S3:** I can calculate experimental and theoretical probabilities

A green die and a red die are rolled.

11. What is the probability of getting a green even number and a red 3? \( P(\text{even G}) \cdot P(3) = \frac{3}{6} \cdot \frac{1}{6} = \frac{3}{36} = \frac{1}{12} \)

12. What is the probability of getting 3 or higher on both dice? \( P(\# \geq 3) \cdot P(\# \geq 3) = \frac{4}{6} \cdot \frac{4}{6} = \frac{4}{36} = \frac{4}{9} \)

13. If 3 coins are tossed, what is the probability of getting 2 heads then a tails? \( P(H) \cdot P(H) \cdot P(T) = \frac{1}{2} \cdot \frac{1}{2} \cdot \frac{1}{2} = \frac{1}{8} \)
A colored spinner was spun 12 times with the following results. Find the following experimental probabilities.

<table>
<thead>
<tr>
<th>Color</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red</td>
<td>4</td>
</tr>
<tr>
<td>Blue</td>
<td>1</td>
</tr>
<tr>
<td>Green</td>
<td>2</td>
</tr>
<tr>
<td>Yellow</td>
<td>5</td>
</tr>
</tbody>
</table>

14. Probability of red or yellow
\[ P(R \text{ or } Y) = \frac{4+5}{12} = \frac{9}{12} = \frac{3}{4} \]

15. Probability of not getting blue
\[ P(\text{not blue}) = \frac{4+2+5}{12} = \frac{11}{12} \]

16. What is probability that a point randomly selected in the square is in the shaded region?
\[ A_{\text{square}} = s^2 = 8^2 = 64 \]
\[ A_{\text{circle}} = \pi r^2 = \pi (4)^2 = 16\pi \]
\[ A_{\text{shaded}} = 64 - 16\pi \approx 13.735 \]
\[ P(\text{shaded}) = \frac{13.735}{64} \approx 0.215 \]

U7S4: I can calculate the probability of independent and dependent events.

A bag contains 6 red, 2 blue, and 5 green marbles.

16. What is the probability of selecting 3 green marbles without replacement?
\[ P(3 \text{ G}) = \frac{5}{13} \cdot \frac{4}{12} \cdot \frac{3}{11} = \frac{5}{143} \approx 0.0349 \]

17. What is the probability of selecting a red then a blue then a green with replacement?
\[ P(R, \text{ then } B, \text{ then } G) = \frac{6}{13} \cdot \frac{2}{13} \cdot \frac{5}{13} = \frac{60}{2197} \approx 0.0273 \]

18. What is the probability of selecting red then blue without replacement?
\[ P(R, \text{ then } B \text{ w/o replacement}) = \frac{6}{13} \cdot \frac{2}{12} = \frac{1}{13} \approx 0.0769 \]

U7S5: I can calculate probabilities of mutually exclusive and inclusive events.

19. Find the probability of selecting a heart or a 7 from a standard deck of cards.
\[ P(H \text{ or } 7) = P(H) + P(7) - P(H \text{ and } 7) \]
\[ = \frac{13}{52} + \frac{4}{52} - \frac{1}{52} = \frac{16}{52} = \frac{4}{13} \]

20. Find the probability of selecting a black card or a face card from a standard deck of cards.
\[ P(B \text{ or } F) = P(B) + P(F) - P(B \text{ and } F) \]
\[ = \frac{26}{52} + \frac{12}{52} - \frac{6}{52} = \frac{32}{52} = \frac{8}{13} \]

21. There are 50 students at international club that speak French, Spanish, or both. 38 students speak Spanish, and 21 speak French. What is the probability that a randomly selected student speaks both languages?
\[ 38 + 21 = 59 \]
\[ \frac{9}{50} \approx 0.18 \]
Solve each equation with the quadratic formula.

22) \( 5n^2 - n = 18 \)
\[
x = \frac{-(-1) \pm \sqrt{(-1)^2 - 4(5)(-18)}}{2(5)} = \frac{1 \pm \sqrt{361}}{10} = \frac{1 \pm 19}{10}
\]
\[
\begin{align*}
1 + 19 &= 20 \Rightarrow \frac{1 + 19}{10} = 2 \\
1 - 19 &= -18 \Rightarrow \frac{1 - 19}{10} = -\frac{9}{5}
\end{align*}
\]

Find all zeros.

23) \( f(x) = 2x^3 - 5x^2 - 12x \)

\[X = 0, \quad \frac{3}{2}, \quad 4\]

Solve each inequality and graph its solution.

24) \( |7r| - 7 > 29 \)
\[
\begin{align*}
|7r| &> 36 \\
7r &> 36 \quad \text{or} \quad 7r < -36 \\
\frac{7r}{7} &> \frac{36}{7} \quad \text{or} \quad \frac{7r}{7} < -\frac{36}{7} \\
r &> 5 \frac{1}{7} \quad \text{or} \quad r < -5 \frac{1}{7}
\end{align*}
\]

Find the inverse of each matrix.

25) \[
\begin{bmatrix}
5 & 3 \\
-8 & -6
\end{bmatrix}
\]
\( \text{use calculator} \)
\[
\begin{bmatrix}
1 & \frac{1}{2} \\
-\frac{4}{3} & -\frac{5}{6}
\end{bmatrix}
\]

Perform the indicated operation.

26) \( f(t) = 4t - 4 \)
\( g(t) = 2t - 4 \)
Find \( (f - g)(t) \)
\[
(f - g)(t) = (4t - 4) - (2t - 4) = 4t - 4 + 2t - 4 = 2t
\]

27) A solution of a polynomial is \(-4 + 2i\), what must be another solution of the polynomial?

\(-4 - 2i \quad \text{conjugate change sign only}\)

Simplify.

28) \( (-5 + 4i)^2 \)
\[
\begin{align*}
(-5 + 4i)(-5 + 4i) &= 25 - 20i - 20i + 16i^2 \\
&= 25 - 40i + 16(-1) = 25 - 40i - 16 = 9 - 40i
\end{align*}
\]

Evaluate each expression.

29) \( \log_4 64 = x \)
\( 4^x = 16^4 \)
\[x = 3 \]
\( \text{or use calculator} \)
\( \text{MATH} \\rightarrow \text{log BASE} \)