AB Exam

Texas A&M High School Math Contest

25 October, 2025

(NOTE: If units are appropriate, please include them in your answer. All answers must be simplified where possible.)

1. A food truck sells tacos only in boxes of 3, 4 and 10 tacos. How many boxes must one order to buy exactly 155 tacos?

2. A bookshelf with 4 shelves holds 100 books. There are 5 more books on the second shelf than the first shelf. There are 2 more books on the third shelf than the second shelf. There are 7 fewer books on the fourth shelf than the third shelf. How many books are on the third shelf?

3. Given that all numbers in the equation below are in base 6, find the value of x (in base 6) which solves the equation:
$$\frac{5(x-24)}{4} = 14$$

4. A store is closing down and selling all items at half price. Paying with cash gives an additional 4% discount on sale prices. If you pay in cash, what is the overall percent discount from the original price?

5. Five years ago, David was 4 times as old as Andrew and James was 6 times as old as Andrew. Today, David and Andrew's combined age is 4 years older than James. What will David, Andrew, and James's combined ages be in 2 years?

6. The points $A(1,1)$, $B(5,1)$, and $C(8,y)$, where $y > 1$, form a triangle with area 21. Find y.

7. A drone flies along a straight path for a total of 100 miles in 4 hours. For the first third of the time, it maintains a constant speed of 10 miles per hour. For the remaining time, it flies at a different constant speed. What is this second speed? Give your final answer as a decimal.

8. When the number $14^5 \cdot 25^{20} \cdot 40^{11}$ is written out, how many consecutive zeroes does the number end with?

9. Five friends are playing a board game. After three rounds, their scores have an average of 12 points. One friend notices that if Alex's score were doubled, the group average would increase to 14 points. What was Alex's score?

10. Find the largest value of n so that 27^n divides $(2025)^{25}$.

11. Let k be a positive constant. Given the system of equations below, find the value of k which makes $kx + y = 0$.

$$kx + 4y = 12$$
$$x + \frac{2}{k}y = 6$$

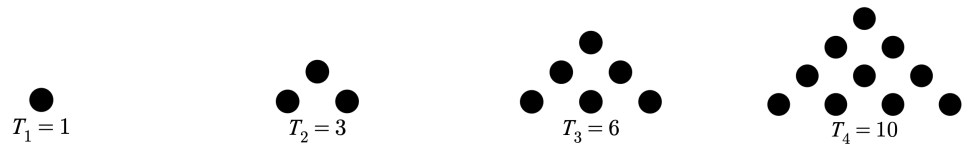
12. A group of robots work in a factory. A robot's light is green when it is charging and blue when it is working. Initially, the ratio of green to blue robots was $3 : 1$. Then 6 green robots stopped charging and started working, and 4 blue robots started charging. After these changes, the ratio of green to blue robots became $5 : 2$. What is the difference between the number of green robots and the number of blue robots now?

13. Solve for x: $3 - \sqrt{3x + 10} = x$. If necessary, write your simplified answer(s) in the form of $a + b\sqrt{c}$

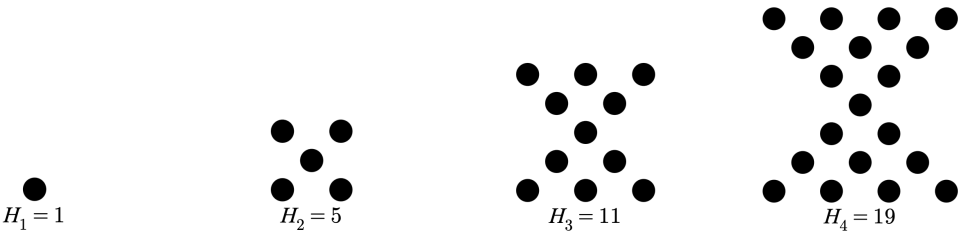
14. How many three-digit numbers are divisible by 11?

15. Working at a constant rate, Bob the Builder would need 30 hours to build a certain brick wall. Working at a different constant rate, Barb the Builder would need 21 hours to build the same wall. Working together, though, they can each lay an extra 4 bricks per hour and build the wall in 11 hours and 40 minutes. How many bricks are in the wall?

16. The nth triangular number (see image below) is given by $T_n = \dfrac{n(n+1)}{2}$.



Define hourglass numbers using the next image below. Find the 25th hourglass number.

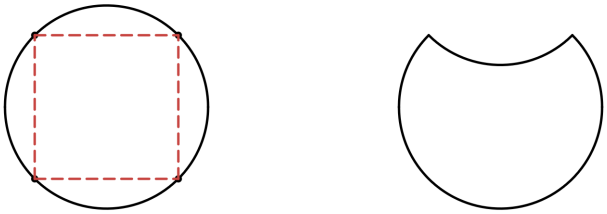


17. The **geometric mean** of two positive numbers a and b is a positive number x such that $x^2 = ab$. If the average of two numbers a and b (with $a > b > 0$) is twice as large as their geometric mean, what is $\dfrac{a}{b}$ rounded to the nearest whole number?

18. Consider a filled in equilateral triangle with area $\sqrt{3}$. Connect the midpoints of each side to form a new, inverted triangle in the center, and remove this area from the original triangle. Repeat this process as in the image below. Find the filled-in area of the last image (after applying this process 4 times).

19. A line segment is drawn in the x-y plane from the point $(500, 1000)$ to the point $(1000, 2025)$. How many points on the line segment have integer coordinates?

20. We start with a circle of radius 2 and inscribe a square inside it. We then reflect the arc of the circle above the square about the top edge of the square to obtain the following shape. Find its area.



21. Solve for x: $2^{2^x} = 4^{4^x}$

22. Find the largest solution x of the equation $\big|3|x| - 2\big| = 1 - 2x$.