MAT086 Pre-Algebra

Course Description: A review of the fundamental concepts of algebra. This course provides a strong base for success in future algebra courses

Measurable Student Learning Outcomes

1. **(Synthesis Level)** Perform the basic operations with numbers of the real number system by applying mathematical rules.

Simplify

$$\frac{2^2 - 3^2}{5(-7+6)}$$

Evaluate the expression if $x = 3$, $y = -4$, and $z = 3$.

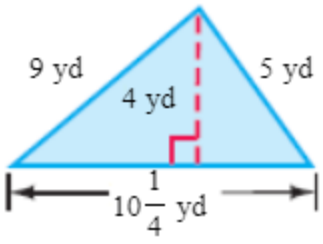
$$\left(\frac{3}{5}x - \frac{4}{9}y\right)\left(-\frac{1}{2}z\right)$$

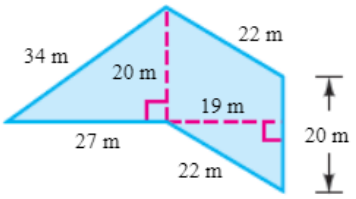
Write a numerical expression for the phrase, then simplify it.

The product of 15 and the difference between 8 and -6

2. **(Application Level)** Use basic geometry concepts to solve problems involving perimeter, area, and volume of geometric figures. Write linear equations in slope-intercept and point slope form.

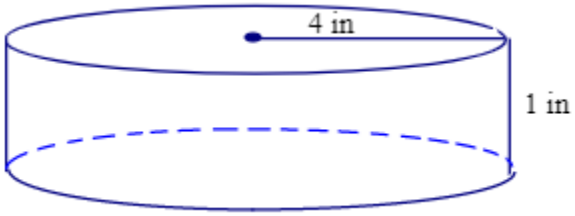
Find the perimeter and area of the triangle.





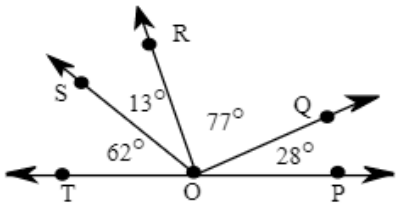
Find the shaded area of the figure.

Find the volume and surface area of the cylinder.

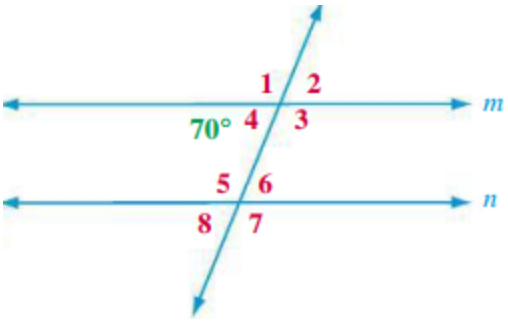


3. **(Evaluation Level)** Evaluate the measures of angles utilizing definitions and theorems involving angles, including vertical, right, corresponding, complementary, and supplementary angles.

Find the measure of the complement of a 8° angle.



Find the measures of all the angles in the figure



4. **(Application Level)** Solve and apply simple linear equations and inequalities.

$$\frac{2}{3}(p+4) > \frac{5}{6}(p-2)$$

Solve the inequality $8x + 3 < 7x - 4$. Write the solution set in interval notation, and graph it.

Solve the following equation, and check the solution.

$$35 - 5(9 - 2t) = 5(t - 1)$$

Solve the following equation, and check the solution.

$$-\frac{2}{7}r + 2r = \frac{1}{2}r + \frac{17}{2}$$

5. **(Evaluation Level)** Graph and interpret linear equations in the Cartesian Coordinate Plane by applying mathematical concepts such as the distance formula, midpoint formula and other formulas, and use mathematical terminology appropriately, including slope, points, and intercepts.

Write an equation of the line passing through the point $(-2,6)$ and having the slope $\frac{2}{3}$. Write the final answer in slope-intercept form.

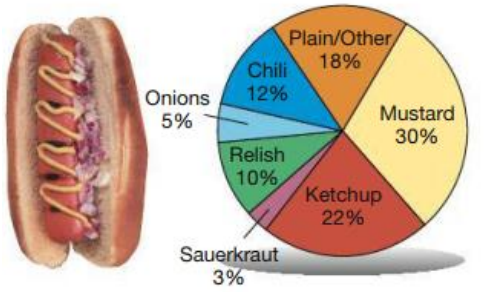
Write an equation for the line passing through the given pair of points. Give the final answer in **(a)** slope-intercept form and **(b)** standard form.

$\left(-\frac{3}{5},\frac{7}{5}\right)$ and $\left(\frac{2}{5},\frac{6}{5}\right)$

6. **(Analysis Level)** Describe tendencies and make conjectures and predictions, and create table, bar, circle, and line graphs based on the data set.

3200 students were surveyed about their favorite hot dog topping. The data has been graphed in a circle graph. How many students said Ketchup is their favorite topping? How many students said Chili was their favorite topping?

Favorite Hot Dog Toppings



ata from National Hot Dog and Sausage Council.

A national health survey provided the information for this table. It shows how often each of the adults in the survey engages in a vigorous, leisure time activity. Find the weighted mean to determine the weekly hours of vigorous activity for the adults surveyed, to the nearest tenth.

Hours per week	Number of Adults
0	224
1	86
2	62
3	45
4	25
5	18
6	24
7	16

The Sunrise Pharmacy filled prescriptions that cost the following amounts: $18.38, $168.75, $28.63, $72.85, $39.60, $183.74, $15.82, $33.18, $87.45, $98.72, and $50.70. Find the average cost (mean) of the prescriptions sold.

7. **(Evaluation Level)** Evaluate the midpoint of and distance between two points in the Cartesian Coordinate Plane, and analyze data represented graphically.

Find the distance between the pair of points.

$(\sqrt{2},\sqrt{6})$ and $(-3\sqrt{2},5\sqrt{6})$

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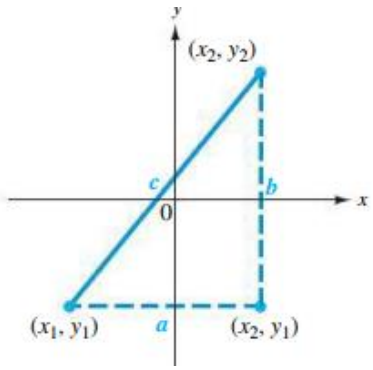
Find the midpoint of the segment with the endpoints $\left(\frac{1}{3},\frac{11}{2}\right)$ and $\left(\frac{11}{3},\frac{1}{2}\right)$.

If (x_1, y_1) is equal to $(-4,-5)$ and (x_2, y_2) is equal to $(5,6)$
find the distance between the 2 points.



8. **(Synthesis Level)** Perform the basic operations of polynomials.

Add.

9. $(8a^3b - 4a^3 + 3b) + (4a^3b - 6a^3 - 9b)$

Subtract $-8x^2 + 6x + 7$ from $4x^2 - 5x + 5$.

Divide and simplify.

$$\frac{5n^8 + 40n^7 - 15n^3}{-5n^6}$$

Find the product.

$(-6x^4) \cdot (-5x^2)$

Multiply.

$9x^2\left(x^2 + 6xy - 2y^2\right)$

Use the FOIL method to find the product.

$(5x + 6)(2x - 1)$

10. **(Application Level)** Apply the laws of exponents, such as squared, cubed, to the power of x.

Simplify.

$\left(\frac{2}{9}\right)^3$

Use the product rule to simplify the expression. Write your answer in exponential notation.

$7^2 \cdot 7^9 \cdot 7^6$

Use the power rules for exponents to simplify the expression. Write the number in exponential form.

$\left(-3^6\right)^6$