TO BEST PREPARE FOR THE UPCOMING YEAR, TRY TO COMPLETE THE FOLLOWING.

SIMPLIFYING EXPRESSION

1. Simplify. $(y^2 - 7y + 4) - (-4y^2 + 5y - 8)$	*2. Simplify.* $-(x^2 - 3x + 18) + (x^2 - 3x + 15)$
3. Simplify the product. $(y - 4)(y^2 + 3y + 5)$	*4. Multiply.* $(2x - 3y)^2$
5. Simplify and write in standard form. $(2 + 3i) + (5 - i)$	*6. Simplify and write in standard form.* $(2 + 3i)(5 - i)$
7. Factor completely. $3x^2 + 18x - 48$	*8. Factor completely.* $4x^3 - 36x$
9. What value of c makes the expression a perfect square trinomial? $x^2 - 8x + c$	*10. Simplify. State any restrictions.* $\dfrac{24x^3}{18x}$
11. Simplify. State any restrictions. $\dfrac{x^2 + 6x + 9}{x^2 - x - 12}$	*12. Simplify. State any restrictions.* $\dfrac{x^2 - 49}{x^2 - 7x}$
13. Simplify. $\dfrac{(6x^2y^3)^2}{4x^2y^5}$	*14. Simplify.* $(3x^{-6}y^2)^3 \cdot 2x^{10}y^{-7}$

FRACTIONS

| 1. Find the LCD. $$\frac{1}{6}, \quad \frac{3}{8}, \quad \frac{7}{9}$$	2. ADD. NO CALCULATOR $$\frac{3}{8} + \frac{7}{10}$$
3. Subtract. NO CALCULATOR $$\frac{5}{6} - \frac{1}{4}$$	4. Multiply. NO CALCULATOR $$\frac{1}{2} * 1\frac{1}{2}$$
5. Divide. NO CALCULATOR $$\frac{5}{12} \div \frac{15}{18}$$	6. Evaluate. NO CALCULATOR $$12\frac{3}{4} * \frac{2}{3}$$
7. Evaluate. NO CALCULATOR $$\frac{1}{2} - \left(\frac{2}{5} + \frac{8}{15}\right)$$	8. Evaluate. NO CALCULATOR $$\frac{2}{7} \div \frac{4}{7} * \frac{5}{9}$$

FRACTIONS, EXPONENTS, and EXPRESSIONS

1. Rewrite in exponential form. $$\sqrt{3x}$$	2. Rewrite in exponential form. $$\sqrt[4]{xy^3}$$
3. Rewrite as a single radical. $$a^{\frac{3}{5}} b^{\frac{2}{5}}$$	4. Simplify the radical expression. $$\sqrt[3]{64x^5 y^6}$$
5. Simplify the exponential expression. $$\left(\frac{y^{\frac{2}{3}}}{x^{\frac{1}{2}}}\right)^6$$	6. Simplify the exponential expression. $$\left(a^{\frac{5}{4}} b^{\frac{5}{3}}\right)\left(a^{\frac{3}{4}} b^{\frac{1}{3}}\right)$$

7. *Simplify the expression. State any restrictions.* $$\frac{x+3}{7} \cdot \frac{14}{2x+6}$$	8. *Simplify the expression. State any restrictions.* $$\frac{y^2+8y+16}{3y^2-y-2} \cdot \frac{3y^2+2y}{y+4}$$
9. *Simplify the expression. State restrictions.* $$\frac{x^2-3x}{14y} \div \frac{2xy}{3y^2}$$	10. *Simplify the expression. State restrictions.* $$\frac{x^2-169}{9x^2+36x} \div \frac{x^2-16x+39}{3x^2-3x}$$
11. *Simplify the expression. State restrictions.* $$\frac{2x+1}{x+3} - \frac{2}{x+3}$$	12. *Simplify the expression. State restrictions.* $$\frac{5}{x+5} - \frac{2x+5}{x^2+9x+20}$$
13. *Simplify the expression. State restrictions.* $$\frac{r+6}{3r-6} + \frac{2r+1}{3r-6}$$	14. *Simplify the expression. State restrictions.* $$\frac{3}{x+7} + \frac{4}{x-8}$$

ALGEBRA/GEOMETRY REVIEW

1. *Find the **midpoint** and **distance** between the pair of points:* $(4,1),(-3,2)$

2. *Write the equation of a line that goes through (4, 5) and (8, 7). Put the equation in slope-intercept form.*

3. *Writ*e an equation in *point-slope form* for a line through the point $(3, -5)$ with a slope $= -2$?
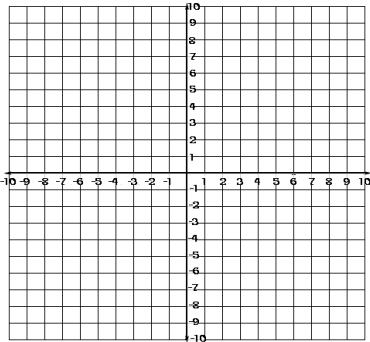
4. Prove the triangle whose vertices are (-2, 5), (1, 3), and (-1, 0) is a *right triangle* using two different methods: using the slopes and using the lengths of the sides. Be thorough in your proof/explanation and show work to justify your explanation.

5. The average SAT math score for selected years is given in the table.

a. Use the data from 2012 and 2017 to write a linear equation for the average SAT math score y in terms of the year x.

b. Use the equation to predict the average SAT math score for 2022.

Year	Scaled Math Score
2005	520
2012	514
2014	513
2016	508
2017	527

Do you think the prediction is valid?

6. Given the screen below:

X	Y1
1.321	-.0158
1.322	-.0116
1.323	-.0073
1.324	-.0031
1.325	.0012
1.326	.00547
1.327	.00975

Y₁ ▣X³−X−1

__EXPLAIN__ why I can conclude x ≈ 1.325.

7. Which of the following graphical viewing windows would be best for *investigating* $f(x) = x^3 - 6x^2 + 2x - 7$?

a. $[-35, 10]_5$, $[-10, 10]_1$

b. $[-10, 35]_5$, $[-10, 10]_1$

c. $[-10, 10]_1$, $[-10, 35]_5$

d. $[-10, 10]_1$, $[-35, 10]_5$

8. Which of the following is an equation of a circle with its center at $(-2, -3)$ and tangent to the $y-axis$ in the standard (x, y) coordinate plane?
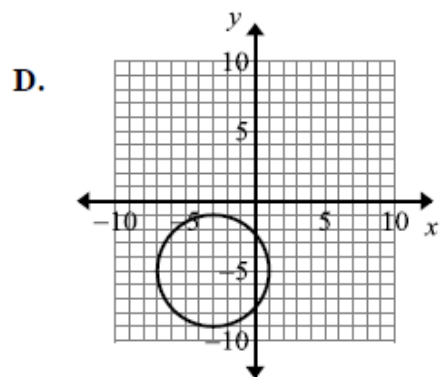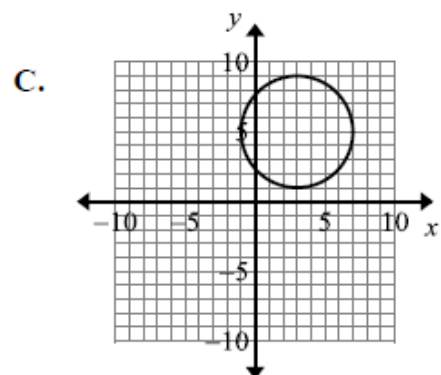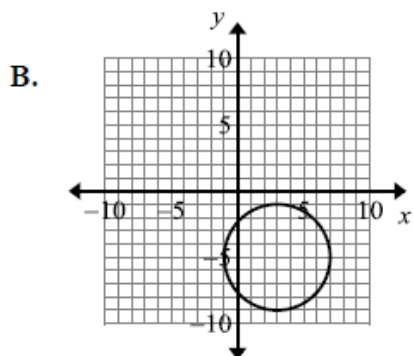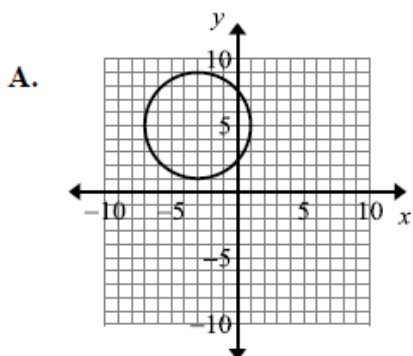
   a. $(x - 2)^2 + (y - 3)^2 = 4$

   b. $(x + 2)^2 + (y + 3)^2 = 4$

   c. $(x - 2)^2 + (y - 3)^2 = 9$

   d. $(x + 2)^2 + (y + 3)^2 = 9$

9. What graph represents $(x - 3)^2 + (y + 5)^2 = 16$?

A.

B.

C.

D.

10. Find the domain of the expression.	11. Find the domain of the expression.
$$\frac{x}{x - 3}$$	$$x(x + 1)^{-2}$$

SOLVING EQUATIONS and INEQUALITIES

1. Solve: $9x^2 - 1 = 0$	2. Solve: $3x^2 + 2x = 2x^2 + 35$

3. Solve: $2x^2 - 3x = -1$	**4. Solve:** $x^2 - 8x + 25 = 0$
5. Solve: $3x - 4 = \sqrt{x+2}$	**6. Solve:** $|4x + 1| = 5$
7. Solve: $x + 7 \geq -1$	**8. Solve:** $|x - 2| < 3$
9. Solve: $x^2 - 7x + 10 > 0$	**10. Solve:** $-3 \leq 4x + 2 < 12$