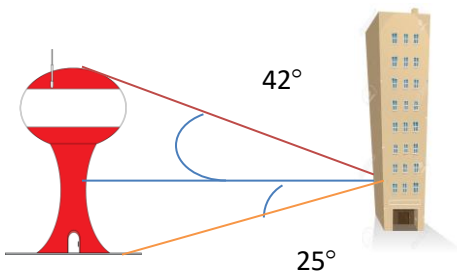


Complete all work on separate loose-leaf or graph paper. Solve problems without using a calculator. Write the answers to multiple choice questions on the attached answer sheet.

<p>1. Evaluate: $\frac{1}{2x} + \frac{1}{3x} + \frac{1}{4x} =$</p> <p>A) $\frac{13}{12x}$ C) $\frac{1}{9x}$ B) $\frac{1}{24x}$ D) $\frac{19}{18x}$</p>	<p>2. Simplify completely: $\frac{2x^2-50}{x^2-10x+25}$</p> <p>A) $\frac{2(x-5)^2}{(x+5)^2}$ C) $\frac{2(x-5)}{x+5}$ B) $-\frac{x^2-2}{10x}$ D) $\frac{2(x+5)}{x-5}$</p>																		
<p>3. In $\triangle ABC$, $m\angle C = 90^\circ$. If $\overline{AB} = 5$ and $\overline{AC} = 4$, which statement is NOT true?</p> <p>A) $\cos A = \frac{4}{5}$ C) $\sin B = \frac{4}{5}$ B) $\tan A = \frac{5}{3}$ D) $\tan B = \frac{4}{3}$</p>	<p>4. The hypotenuse of right $\triangle ABC$ is 10 and the $m\angle A = 60^\circ$, what is the measure of the leg opposite angle A?</p> <p>A) 5 C) $5\sqrt{2}$ B) $10\sqrt{3}$ D) $5\sqrt{3}$</p>																		
<p>5. Which cubic polynomial best describes the data?</p> <table border="1" data-bbox="94 877 792 972"> <tbody> <tr> <td>x</td> <td>-3</td> <td>-2</td> <td>-1</td> <td>0</td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> </tr> <tr> <td>y</td> <td>-12</td> <td>0</td> <td>0</td> <td>-6</td> <td>-12</td> <td>-12</td> <td>0</td> <td>30</td> </tr> </tbody> </table> <p>A) $y = x^3 + 6x^2 - 7x - 6$ C) $y = x^3 - 7x - 6$ B) $y = x^3 - 7x + 6$ D) $y = -x^3 - 7x + 6$</p>	x	-3	-2	-1	0	1	2	3	4	y	-12	0	0	-6	-12	-12	0	30	<p>6. The graph of a polynomial function has the following x-intercepts: 0, 1, 3, 6. Which of these expressions represents such a function?</p> <p>A) $(x-1)(x-3)(x-6)$ C) $x(x+1)(x+3)(x+6)$ B) $2x(x-1)(x-3)(x-6)$ D) $(x+1)(3x+1)(6x+1)$</p>
x	-3	-2	-1	0	1	2	3	4											
y	-12	0	0	-6	-12	-12	0	30											
<p>7. The base angle of an isosceles triangle measures 30°, and the length of one of the legs is 12. What is the length of the altitude drawn to the base of the triangle?</p> <p>A) 6 C) $6\sqrt{3}$ B) 12 D) 9</p>	<p>8. Divide, using either polynomial long or synthetic division: $\frac{2x^4+7x^3+8x^2+8x+8}{x+2}$:</p> <p>A) $2x^3 + x^2 + 3x + 2$ C) $2x^3 + 3x^2 + 2x + 8$ B) $2x^3 + x^2 + 3x + 4$ D) $2x^3 + 3x^2 + 2x + 4$</p>																		
<p>9. The side of a square is 8 units. What is the length of its diagonal?</p> <p>A) $8\sqrt{3}$ C) $4\sqrt{2}$ B) $8\sqrt{2}$ D) $16\sqrt{2}$</p>	<p>10. The graph of a quadratic function $y = (x+1)^2 - 3$ is reflected across the y-axis and then translated 2 units down. Which are the coordinates of the vertex of the new graph?</p> <p>A) $(-1, 1)$ C) $(1, -5)$ B) $(1, -1)$ D) $(-1, -5)$</p>																		

<p>11. If $g(x) = x^2 - x$, find $\frac{g(2+h)-g(2)}{h}$.</p> <p>A) $3 + h$ C) $1 + h$ B) $6 + h$ D) $5 + h$</p>	<p>12. With respect to which line is the graph of the equation $f(x) = x^4 - 3x^2 + 6$ symmetric?</p> <p>A) $y = 0$ C) $x = 6$ B) $x = 0$ D) $y = x$</p>														
<p>13. Which of the following is NOT an asymptote of the function $R(x) = \frac{ x (x^2+x-6)}{x(x^2-x-6)}$:</p> <p>A) $x = 3$ C) $x = 0$ B) $y = 1$ D) $y = -1$</p>	<p>14. The table below shows several corresponding values of x and y in a continuous polynomial relation. Based on the table, within which interval is there a zero of the polynomial?</p> <table border="1" data-bbox="789 600 1526 663"> <tbody> <tr> <td>x</td> <td>-3</td> <td>-1</td> <td>1</td> <td>3</td> <td>5</td> <td>7</td> </tr> <tr> <td>y</td> <td>4.24</td> <td>-10.18</td> <td>-16.60</td> <td>-15.02</td> <td>-5.44</td> <td>6.35</td> </tr> </tbody> </table> <p>A) $-1 < x < 1$ C) $3 < x < 5$ B) $1 < x < 3$ D) $5 < x < 7$</p>	x	-3	-1	1	3	5	7	y	4.24	-10.18	-16.60	-15.02	-5.44	6.35
x	-3	-1	1	3	5	7									
y	4.24	-10.18	-16.60	-15.02	-5.44	6.35									
<p>15. Combine to a single rational expression:</p> $\frac{x-5}{x+3} - \frac{x+2}{x+7}$ <p>A) $\frac{-3x-41}{x^2+10x+21}$ C) $\frac{3x-41}{x^2+10x+21}$ B) $\frac{-2x-31}{x^2+10x+21}$ D) $\frac{2x-31}{x^2+10x+21}$</p>	<p>16. The SUM of the two real solutions to $x + 4 = \sqrt{13x + 30}$ is:</p> <p>A) 10 C) 5 B) 9 D) 6</p>														
<p>17. Simplify the rational expression: $\frac{2x^2-7x-15}{4x^2+10x+6}$</p> <p>A) $\frac{x+3}{2x+2}$ C) $\frac{x+5}{2x+6}$ B) $\frac{x-5}{2x+2}$ D) $\frac{x+3}{2x+1}$</p>	<p>18. A number c is a multiple zero of a polynomial $P(x)$ if $P(x)$ has a factor in the form $(x - c)^m$ when $m \geq 2$ (multiplicity). How many numbers are multiple zeros of the polynomial $P(x) = (x^6 - 1)(x - 1) - (x^3 - 1)(x^2 - 1)$?</p> <p>A) 0 C) 2 B) 1 D) 4</p>														
<p>19. If $f(x) = x^2 + 4$ and $g(x) = \sqrt{1 - x}$. What is the value of $f(g(-3))$?</p> <p>A) $2i\sqrt{3}$ C) 8 B) 2 D) 13</p>	<p>20. Solve; check for extraneous solutions: $6x = \sqrt{24 + 12x}$</p> <p>A) $x = \frac{2}{3}$ C) $x = 1$ and $-\frac{2}{3}$ B) $x = -1$ D) $x = -\frac{1}{3}$ and 2</p>														

<p>21. Solve the inequality for x: $\frac{x+2}{2x-1} > 5$. The solution set for x is (<i>Hint</i>: Don't forget to consider any vertical asymptote):</p> <p>A) $x < \frac{1}{2} \cup \frac{7}{9} < x$ C) $\frac{1}{2} < x < 2$ B) $x < 2$ D) $\frac{1}{2} < x < \frac{7}{9}$</p>	<p>22. Find the inverse of $y = 7x^2 - 3; x \geq 0$</p> <p>A) $y = \sqrt{\frac{x+3}{7}}$ C) $y^2 = \frac{x-3}{7}$ B) $x = \sqrt{\frac{y+3}{7}}$ D) $y = \sqrt{\frac{x-3}{7}}$</p>
<p>23. Rationalize the denominator of the expression: $\frac{\sqrt{3}-\sqrt{6}}{\sqrt{3}+\sqrt{6}}$; simplify completely.</p> <p>A) $\frac{-1-2\sqrt{18}}{3}$ C) $-3 + 2\sqrt{2}$ B) $\frac{-3-2\sqrt{18}}{9}$ D) $9 - 2\sqrt{18}$</p>	<p>24. Use the quadratic formula to solve the equation: $5x^2 + 9x - 2 = 0$</p> <p>A) $x = \frac{2}{5}, -4$ C) $x = \frac{56}{5}, -13$ B) $x = \frac{1}{5}, -2$ D) $x = -\frac{1}{5}, 2$</p>
<p>25. Simplify $\sqrt{-175}$ using imaginary number i.</p> <p>A) $i\sqrt{175}$ C) $5\sqrt{-7}$ B) $5i\sqrt{7}$ D) $-5\sqrt{7}$</p>	<p>26. Simplify the expression $(2 + 5i)(-1 + 5i)$</p> <p>A) $-27 + 5i$ C) $-2 + 25i$ B) $23 + 5i$ D) $-2 + 5i$</p>
<p>27. Factor the expression: $c^3 - 512$</p> <p>A) $-(c - 8)(c^2 + 8c + 64)$ C) $(c + 8)(c^2 + 8c + 64)$ B) $(c - 8)(c^2 + 8c + 64)$ D) $(c - 8)(c^2 - 8c - 64)$</p>	
<p>28. Divide; state all restrictions on the variables: $\frac{x^2-16}{x^2+5x+6} \div \frac{x^2+5x+4}{x^2-2x-8}$</p> <p>A) $\frac{(x-4)^2}{(x+3)(x+1)}$; $x \neq -3, -1$ C) $\frac{(x-4)^2}{(x+3)(x+1)}$; $x \neq -4, -3, -2, -1, 4$ B) $\frac{(x+4)^2(x+1)}{(x+2)^2(x+3)}$; $x \neq -3, -2, 4$ D) $\frac{1}{(x+3)(x+1)}$; $x \neq -3, -2, -1, 4$</p>	

<p>29. Simplify $\sqrt[3]{128a^{13}b^6}$; assume all variables are positive.</p> <p>A) $2a^4b^2(\sqrt[3]{4a})$ C) $2a^4b(\sqrt[3]{8a})$ B) $4a^4b(\sqrt[3]{a})$ D) $4a^4b^2(\sqrt[3]{2a})$</p>	<p>30. Find the missing value to “complete the square” of $x^2 + 6x + \square$.</p> <p>A) $\frac{3}{2}$ C) 9 B) $\frac{9}{4}$ D) 36</p>
<p>31. Factor the expression: $x^4 - 20x^2 + 64$</p> <p>A) $(x - 2)^2(x + 4)^2$ B) $(x - 2)(x - 4)(x^2)$ C) $(x - 2)(x + 2)(x - 4)(x + 4)$ D) No solution</p>	<p>32. Simplify the complex fraction:</p> $\frac{(49-x^2)^{1/2} + 9x^2(49-x^2)^{-1/2}}{49-x^2}$ <p>A) $\frac{49+8x^2}{(49-x^2)^{3/2}}$ C) $\frac{58x^2}{(49-x^2)^{3/2}}$ B) $\frac{49+11x^2}{(49-x^2)^{3/2}}$ D) None of these</p>
<p>33. Simplify the complex fraction: $\frac{\frac{4}{x+3}}{\frac{1}{x}+3}$</p> <p>A) $\frac{12x+4}{x^2+3x}$ C) $\frac{4x}{3x^2+10x+3}$ B) $\frac{4x}{3x+9}$ D) None of these</p>	<p>34. Solve the equation and check your solution:</p> $\frac{a}{a^2-36} + \frac{2}{a-6} = \frac{1}{a+6}$ <p>A) $a = -6$ C) $a = -9, -6$ B) $a = -9$ D) $a = 6$</p>
<p>35. Let $f(x) = \frac{1}{4x^2-5}$ and $g(x) = \sqrt{x-3}$. Find $f(g(x))$ and $g(f(x))$.</p> <p>A) $f(g(x)) = \frac{1}{4\sqrt{x-3}-5}$; $g(f(x)) = \sqrt{\frac{2x-4}{4x^2-5}}$ B) $f(g(x)) = \frac{1}{4x-17}$; $g(f(x)) = 3\sqrt{\frac{2x-4}{4x^2-14}}$ C) $f(g(x)) = \frac{1}{16x^2-8}$; $g(f(x)) = 2\sqrt{4x^2-14}$ D) $f(g(x)) = \frac{1}{4x-17}$; $g(f(x)) = 2\sqrt{\frac{4-3x^2}{4x^2-5}}$</p>	
<p>36. A water tower is located 410 feet from a building. From a window in the building, the angle of elevation measured to the top of the tower is 42° and the angle of depression to the bottom of the tower is 25°. Approximately how tall is the tower?</p> <p>A) 191 feet C) 448 feet B) 369 feet D) 560 feet</p>	

<p>1. Factor by grouping: $3x^4 + 8x^3 - 15x - 40$</p>	<p>2. Find the domain of the function: $y = \frac{x^2 - 3x - 28}{x^2 - 6x - 27}$</p>	<p>3. Find the domain of the function: $y = \sqrt{x - 36}$</p>	
<p>4. Factor the polynomial into linear factors: $m(x) = x^3 + 4x^2 + x - 6$</p>		<p>5. The length of the hypotenuse of a right triangle is 13 mm. The length of the shorter leg is 7 mm less than the length of the longer leg. Find the length of the shorter leg (MUST show ALL algebra work or NO credit).</p>	
<p>6. The expression $s(t) = -16t^2 + 1800$ models the height of an object t seconds after it has been dropped from a height of 1800 feet. Find the height of the object after falling for 4.8 seconds.</p>		<p>7. In right triangle $\triangle ABC$, $\overline{AB} = 18.3$, $\overline{BC} = 11.2$, and $m\angle C = 90^\circ$. What is the measure of angle A to the nearest tenth of a degree?</p>	
<p>8. The height h in meters of a rock thrown straight up at t seconds is described by the equation $h(t) = 2 + 20t - 4.9t^2$. Find and interpret the average rate of change of the change in the height of the rock over the first two seconds of flight.</p>		<p>9. A company's total revenue, $R(x)$ (in millions of dollars), is related to its expenses by the equation $R(x) = 4x^3 - 16x^2 + 12x$, where x is the amount of expenses (<u>in tens of thousands of dollars</u>). What values of x will produce zero revenue?</p>	
<p>10. On separate full-sized piece of graph paper (very clearly and neatly – NOT a small sketch):</p> <p>(a) Draw the graph of the equation $y = x^2 - 4x + 4$, including all values of x from $x = -1$ to $x = 5$. Label the graph a.</p> <p>(b) On the same set of axes, draw the image of the graph drawn in part (a) after a translation that maps $(x, y) \rightarrow (x - 2, y + 3)$. Label the image b.</p> <p>(c) On the same set of axes, draw the image of the graph drawn in part (b) after a reflection across the x-axis. Label the image c.</p> <p>(d) Which equation could represent the graph drawn in part (c)? Write this on the graph paper.</p> <p>1) $y = -x^2 + 4x + 4$ 2) $y = x^2 - 3$ 3) $y = -x^2 - 3$ 4) $y = -x^2 + 3$</p>			
<p>11. Graph the function $y = \sqrt{x + 3}$</p>	<p>12. Graph the function $y = -x^3 + 4x^2 - 5$</p>	<p>13. Graph the function $y = \frac{x^2 - 4x - 12}{2x^2 - 8}$</p>	<p>14. Graph the solutions to the system of inequalities. $\begin{cases} y \geq 2x + 3 \\ 2x - 5y < 20 \end{cases}$</p>

Name: _____

Staple ALL work to this Answer Sheet

Multiple Choice Questions: Write the letter of your answer in the box provided,

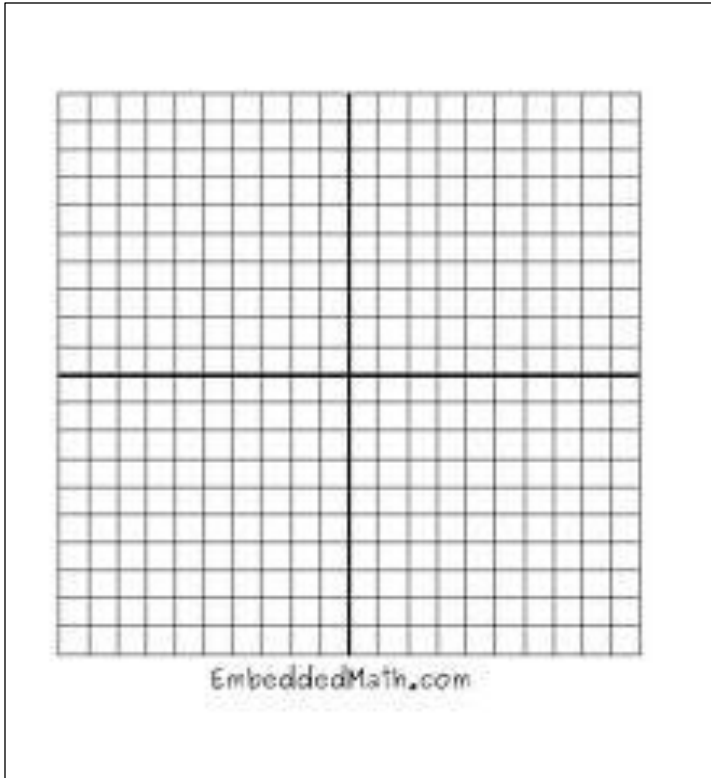
<u>All Students</u>	<u>All Students</u>	<u>All Students</u>	<u>All Students</u>	<u>All Students</u>	<i>Honors Only!</i>
1)	7)	13)	19)	25)	31)
2)	8)	14)	20)	26)	32)
3)	9)	15)	21)	27)	33)
4)	10)	16)	22)	28)	34)
5)	11)	17)	23)	29)	35)
6)	12)	18)	24)	30)	36)

Free Response Questions (except graphs): write responses in the boxes below; complete the graphs on the reverse of this sheet.

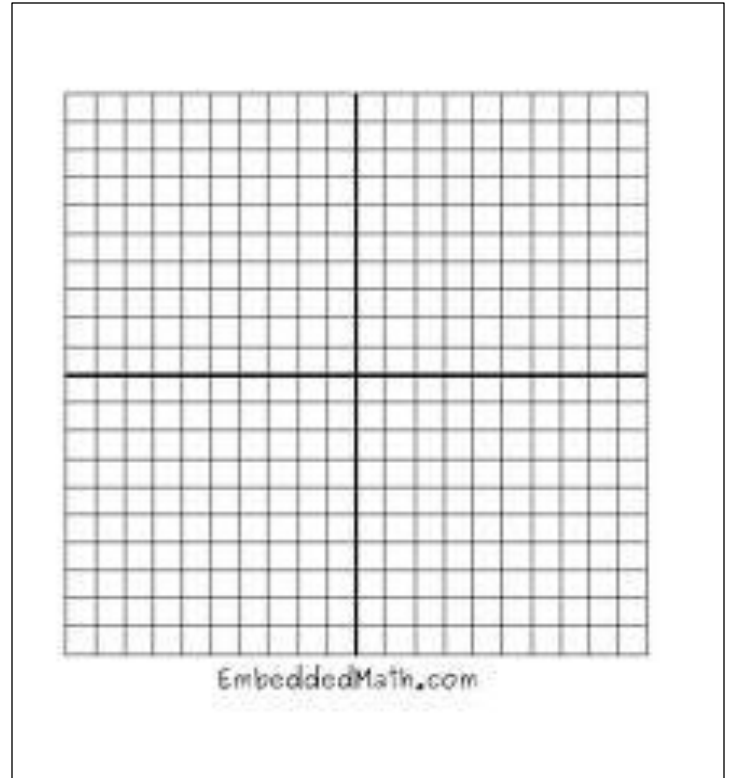
1)	2)
3)	4)
5)	6)
7)	8) <i>Honors Only!</i>
9)	10) For (a), (b), and (c), attach SEPARATE graph paper (d)

Graphs:

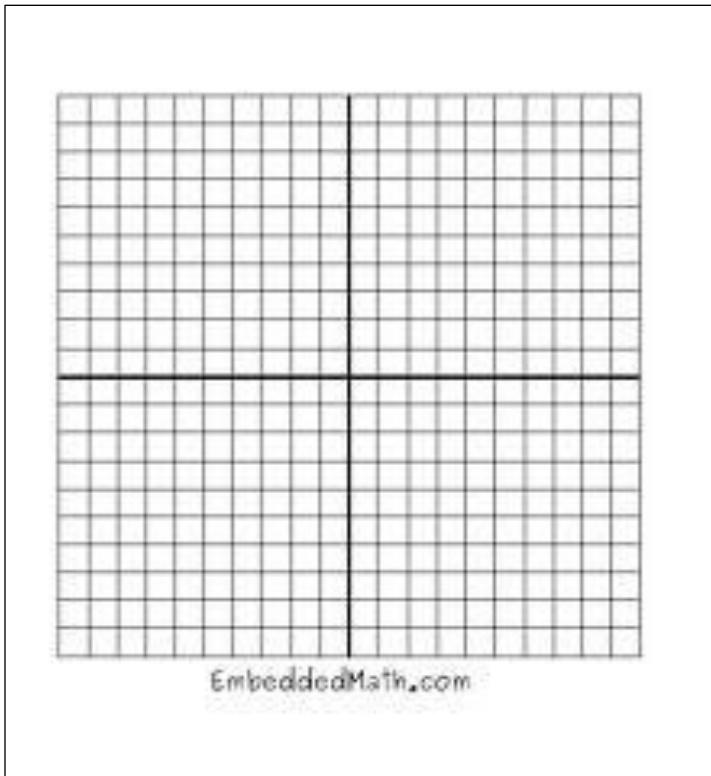
11)



12)



13) *Honors Only!*



14)

