

Summer Review for Algebra 3/Trig and Precalculus

Complete the following. Use directions given for each part. Do not use a calculator (graphing or other). Show all algebraic work in the space provided. Write answers in most simplified form. Write answers in the indicated blank. Show all work. These problems are due one week from the first day of school in August 2023.

I. Find the value of each expression if $x = -2$ and $y = 3$.

<p>1. $\frac{x+y}{x-y}$</p> <p style="text-align: right;">1. _____</p>	<p>2. $\frac{2x-3}{y}$</p> <p style="text-align: right;">2. _____</p>
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II. Find the value of each expression if $x = 3$ and $y = -2$.

<p>3. $-3x+2y$</p> <p style="text-align: right;">3. _____</p>	<p>4. $\frac{ x+y }{y-x}$</p> <p style="text-align: right;">4. _____</p>
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III. Find the domain of the following functions.

<p>5. $f(x) = \frac{x^2+1}{x}$</p> <p style="text-align: right;">5. _____</p>	<p>6. $f(x) = \frac{x^3}{x^2-1}$</p> <p style="text-align: right;">6. _____</p>
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IV. Simplify each expression. Where appropriate express answers with positive exponents. Assume the base is not zero.

<p>7. $4^{-2} \cdot 4^3$</p> <p style="text-align: right;">7. _____</p>	<p>8. $(2^{-1})^{-3}$</p> <p style="text-align: right;">8. _____</p>
<p>9. $(-3x^2y^{-1})^2$</p> <p style="text-align: right;">9. _____</p>	<p>10. $\frac{4x^{-2}(yz)^{-1}}{2^3x^4y}$</p> <p style="text-align: right;">10. _____</p>

V. Perform the indicated operations. Express each answer as a polynomial written in standard form.

11.	$-6(x^2 - 5x + 7) - (2x^2 + 4x - 3)$	12.	$(x - a)^2 - x^2$
	11. _____		12. _____
13.	$(2x^2 - 3x + 1)(4x^2 - x + 4)$	14.	$x(3x - 1)(3x + 1)$
	13. _____		14. _____

VI. Factor completely each polynomial.

15.	$x^2 - 4x - 5$	16.	$4x^2 + 3x - 1$
	15. _____		16. _____
17.	$x^6 + 2x^3 + 1$	18.	$54x^3(2x + 5) - 2(2x + 5)$
	17. _____		18. _____
19.	$4 - 14x^2 - 8x^4$	20.	$x^3 - 3x^2 - x + 3$
	19. _____		20. _____

VII. Perform the indicated operation and simplify the result. Leave your answers in factored form.

21.	$\frac{9x}{x^3 - 5x^2} \cdot \frac{x^2 - 25}{27x - 90}$	22.	$\frac{x}{x^2 - 4} - \frac{x + 1}{x^3 - 5x^2 + 6x}$
	21. _____		22. _____
23.	$\frac{1}{h} \left(\frac{1}{x+h} - \frac{1}{x} \right)$	24.	$\frac{5(4x+1) - 4(5x-2)}{(5x-2)^2}$
	23. _____		24. _____

VIII. Use Long Division to find the quotient and remainder.

25.	$(3x^3 - x^2 + x - 2) \div (x + 2)$	26.	$(4x^3 - 3x^2 + 3x - 2) \div (2x^2 + 1)$
	25. _____		26. _____

IX. Use synthetic division to find the quotient and remainder.

27.	$(-4x^3 + 2x^2 - x + 1) \div (x + 2)$	28.	$(x^4 + x^2 + 2) \div (x - 2)$
	27. _____		28. _____

X. Use synthetic division to determine whether $x - c$ is factor of the given polynomial.

29.	$-4x^3 + 5x^2 + 8; x + 3$	30.	$2x^4 - x^3 + 2x - 1; x - \frac{1}{2}$
	29. _____		30. _____

XI. Solve each equation.

31.	$2(2-x) = 2x-1$	32.	$1 - \frac{1}{2}x = 5$
	31. _____		32. _____
33.	$x^3 = x^2$	34.	$v^2 + 7v + 12 = 0$
	33. _____		34. _____

35.	$\left \frac{2}{3}x - 1 \right + 4 = 2$	36.	$x(x+1) = 12$
	35. _____		36. _____
37.	$(x+2)^2 = 1$	38.	$4x^2 - 4x + 1 = 0$
	37. _____		38. _____

XII. Write each expression in the standard form of $a + bi$. Do not use your calculator!!!

39.	$(-3+i)(3+i)$	40.	$\frac{13}{5-12i}$
	39. _____		40. _____
41.	i^{14}	42.	$4i^3 - 2i^2 + 1$
	41. _____		42. _____

XIII. Use the quadratic formula to solve in the complex number system. Express answers in the form of $a+bi$.

43.	$x^2 + 4x + 8 = 0$	44.	$13x^2 + 1 = 6x$
	43. _____		44. _____

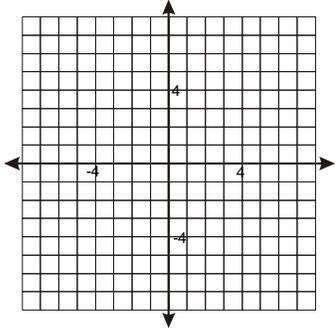
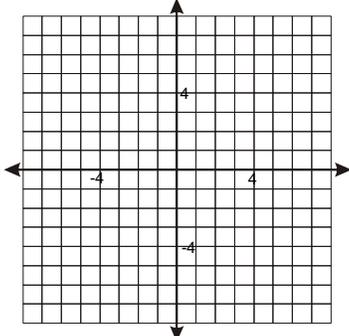
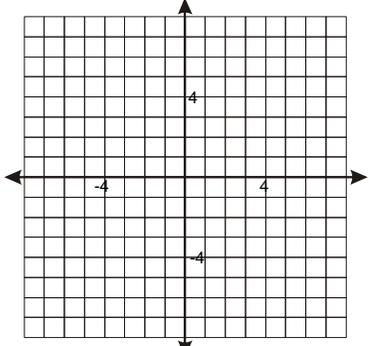
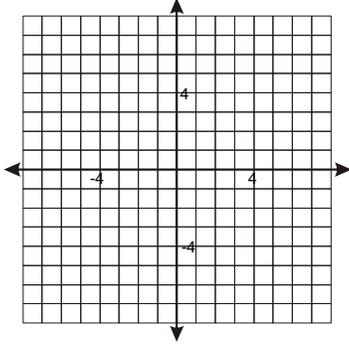
XIV. Solve each inequality.

45.	$-3(1-x) < 12$	46.	$4 \leq 2x + 2 \leq 10$
	45. _____		46. _____
47.	$ 2x+5 \leq 7$	48.	$ 3x-2 > 1$
	47. _____		48. _____

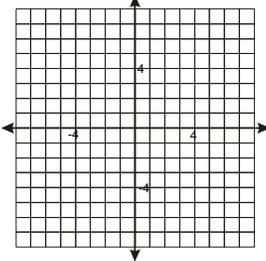
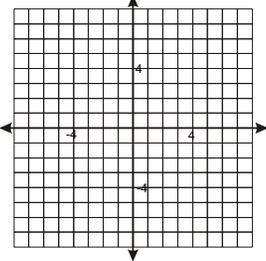
XV. Simplify each expression. Assume all variables are positive when they appear.

<p>49. $\sqrt{5x}\sqrt{20x^3}$</p> <p style="text-align: right; margin-top: 100px;">49. _____</p>	<p>50. $(\sqrt{5}-2)(\sqrt{5}+3)$</p> <p style="text-align: right; margin-top: 100px;">50. _____</p>
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XVI. Graph the following parent graphs. Complete the table of ordered pairs.

<p>51. $f(x) = x^2$</p> <table border="1" style="display: inline-table; margin-right: 20px;"> <thead> <tr><th>x</th><th>y</th></tr> </thead> <tbody> <tr><td>-2</td><td></td></tr> <tr><td>-1</td><td></td></tr> <tr><td>0</td><td></td></tr> <tr><td>1</td><td></td></tr> <tr><td>2</td><td></td></tr> </tbody> </table> 	x	y	-2		-1		0		1		2		<p>52. $f(x) = x^3$</p> <table border="1" style="display: inline-table; margin-right: 20px;"> <thead> <tr><th>x</th><th>y</th></tr> </thead> <tbody> <tr><td>-2</td><td></td></tr> <tr><td>-1</td><td></td></tr> <tr><td>0</td><td></td></tr> <tr><td>1</td><td></td></tr> <tr><td>2</td><td></td></tr> </tbody> </table> 	x	y	-2		-1		0		1		2	
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XVII. Using the given information, write the equation ($Ax + By + C = 0$) of the line and then graph the line.

<p>55. Passes through the points $(-3, 4)$ and $(6, 1)$</p>  <p style="text-align: right;">55. _____</p>	<p>56. Passes through $(-1, 4)$ and is parallel to $2x - y - 4 = 0$</p>  <p style="text-align: right;">56. _____</p>
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XVIII. Given $f(x) = 2x - 1$ and $g(x) = 3x^2 - 1$. Find the following. Write answers in most simplified form.

<p>57. $g(x + h)$</p> <p style="text-align: right;">57. _____</p>	<p>58. $g\left(\frac{1}{3}\right)$</p> <p style="text-align: right;">58. _____</p>
<p>59. $f(x) - g(x)$</p> <p style="text-align: right;">59. _____</p>	<p>60. $f(x) \cdot g(x)$</p> <p style="text-align: right;">60. _____</p>
<p>61. $(f \circ g)(x)$</p> <p style="text-align: right;">61. _____</p>	<p>62. $(g \circ f)(x)$</p> <p style="text-align: right;">62. _____</p>

XIX. Complete the square to find the center and radius of the given circle.

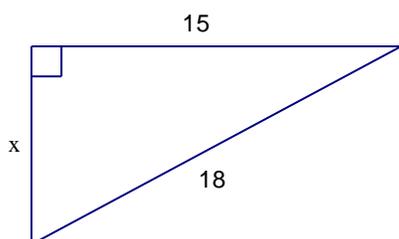
<p>63. $x^2 + y^2 + 6x - 4y - 3 = 0$</p> <p style="text-align: right;">63. (____, ____)</p> <p style="text-align: right;">r = _____</p>	<p>64. $2x^2 + 2y^2 - 4x + 8y - 24 = 0$</p> <p style="text-align: right;">64. (____, ____)</p> <p style="text-align: right;">r = _____</p>
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XX. Complete the square to find the vertex of the given parabola.

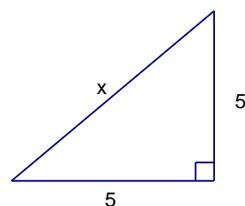
<p>65. $y = x^2 - 4x + 1$</p> <p style="text-align: right;">65. (____, ____)</p>	<p>66. $y = 2x^2 - 6x + 1$</p> <p style="text-align: right;">66. (____, ____)</p>
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Use the Pythagorean Theorem ($a^2 + b^2 = c^2$) to find the value of x . Leave your answer in simplest radical form.

67.

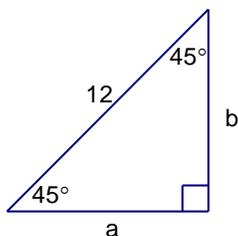


68.

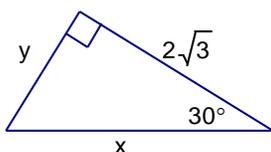


Use the special right triangles ratios $((1:1:\sqrt{2})$ and $(1:\sqrt{3}:2)$) to find the value of each variable. If your answer is not an integer, leave it in simplest radical form.

69.

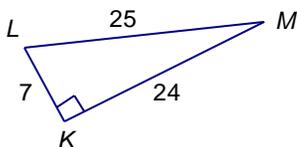


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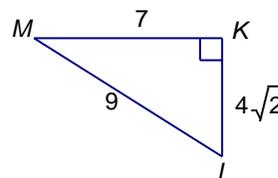


Write the ratios for $\sin M$, $\cos M$ and $\tan M$.

71.

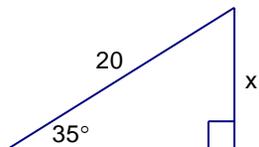


72.

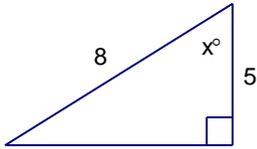


Find the value of x . Round answers to the nearest hundredth.

73.



74.



75. The world's tallest unsupported flagpole is a 282-ft-tall steel pole in Surrey, British Columbia. The shortest shadow cast by the pole during the year is 137 ft long. To the nearest degree, what is the angle of elevation of the sun when the shortest shadow is cast?

76. A blimp is providing aerial television views of a football game. The television camera sights the stadium at a 7° angle of depression. The blimp's altitude is 400 m. What is the line-of-sight distance from the TV camera to the stadium, to the nearest ***hundred meters?***