

Geometry/Algebra II Honors Summer Packet

We are so excited to have you in our Geometry/Algebra II Honors course next year, but it is critical that you come in with certain fundamental skills so that you are prepared for the pace and rigor of the course. **You should only use a calculator on the parts that specify to use a calculator. Make sure to show ALL work for every problem.** As such, we have created this summer packet with some accompanying videos of various skills that are crucial to your success in this course. We encourage you to attempt the worksheets first utilizing skills you have learned in previous courses, check your answers against the keys, and then utilize the videos for refreshers/support on topics that you may not feel strong on.

The second year of this course definitely comes with a step up from the first year in terms of rigor and pace, so it is encouraged that you complete this packet with fidelity and earnest effort to make sure you are best prepared for success when entering this course. While we preregistered you for this course last spring, we will still thoughtfully evaluate each student's readiness and placement to ensure that this course is an appropriate and supportive fit for their academic growth.

Keep track of any problems that you are struggling with and be ready to ask for support on these topics from your teacher when the school year starts.

There will be a Summer Packet Quiz in the first week of school covering these prerequisite topics to ensure that you have all the necessary fundamentals before we dive into new content.

This packet, completed in its entirety, will be due the second day of school.

We hope you have a wonderful and restful summer with plenty of time for all your favorite activities. Be ready to hit the ground running once school starts in August.

This QR code links to a helpful website that has the solutions to these worksheets. It also has some helpful videos going over some of these skills to help you brush up on anything you need extra support on.

Please make sure to attempt these worksheets on your own **before** accessing the website.



Part 1: Fractions and Order of Operations

NO CALCULATOR

Evaluate each expression and leave your answer in simplest form.

1) $\frac{7}{13} - \frac{4}{13} - \frac{2}{13}$

2) $\frac{1}{2} + \frac{5}{7}$

3) $\frac{3}{8} - \frac{7}{4}$

4) $1\frac{1}{3} + 2\frac{1}{6}$

5) $7\frac{1}{6} - 5\frac{2}{3}$

6) $6\left(\frac{3}{8}\right)$

7) $\frac{4}{5} \cdot \frac{3}{8}$

8) $\left(-\frac{3}{5}\right)\left(-\frac{5}{9}\right)\left(-\frac{3}{10}\right)$

9) $2\frac{1}{3} \cdot 2\frac{1}{4}$

10) $\frac{4}{9} \div \frac{2}{3}$

11) $1\frac{3}{10} \div \frac{4}{5}$

12) $(2 + 10) \div 2(3) + 7$

13) $2 \cdot 5 \div 4^2 + 1$

14) $\frac{4}{3} \cdot \frac{5}{2} - \frac{3}{2} \div \frac{2}{7}$

15) $7 + 2(11 - 2^3)$

Part 2: Simplifying and Evaluating Expressions

NO CALCULATOR

Evaluate each expression for the given value of x and/or y .

16) $x^5 - 2y^2$; $x = -1$, $y = 4$

17) $\frac{x-y}{2(x+y)}$; $x = 5$, $y = -3$

18) $4\left(\frac{y}{x}\right) - 2y^3$; $x = -\frac{1}{3}$, $y = 2$

19) $(3x)^2 - 2y^3$; $x = 4$, $y = -3$

Simplify each expression and leave your answer in simplest form. Also, be sure your answer is in standard form.

20) $3y(4 - y) + 2y^2$

21) $\frac{20x^2 + 30x -}{-5}$

22) $x - 3(5x - 3) - (2 - x)$

23) $\frac{1}{3}(6 - 9x) - \frac{3}{5}(20 - 10x)$

24) $\frac{1}{2}(8 - 4x) + \frac{1}{3}(6x - 9)$

Let p represent a positive number and n represent a negative number. Determine if the given expressions will *always* be positive, *always* be negative, or *sometimes positive* and *sometimes negative*.

25) np^6

26) $-(n)^2$

27) $(-p)^2$

Part 3: Solving Linear Equations and Inequalities

NO CALCULATOR

Solve the following equations for x . You must show all algebraic steps.

$$28) \frac{3}{4}x - \frac{10}{3} = 5 + \frac{x}{2}$$

$$29) 14x - (6x + 4) = 3x + 5(x - 1) + 1$$

$$30) 6.2x + 11.8 = 3.8(x + 1)$$

$$31) 4 - 2(x - 11) = 3(x + 4) - 6$$

$$32) \frac{1}{4}(4 - x) = 10 + 2x$$

$$33) \frac{1}{5}x = 7 - \frac{4}{5}x$$

Solve the following inequalities for x . You must show all algebraic steps. Write your answer in interval notation.

$$34) \frac{1}{3}x + \frac{2}{5} \leq \frac{4}{5}x + \frac{5}{3}$$

$$35) 2(x - 1) > \frac{3}{5}(10 + 5x)$$

$$36) 2(x - 2x + 3x - 4) < 4(x - 3)$$

$$37) \frac{6-5x}{4} \geq 3x + 1$$

Solve the following absolute value equations for x .

38) $|2x + 7| = 5$

39) $\left|\frac{1}{2}x - 2\right| = 2x + 5$

40) $|2x + 1| + 7 = -x - 3$

41) $|3x - 7| = x + 25$

Solve the following absolute value inequalities for x . Write your answer in interval notation.

42) $|5x + 1| + 7 > -x - 3$

43) $|-x + 3| \leq 2x + 7$

44) $\left|\frac{1}{3}x + 5\right| \geq -2x + 11$

45) $|3x + 5| < 2x - 1$

Part 4: Solving Literal Equations

NO CALCULATOR

For questions 46 and 47,

a) Solve each equation for y in terms of x , showing your work.

b) Then evaluate when $x = 2$.

46) $-\frac{2}{3}x + \frac{1}{5}y = 1$

47) $\frac{1}{4}y + 3x - 6 = y + 21$

Solve each equation for the indicated variable.

48) $p = 2l + 2w$ for l

49) $V = \frac{1}{3}(l \cdot w \cdot h)$ for w

50) $C = \frac{5}{9}(F - 32)$ for F

51) $A = \frac{1}{2}h(b_1 + b_2)$ for b_1

52) $d = \sqrt{l^2 + w^2 + h^2}$ for l

53) $I = P(1 + r)^t$ for P

Part 5: Linear Functions and Inequalities

NO CALCULATOR

Find the slope of the line passing through the given points. Include your work.

54) $(-2,5), (-8,1)$

55) $(-3,8), (-3,4)$

Find the equation of the line in slope-intercept form ($y = mx + b$) using the given information.

56) $\text{slope} = 5, y\text{-int} = 2$

57) $m = -4, b = -9$

58) $m = -2$, goes through $(-1, -4)$

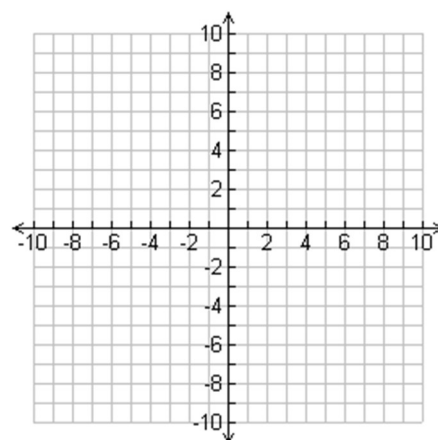
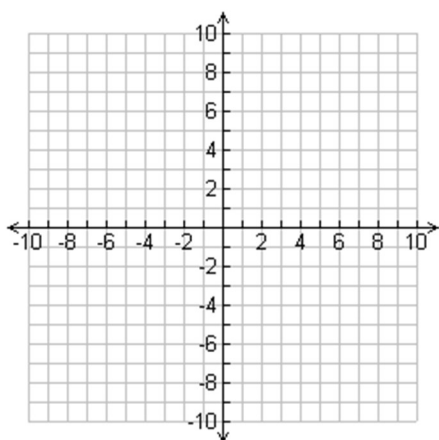
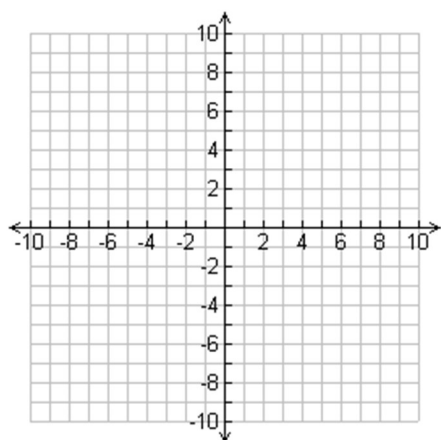
59) Goes through $(5,7)$ and $(8,1)$

Graph the functions. Please use a straightedge to connect your points.

60) $y = 2x - 3$

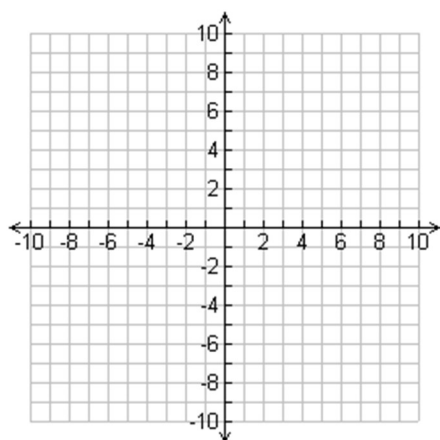
61) $y = -x$

62) $y = 4$

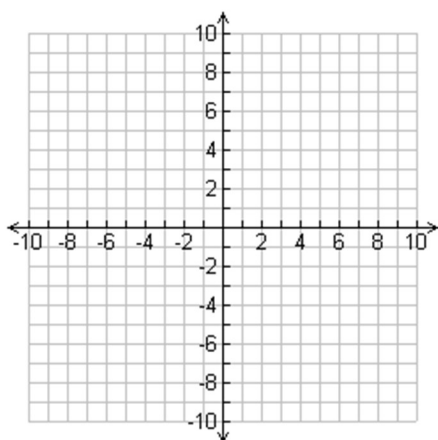


Graph the functions. Please use a straightedge to connect your points.

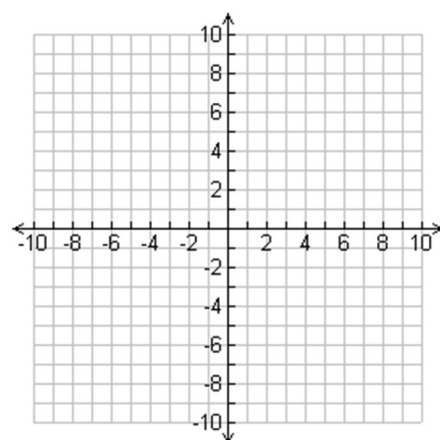
63) $2x + 4y = 8$



64) $y - 5 = \frac{1}{3}(x + 1)$

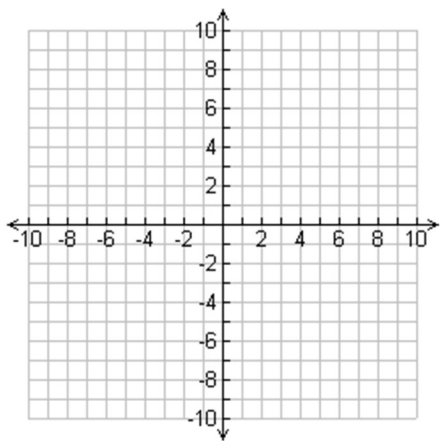


65) $y + 7 = 2(x - 5)$

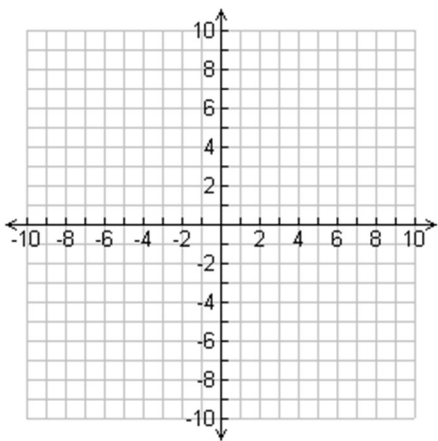


Graph and shade the inequalities. Please use a straightedge to connect your points, paying attention to if your line should be solid or dotted.

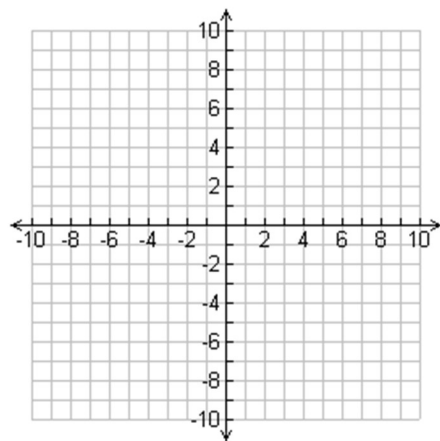
66) $y \geq -\frac{2}{3}x$



67) $4x - 2y > 12$



68) $x \geq -3$

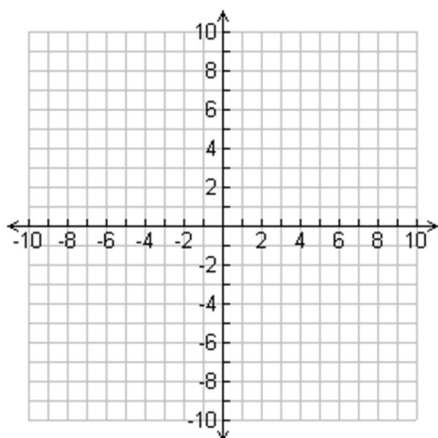


Part 6: Systems of Equations

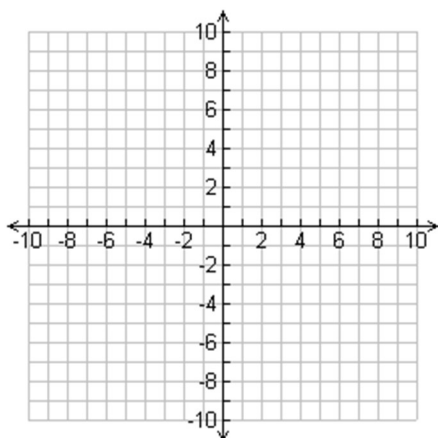
NO CALCULATOR

Solve each system of equations by graphing. Please use a straightedge to connect your points.

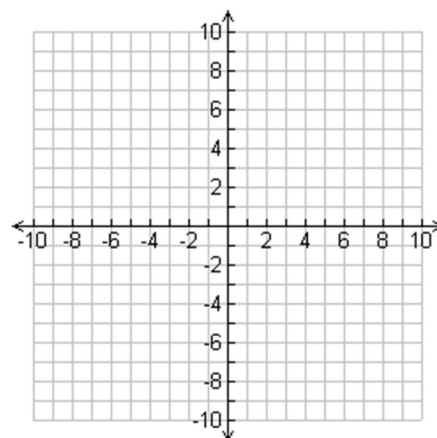
$$69) \begin{cases} y = x + 3 \\ y = -\frac{1}{2}x + 6 \end{cases}$$



$$70) \begin{cases} 4x + 3y = 12 \\ y = -\frac{4}{3}x + 4 \end{cases}$$



$$71) \begin{cases} 4x - 2y = 12 \\ y - 8 = 2(x - 1) \end{cases}$$



Solve the following systems of equations using the substitution or the elimination method. Remember to write your solution as an ordered pair.

$$72) \begin{cases} y = x + 4 \\ 3x + y = 16 \end{cases}$$

$$73) \begin{cases} 8x - 4y = 4 \\ 4x - 2y = -3 \end{cases}$$

$$74) \begin{cases} 6x - 2y = 12 \\ 3x - y = 6 \end{cases}$$

$$75) \begin{cases} 4x + 5y = 12 \\ 6x - 3y = -3 \end{cases}$$

Part 7: Multiplying Expressions and Factoring

NO CALCULATOR

Find each product. All answers should be written in standard form.

76) $3x(x^2 - 4x + 3)$

77) $(x - 8)(x + 7)$

78) $(2x - 3)(2x + 3)$

79) $(5d + 3)(4d + 7)$

80) $(7x + 4)(7x - 4)$

81) $(w - 5)^2$

82) $2(4a + 3)^2 - 7$

83) $(-5x + 4)(2x - 9)$

84) $-(2w - 7)(w + 1) - 7$

Factor each quadratic expression. Always check for a greatest common factor. If the expression cannot be factored, write prime.

85) $x^2 - 9x + 20$

86) $x^2 - 81$

87) $x^2 - 13x + 36$

88) $6x^2 - 11x + 4$

89) $x^2 + 25$

90) $50x^2 - 350x + 300$

91) $4x^2 + 20x + 25$

92) $4x^2 - 25$

93) $2x^4 + 9x^3 - 5x^2$

Part 8: Factoring and Solving Quadratic Equations

NO CALCULATOR

Factor each expression. Always check for a greatest common factor. If the expression cannot be factored, write prime.

94) $-4x^2 - 20x$

95) $x^2 - 9$

96) $x^2 + 7x + 12$

97) $x^2 - x - 42$

98) $2x^2 - 11x - 21$

99) $x^3 + 6x^2 + 5x$

100) $5x^3 + 7x^2 - 15x - 21$

101) $2x^3 - 5x^2 - 18x + 45$

102) $(5x + 1)^4(2x - 3)^2 + (5x + 1)^5(2x - 3)$

103) $8x^2(2x + 1)^3(x - 5) + 10x(2x + 1)^2(x - 5)^2$

Complete the square on the following quadratic expressions.

104) $x^2 + 8x - 11$

105) $3x^2 + 12x + 15$

106) $2x^2 + 10x + 7$

Solve the equation by factoring. Include your algebra and be sure your solutions include statements " $x =$ "

107) $x^2 + 3x - 70 = 0$

108) $3x^2 = -30x$

109) $x^2 + 8x = 20$

110) $2x^2 + 7x + 3 = 0$

111) $6x^2 - 5x - 6 = 0$

112) $8x^2 + 2x = 3$

113) $x^2 + 15x - 100 = 0$

114) $x^2 - 121 = 0$

115) $x^2 + 12x + 36 = 0$

116) $3x^2 + 11x + 13 = -3x^2 - 8x + 3$

Use the quadratic formula to solve the following equations for x . $\left(x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}\right)$

117) $x^2 - 5x - 7 = 0$

118) $x^2 + 5x + 7 = 0$

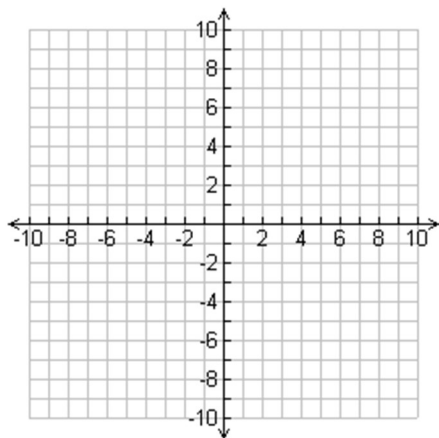
119) $3x^2 - 4x + 2 = 7$

Part 9: Graphing Quadratic Equations

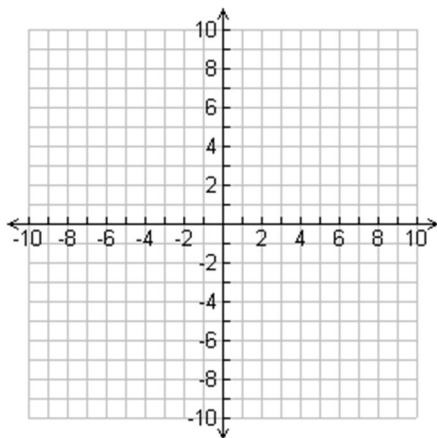
NO CALCULATOR

Graph the following quadratic functions.

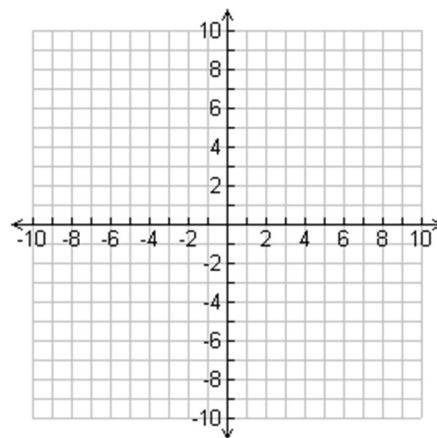
120) $y = x^2 - 8x + 12$



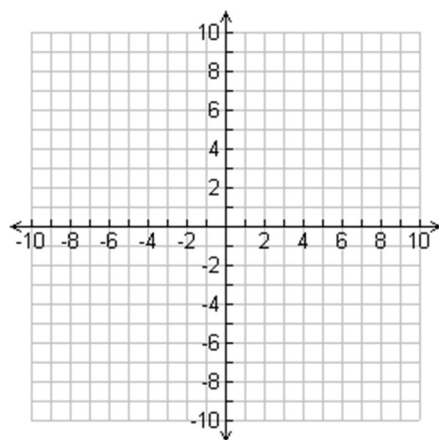
121) $y = -2x^2 - 16x - 28$



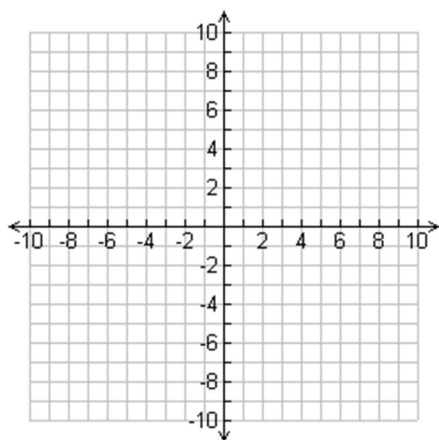
122) $y = 3x^2 + 12x + 10$



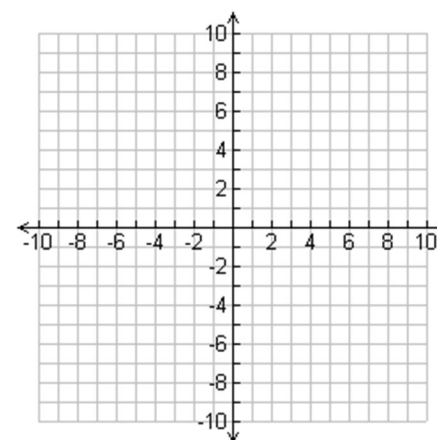
123) $y = (x - 5)(x - 9)$



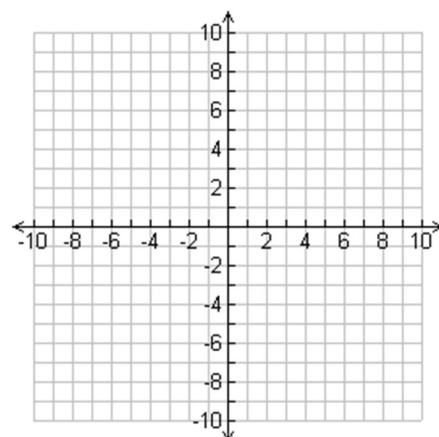
124) $y = -2(x + 2)(x - 2)$



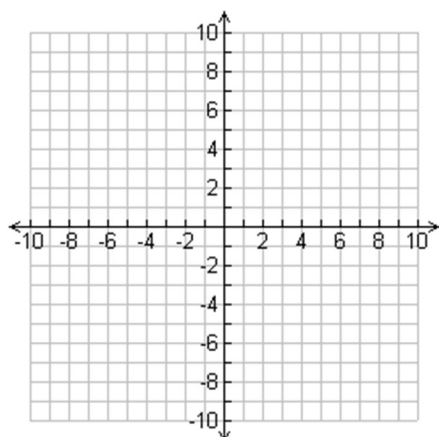
125) $y = 2(x + 1)(x - 3)$



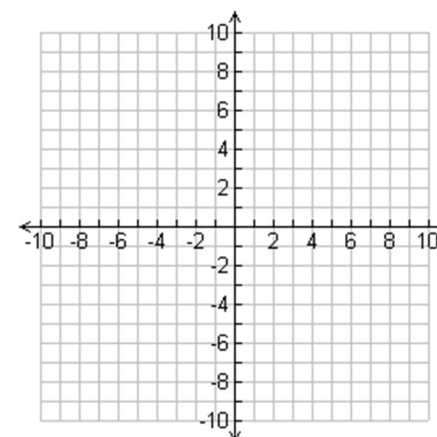
126) $y = 2(x - 1)^2 + 3$



127) $y = -(x + 1)^2$



128) $y = 3(x + 4)^2 - 8$



Part 10: Exponents and Simplifying Expressions

NO CALCULATOR

Simplify each expression fully. Your answers cannot include negative exponents. If an expression cannot be simplified, state “already simplified”.

129) $c^4 \cdot c^2$

130) $(n^3)^4$

131) $(-2x^3)^3$

132) $\frac{-72x}{-9x^3}$

133) $\left(\frac{x^3}{y^5}\right)^2$

134) $\left(-\frac{3a^3}{15^4}\right)$

135) $5m^0$

136) $(7a^4)(-a^5)$

137) $\frac{1}{n^{-5}}$

138) $-x^3 \cdot x^5 \cdot x$

139) $x^5 \cdot x^{-9}$

140) $\frac{3a}{6a^2}$

141) $\frac{a^3}{b^4} \cdot \frac{-b^4}{a^3}$

142) $\frac{5a+7a}{6}$

143) $\frac{3x}{-6x^2} \cdot 4x$

Simplify each expression fully. Your answers cannot include negative exponents. If an expression cannot be simplified, state “already simplified”.

144) x^2x^6

145) $\frac{x^7}{x^2}$

146) $\frac{x^{-5}y^3m^2}{x^2y^{-8}m^6}$

147) $(x^{-2})^3$

148) $\left(\frac{2x^3}{3y^4}\right)^2$

149) $\left(\frac{6yx^6}{3y^4x^2}\right)^4$

150) $\left(\frac{2x^2}{m^3}\right)^{-2}$

151) $\frac{(a+b)^3}{(a+b)^7}$

152) $(3x10^5)^3$

153) $\left(\frac{7x^5y^2}{4x^2y^5}\right)^0$

154) $\left(\frac{a^{-\frac{1}{2}}}{a^{-\frac{2}{3}}}\right)^6$

Part 11: Simplifying Radical Expressions

NO CALCULATOR

Simplify each radical expression fully. If an expression cannot be simplified, state “already simplified”.
Answers should be rationalized with no radicals in the denominator.

155) $\sqrt{108}$

156) $\sqrt{80}$

157) $\sqrt{125}$

158) $\sqrt{300}$

159) $\sqrt{15} \cdot \sqrt{10}$

160) $2\sqrt{10} \cdot 3\sqrt{5}$

161) $\sqrt{\frac{16}{25}}$

162) $\sqrt{\frac{56}{36}}$

163) $\sqrt{\frac{12}{5}}$

164) $\sqrt{3^2 + 4^2}$

165) $\sqrt{6} + \sqrt{10}$

166) $\sqrt{8}$

167) $4\sqrt{45} + 2\sqrt{20}$

168) $\sqrt{50} - \sqrt{16} + \sqrt{72}$

169) $\sqrt{6} \cdot \sqrt{15}$

Simplify each radical expression fully. If an expression cannot be simplified, state “already simplified”. Answers should be rationalized with no radicals in the denominator.

170) $4\sqrt{3} \cdot 5\sqrt{27}$

171) $\frac{\sqrt{36}}{\sqrt{25}}$

172) $\frac{5}{\sqrt{3}}$

173) $\frac{\sqrt{7}}{\sqrt{2}}$

174) $\frac{\sqrt{6}}{\sqrt{12}}$

175) $\frac{4}{1+\sqrt{3}}$

176) $\frac{8}{2-\sqrt{2}}$

177) $\frac{10}{5-\sqrt{5}}$

178) $\sqrt{36x^4y^{10}}$

179) $\sqrt{72x^5y^6}$

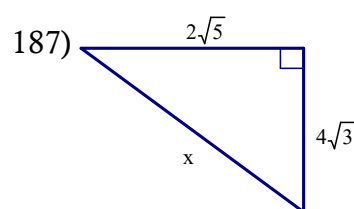
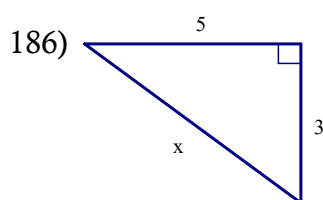
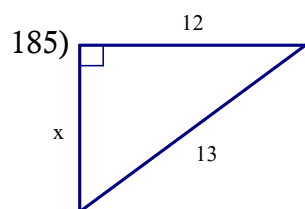
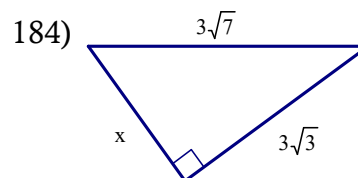
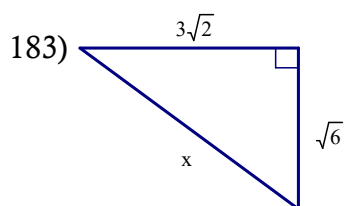
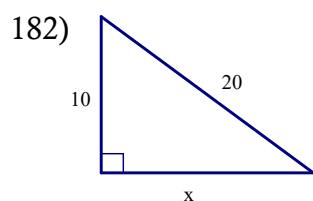
180) $3xy\sqrt{x^2y^5} \cdot 7x\sqrt{x^3y^7}$

181) $\sqrt{\frac{21^7y^3z^2}{7x^2y^5z^7}}$

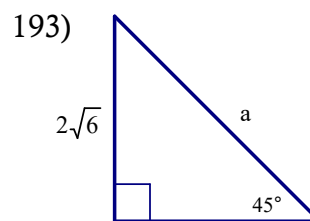
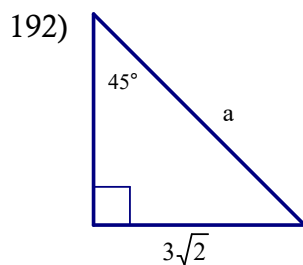
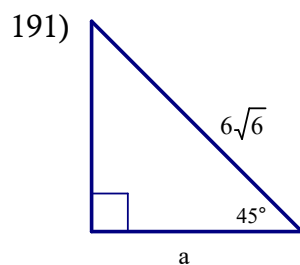
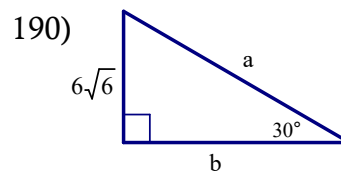
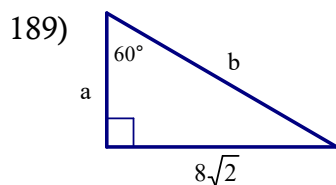
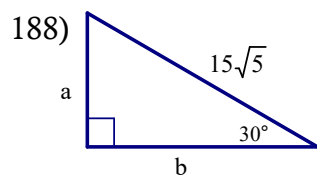
Part 12: Pythagorean Theorem and Special Right Triangles

NO CALCULATOR

Solve for the value of each variable in the following right triangles. Find exact answers (no decimals). Show your work whenever possible.



Solve for the value of each variable in using 30-60-90 or 45-45-90 triangle ratios. Find exact answers (no decimals). Show work whenever possible.



Part 13: Right Triangle Trigonometry

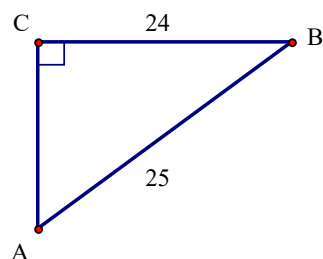
CALCULATOR ALLOWED ON PROBLEMS 197 – 202

Using the given right triangle, find the missing side length then the following trig ratios (without a calculator).

194) $\sin(A) = \underline{\hspace{2cm}}$

$\cos(A) = \underline{\hspace{2cm}}$

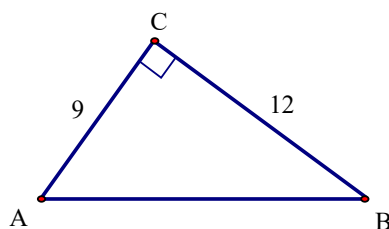
$\tan(A) = \underline{\hspace{2cm}}$



195) $\sin(A) = \underline{\hspace{2cm}}$

$\cos(A) = \underline{\hspace{2cm}}$

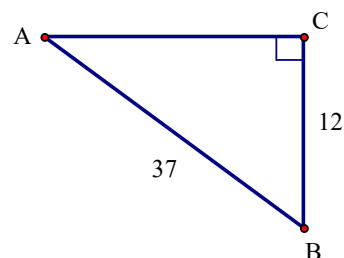
$\tan(A) = \underline{\hspace{2cm}}$



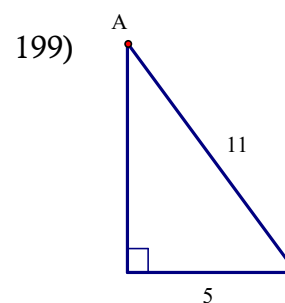
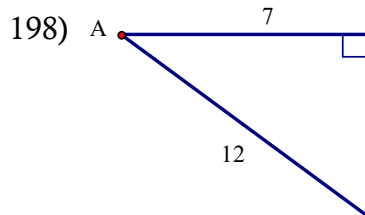
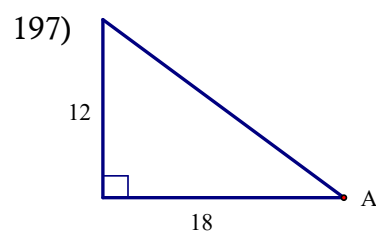
196) $\sin(B) = \underline{\hspace{2cm}}$

$\cos(B) = \underline{\hspace{2cm}}$

$\tan(B) = \underline{\hspace{2cm}}$



Using the given right triangle and a calculator find the measure of A to the nearest hundredth of a degree.



Using the given right triangle and a calculator find the length of x to the nearest hundredth.

