

# Algebra Ninja v2

skills needed to sneak up on the  
SAT  $\cap$  ACT  $\cap$  MCA  
www.AlgebraNinja.com for video  
lessons on each type of problem

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## Simple Numbers

1.  $\sqrt{16}$
2. simplify  $\sqrt{8}$
3. estimate  $\sqrt{147}$
4.  $-4 * 7$
5.  $-3 + -10$
6.  $7^2$
7.  $-(-3)$
8.  $-8(a - 4)$
9.  $-(x - 9)$
10.  $3 + 5(2 - 1)$

11.  $(-1)^2$  vs  $-1^2$  which is 1?

12. long divide  $303 \div 3$

13.  $.45 = \frac{?}{?} = ?\%$

14.  $\frac{1}{2} = .?? = ?\%$

15. Give the unit rate if the

data gathered was:

100 miles per 2 gallons

16.  $.6 \times .05$

17.  $-17[ ] - 13, ><=?$

18.  $2 \times 10^{-4} = ?$

19.  $\frac{2}{-5} = \frac{n}{15}$

20.  $|-10| = ?$

21.  $-|-2| = ?$

22.  $\sqrt{-81}$

23.  $\sqrt{w^2}$

24.  $\sqrt{7} + 9\sqrt{7}$

## Principles of Exponents

25.  $p^0$

26.  $a^x a^y$

27.  $\frac{a^x}{a^y}$

28.  $(a^x)^y$

29.  $(x + 8)^2$

30.  $(4a^m)^2$

31. rewrite  $\sqrt{a}$  as  $a^?$

32.  $\sqrt[r]{a}$

33.  $\sqrt[n]{a^m}$

34.  $p^{-x}$

35.  $\sqrt[y]{\frac{w}{k}}$

36.  $y^{-1}$

## Fractions & Cancelling

37. simplify  $\frac{8a+a}{a}$

38.  $\frac{3}{4}$  of 8 =

39.  $(\frac{1}{4}) + (\frac{3}{5})$

40.  $(\frac{1}{7}) \div (\frac{3}{4})$

41.  $-1(\frac{1}{-9})$

42.  $(\frac{2}{8}) \times (\frac{6}{5})$

43.  $2\frac{2}{7} = \frac{?}{?}$

44. rewrite  $\frac{q+c}{c}$

45. rewrite  $\frac{3}{5}a$

46.  $\frac{1}{\frac{1}{r}}$

47.  $\frac{8}{5}$  rewrite as mixed #

48.  $\frac{15}{35}$  reduces to  $\frac{?}{?}$

49.  $u * \frac{b}{c}$

50.  $\frac{\frac{r}{b}}{\frac{y}{d}}$

51.  $\frac{\frac{a}{t}}{\frac{c}{c}}$

52.  $(6) \left(\frac{2}{4}\right)$

**Factoring/Foiling**

53.  $x^2 + 6x + 5$

54.  $x^2 - 3x - 10$

55.  $3x^2 + 6x - 9$

56.  $x^2 - 49$

57.  $3x^2 + 8x + 4$

58. factor  $eb + ec =$

59.  $(x + 5)(x - 5)$

60.  $(x + 4)(x + 3)$

61.  $(x + 7)^2$

**Variables**

62.  $wb \times wb$

63.  $qb + qb$

64.  $3x + 6 - 8x$

65. rewrite  $aaaaa$

66. rewrite  $aaabb$

67.  $2(t + b)$

68.  $-(3 - m)$

69.  $9a^2 + 7a^2$

70.  $7a - 3a$

71.  $-6a - 5a$

72.  $2(9x)$

73.  $10x^3/2x^3$

74.  $\frac{10xy^7}{8x^3}$

**Basic Equation/Ineq**

75.  $\frac{2}{5} = \frac{n}{8}$

76.  $2a = 11$

77.  $-r = -2$

78.  $\frac{2}{7}n = 2$

79.  $3p + 1 = 5p$

80.  $n + 6 = n - 8$

81.  $\frac{n+6}{2} = \frac{n}{3}$

82.  $-4x \leq 6$

83.  $|x| = 1$

84.  $|8x - 1| = 2$

85. Solve

$0 = (x - 1)(x + 10)$

86. Solve w/substitution

$y = 2x - 7$

$y = x - 5$

87. Solve w/elimination

$-2x + 3y = 1$

$x + y = 2$

88. Solve with the

quadratic formula:

$0 = x^2 + 5x - 4$

89. Show all steps:

$2\left(\frac{x}{4} - 1\right) + 9 = 6(2x - 3)$

## Memorization

90.  $10^2, 11^2, 12^2, 13^2, 14^2, 15^2$

91.  $2^3, 3^3, 4^3, 5^3$

92. *number of feet in 1 mile*

93. *distance = rate \* ?*

94. *\_\_ ounces = 1 pound*

95. *\_\_ weeks in year*

96. *1 liter ≈ ? quart(s)*

97. *1 in = \_\_ cm*

98. *1 pint of water = ?*

## Trigonometry

99. *define Sin*

100. *define Cos*

101. *define Tan*

## Data Handling

102. *Mean of 2,2,3,9*

103. *Median of 2,2,3,9*

104. *Mode of 2,2,3,9*

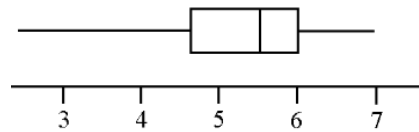
105. *Range of 2,2,3,9*

106. *Outlier in 1,7,8,8.*

107. If outliers exist  
then use \_\_\_ not \_\_\_.

108. *Use box & whisker*

Upper quartile? max?



109. *This stem & leaf*

2	001
3	122
4	37

Has what minimum?

## Functions

110. Evaluate

$f(x) = 8x - 1$  at  $x = 3$

111. If you

superimpose a

vertical line onto a

graph and it touches

twice is it a function?

112.  $(2,3), (2,4),$

$(3,6), (4,9)$  is this

relation a function?

113. *sketch  $y = x$*

114. *sketch  $y = x^2$*

115. *sketch  $y = |x|$*

116. *sketch  $y = \sqrt{x}$*

117. *sketch  $y = x^3$*

118. *sketch  $y = 2^x$*

119. When looking at

$y = -(x - 4)^2 + 6$

list transformations :

120. if  $f(x) = \frac{1}{x}$

what is domain  $f(x)$ ?

## Terminology

121. Given a function

$f(x) = -4x^2 - 2x + 9,$

what is its lead

coefficient?, constant?

122. T/F You can use a regression equation as a line of best fit.

123. A radian is a measure of degrees which is about 180/?

124. A recursive sequence is as follows

$$u_0 = 30$$

$$u_n = u_{n-1} * 2$$

What is  $u_1 =$

125. Given a function

$$f(x) = -2x^2 - 3x - 1$$

Compute the

discriminant then tell

how many solutions

$f(x)$  will have.

126. Domain is like the inputs(x), range is like outputs(y). T/F

127. Inverse of 4 =

128. Reciprocal of 4

129. Sum means:

130. Difference means:

131. Product means:

132. Quotient means:

133. Factors of 8:

134. Rewrite this equation in standard

$$\text{form: } y = -4x + 2$$

135. Rewrite this

equation in slope

intercept form:

$$4x - 2y = 6$$

136. What form is

this equation in?

$$(y - 8) = 2(x - 5)$$

137. What is the rate

of growth or decay in

this exponential eqn?

$$y = 4(.94)^x$$

138.  $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

is what formula?

139. Numbers that

can be written as a

fraction are \_\_\_\_\_.

140. Give an example

of an irrational #:

141. List the first 3

prime numbers:

142. Cross out the

non-integer on this

list: -5, 0, 2,  $\frac{1}{2}$ , 20

143. If any odd

integer is represented

as  $2n+1$ , what would

any even integer be?

144. If 2 consecutive

integers are  $n$  and

$n+1$ , what is the next

consecutive integer?

145. Old price for soap=\$2.80 New=\$3  
What is % of change?

**Geometry/formulas**

146. *area of rectangle =*

147. *area of triangle =*

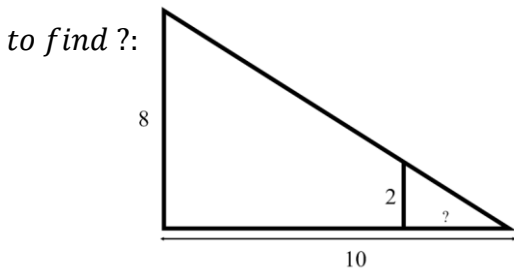
148. *area trapzoid =*

149. *area of circle =*

150. *Area formula for a parallelogram =*

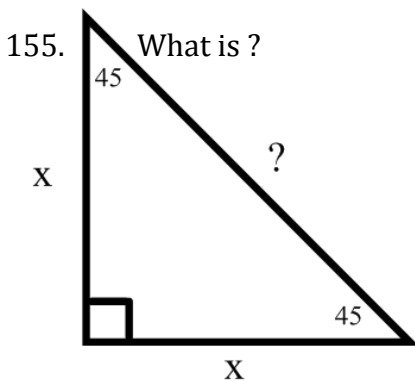
151. *Pythagorean thm:*

152. *use similar Δs*

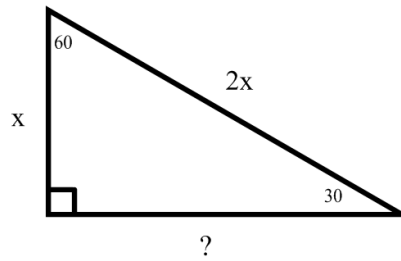


153. *Distance Formula:*

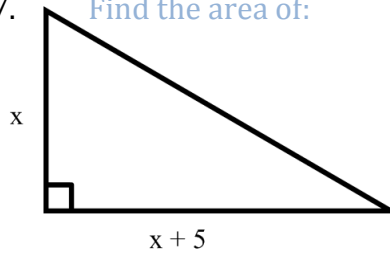
154. *Midpoint Formula: =*



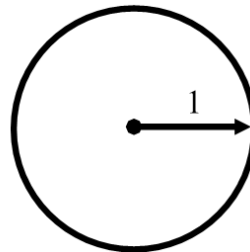
156. What is ?:



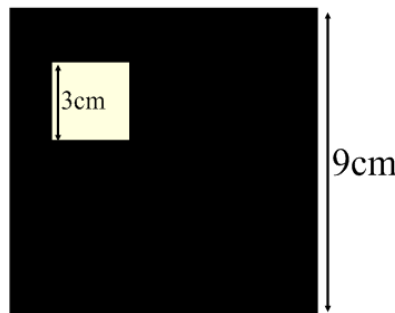
157. Find the area of:



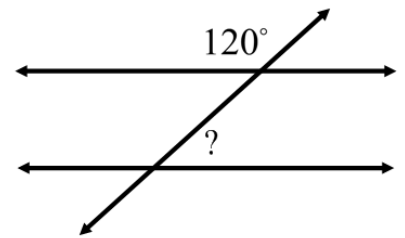
158. Find the area of:



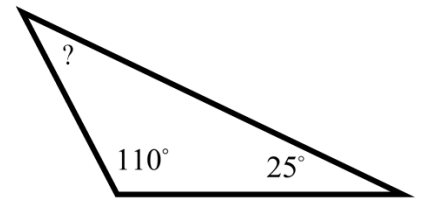
159. Find dark area:



161. Find the degrees of the angle:



162. Find the degrees of the ? angle:

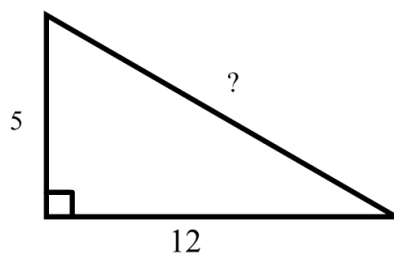


163. Could these 3 sides make a triangle:

3 in, 4 in, 8 in?

164. If the circumference of a circle is  $4\pi$ , what is its diameter?

160. Find the missing side:



165. A cube has a side length of 2 in.

What is its surface area?

## Probability

166. Given a jar with 5 marbles, 3 red and 2 white, what is  $P(R,W)$  given no replacement.

167. Given a coin is flipped twice and a die is rolled. Find  $P(H,T,3)$

168. In which does order NOT matter, Permutation or Combination?

169. Set up a " ${}_9P_2$ " for a race with 9 runners and 4 places.

170. Set up a " ${}_9C_2$ " for a committee made up of 5 people chosen from 25.

171. Set up a " ${}_9C_2$ " ...If there are 3 types

of Drinks and 4 kinds of burgers, how many meals can be made which have one drink and two burgers?

172. Set up a " ${}_9C_2$ " ...In a 7 card game with a 52 card deck, what  $p(4$  Kings and 3 Queens) being dealt?

173. Just set up the binomial for this: Jim has a 90% free throw average. In 3 shots what's the probability of making exactly 2.

## Polynomials

174. What is the degree of this?  
 $y = -x^4 - 2x + 8$

175. What is the degree of this?  
 $y = (x - 7)(x + 2)^3$

176. Linear polynomials are degree \_\_\_\_?

177. Quadratic polynomials are degree \_\_\_\_?

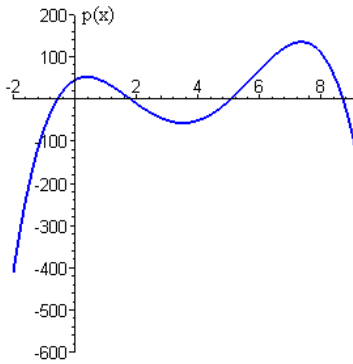
178. Cubic polynomials are degree \_\_\_\_?

179. List the right end behavior of graph for  $y = x^2 - x + 7$

180. What is the L and R end behavior of the graph of:  
 $y = 2x^4 - 2x^2 - x + 7$

181. Given graph of

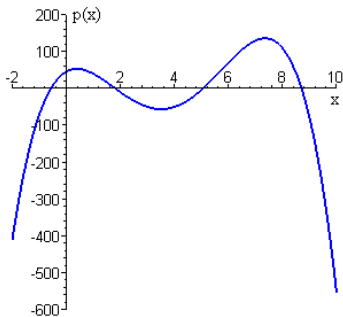
polynomial below



How many local  
maxes does it have?

182. The word for all  
local minimums and  
maximums is \_\_\_\_\_.

183. Given graph:



Does this have absolute max?

### Graphing

184. rise over run is:

185. Given

$$y = 5x + 2 \text{ find 3}$$

points on the line.

186.  $y = 2x + 3$  and  
 $y = 2x - 4$  are \_\_\_\_\_

lines?

187. A perpendicular  
line to  $y = \frac{1}{2}x - 4$   
would have what  
slope?

188. Given slope -4  
and y intercept = 10  
write the equation:

189. Given  
point (-5,2), Slope 3

Write the equation:

190. Given  
 $y - 8 = -2(x + 3)$

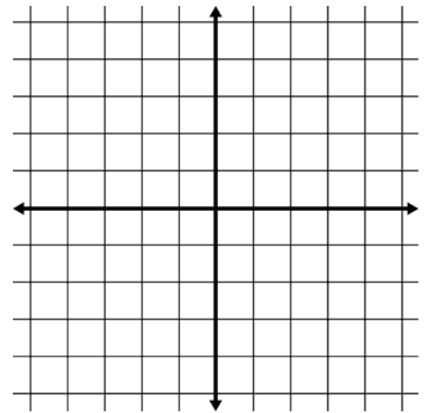
Identify a point & slope.

191. Given point

(2,2) and point (-4,5)

Find the slope:

Use the following graph for  
the next three problems



192. label X axis

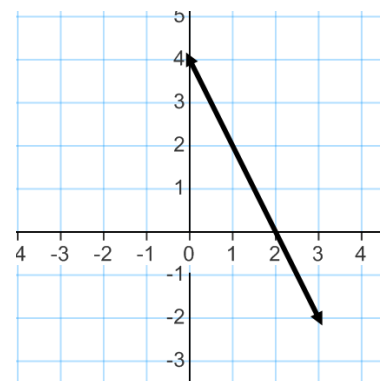
193. label Y axis

194. graph  $y = 4$

195. graph  $x = 1$

196. graph  $y = 3x - 1$

197. write eqn for this



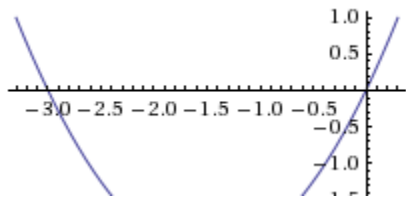
198. Which axis is

Range about, x or y?

199. Identify the

solutions of the

quadratic graphed.



202. A graph that is

increasing at an

increasing rate would

demonstrate \_\_\_\_\_

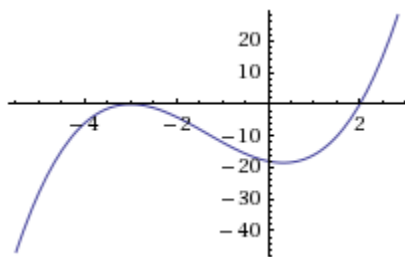
growth.

200. The polynomial

graphed below has a

single root at 2 and a

\_\_\_\_\_ at -3.



201. The x intercept

is found where  $y = \underline{\hspace{1cm}}$



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