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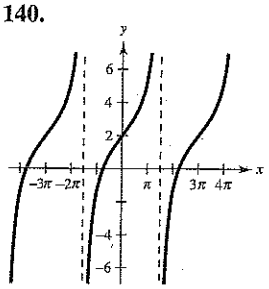

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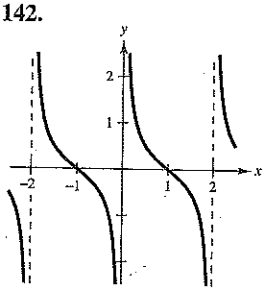

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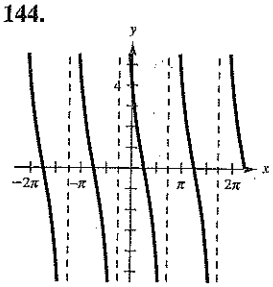

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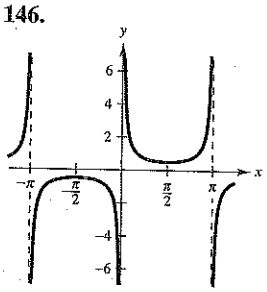

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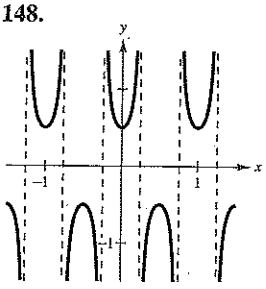

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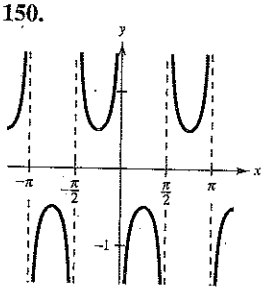

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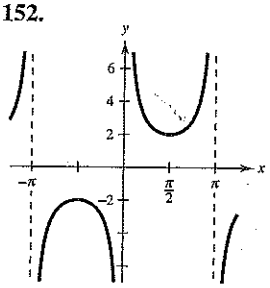

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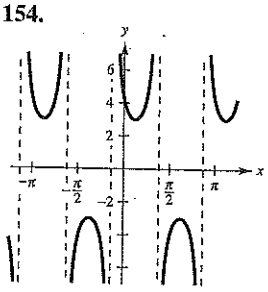

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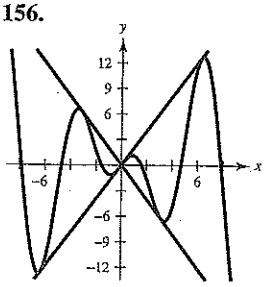

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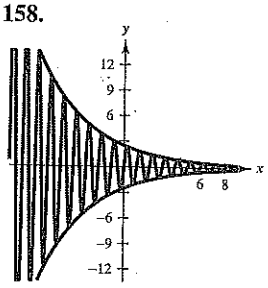


160. (a) $-\frac{\pi}{4}$ (b) $\frac{\pi}{3}$ **162.** (a) $-\frac{\pi}{3}$ (b) $-\frac{\pi}{4}$

164. (a) -1.223 (b) 1.691

166. (a) 0.681 (b) 1.416 **168.** $\theta = \arctan\left(\frac{x+1}{20}\right)$

170. $\frac{\sqrt{4-x^2}}{x}$ **172.** $\frac{1}{10x}$

174. 49,987 feet $\approx$ 9.47 miles **176.** 1221 miles; N 85.6° E

178. False. The expressions are not equivalent.

180. False.
y is a function but is not one-to-one on $30° \le \theta \le 150°$.

182. (a) An angle whose vertex is the origin and whose initial side is the positive x-axis.

(b) An angle generated by clockwise rotation

(c) An angle that has the same initial and terminal sides

(d) An angle whose measure is between 90° and 180°

Chapter 5

Section 5.1 *(page 381)*

2. $\sin\theta = \frac{3}{5}$

$\cos\theta = \frac{4}{5}$

$\sec\theta = \frac{5}{4}$

$\cot\theta = \frac{4}{3}$

4. $\sin x = -\frac{1}{2}$

$\csc x = -2$

$\sec x = -\frac{2\sqrt{3}}{3}$

$\cot x = \sqrt{3}$

6. $\cos\phi = \frac{-5\sqrt{26}}{26}$

$\tan\phi = -\frac{1}{5}$

$\csc\phi = \sqrt{26}$

$\sec\phi = -\frac{\sqrt{26}}{5}$

8. $\sin x = \frac{3}{5}$

$\tan x = \frac{3}{4}$

$\csc x = \frac{5}{3}$

$\sec x = \frac{5}{4}$

$\cot x = \frac{4}{3}$

10. $\sin x = \frac{1}{5}$

$\cos x = \frac{2\sqrt{6}}{5}$

$\tan x = \frac{\sqrt{6}}{12}$

$\sec x = \frac{5\sqrt{6}}{12}$

$\cot x = 2\sqrt{6}$

12. $\sin\theta = \frac{2\sqrt{2}}{3}$

$\cos\theta = -\frac{1}{3}$

$\tan\theta = -2\sqrt{2}$

$\csc\theta = \frac{3\sqrt{2}}{4}$

$\cot\theta = -\frac{\sqrt{2}}{4}$

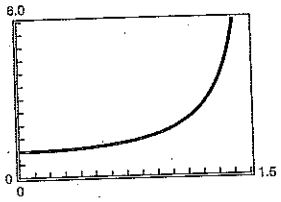
14. $\sin\theta = 1$ $\quad \csc\theta = 1$
$\cos\theta = 0$ $\quad \sec\theta$ is undefined.
$\cot\theta = 0$

16. 1, 1 **18.** $0, -\infty$ **20.** (f) **22.** (b) **24.** (c)
26. (c) **28.** (a) **30.** (d) **32.** $\sin\beta$ **34.** 1
36. $\tan\theta$ **38.** $\cos^2 x$ **40.** $\sin^2\theta$ **42.** $\sin x$
44. $\sec t$ **46.–62.** Answers will vary. **64.** $\sec^4 x$
66. $\csc x + 1$ **68.** $\cos^4 x$
70. $(\sec x - 1)(\tan^2 x)$ **72.** -1 **74.** $9\cos^2 x$
76. $-2\cot^2 x$ **78.** $-\cot x$ **80.** $5(\sec x - \tan x)$
82. $\tan^4 x(\csc x - 1)$

84.

x	0.2	0.4	0.6	0.8
y_1	1.0203	1.0857	1.2116	1.4353
y_2	1.0203	1.0857	1.2116	1.4353

x	1.0	1.2	1.4
y_1	1.8508	2.7597	5.8835
y_2	1.8508	2.7597	5.8835

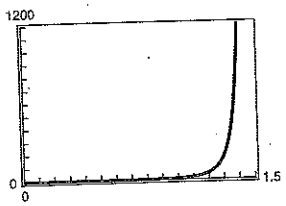


$y_1 = y_2$

86.

x	0.2	0.4	0.6	0.8
y_1	0.0428	0.2107	0.6871	2.1841
y_2	0.0428	0.2107	0.6871	2.1841

x	1.0	1.2	1.4
y_1	8.3087	50.3869	1163.61
y_2	8.3087	50.3869	1163.61



$y_1 = y_2$

88. $\sec x$ **90.** $\sec\theta$ **92.** $4\cos\theta$ **94.** $2\tan\theta$
96. $10\sec\theta$ **98.** $\frac{\pi}{2} \le \theta \le \frac{8\pi}{2}$ 3π/2 ?

100. $0 \le \theta < \frac{\pi}{2}$; $\pi \le \theta < \frac{3\pi}{2}$ **102.** $\ln|\sec\theta|$

104. $\ln|\cot t + \tan t|$

106. (a) $\tan^2(346°) + 1 = 1.0622$; $\sec^2(346°) = 1.0622$
(b) $\tan^2(3.1) + 1 = 1.0017$; $\sec^2(3.1) = 1.0017$

108. (a) $\sin(-250°) = 0.9397$; $-\sin(250°) = 0.9397$
(b) $\sin\left(-\frac{1}{2}\right) = -0.4794$; $-\sin\left(\frac{1}{2}\right) = -0.4794$

110. False. $\frac{\sin k\theta}{\cos k\theta} = \tan k\theta \neq \tan\theta$

112. False. $\sin 0 \cos 0$ is undefined.

114. $\cos\theta = \pm\sqrt{1 - \sin^2\theta}$

$\tan\theta = \pm\dfrac{\sin\theta}{\sqrt{1 - \sin^2\theta}}$

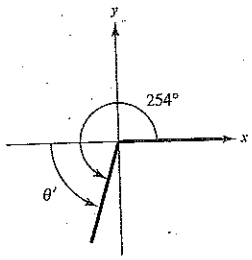
$\csc\theta = \dfrac{1}{\sin\theta}$

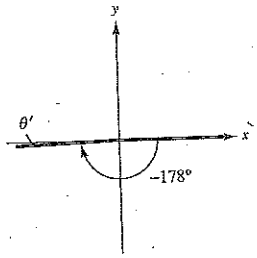
$\sec\theta = \pm\dfrac{1}{\sqrt{1 - \sin^2\theta}}$

$\cot\theta = \pm\dfrac{\sqrt{1 - \sin^2\theta}}{\sin\theta}$

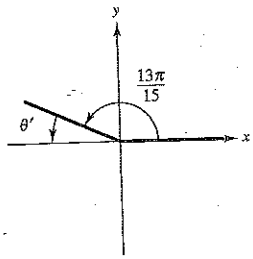
The sign depends on the choice of θ.

116. $\theta = 254°$, $\theta' = 74°$ **118.** $\theta = -178°$, $\theta' = 2°$

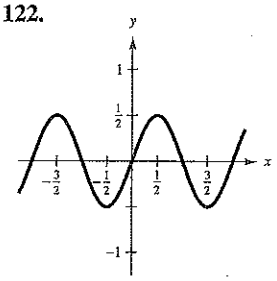




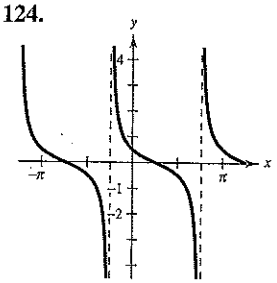
120. $\theta = \frac{13\pi}{15}$, $\theta' = \frac{2\pi}{15}$



122.



124.



126. $A = 10°$
$C = 90°$
$b = 90.74$
$c = 92.14$

128. $A = 60.26°$
$B = 29.74°$
$C = 90°$
$c = 16.12$

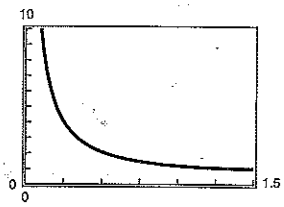
Section 5.2 *(page 389)*

2.–10. Answers will vary.

12.

x	0.2	0.4	0.6	0.8
y_1	5.0335	2.5679	1.771	1.394
y_2	5.0335	2.5679	1.771	1.394

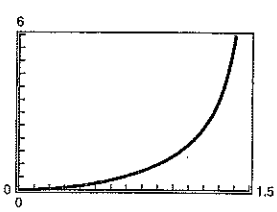
x	1.0	1.2	1.4
y_1	1.1884	1.0729	1.0148
y_2	1.1884	1.0729	1.0148



14.

x	0.2	0.4	0.6	0.8
y_1	0.0403	0.1646	0.3863	0.7386
y_2	0.0403	0.1646	0.3863	0.7386

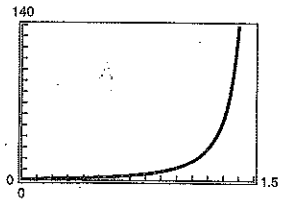
x	1.0	1.2	1.4
y_1	1.3105	2.3973	5.7135
y_2	1.3105	2.3973	5.7135



16.

x	0.2	0.4	0.6	0.8
y_1	1.4958	2.2756	3.5939	6.0760
y_2	1.4958	2.2756	3.5939	6.0760

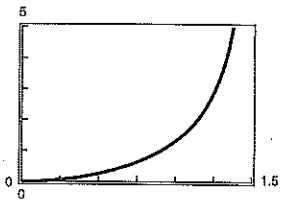
x	1.0	1.2	1.4
y_1	11.6160	28.4287	136.4545
y_2	11.6160	28.4287	136.4545



18.

x	0.2	0.4	0.6	0.8
y_1	0.04027	0.16464	0.38629	0.73862
y_2	0.04027	0.16464	0.38629	0.73862

x	1.0	1.2	1.4
y_1	1.3105	2.3973	5.7135
y_2	1.3105	2.3973	5.7135



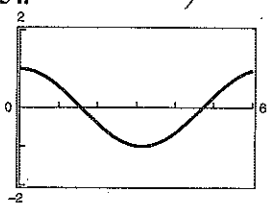
20. $\sec(-\theta) = \sec\theta$ and $\sin(-\theta) = -\sin\theta$ so,

$$\frac{1 + \sec(-\theta)}{\sin(-\theta) + \tan(-\theta)} = -\csc\theta.$$

22. $\dfrac{\sin^2 x - \cos^2 x}{\sin^2 x + \cos^2 x}$; $-(\cos^2 x - \sin^2 x)$

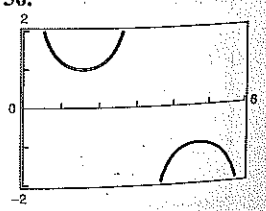
24.–52. Answers will vary.

54.



$\cos x$

56.



$\csc t$

58. and 60. Answers will vary. **62.** 1 **64.** 2