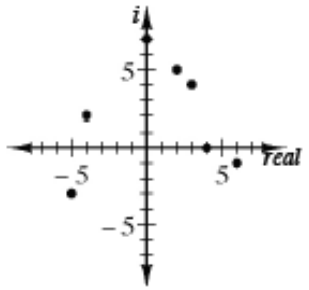
Lesson 8.2.3

8-97. See below:

a. See graph below.

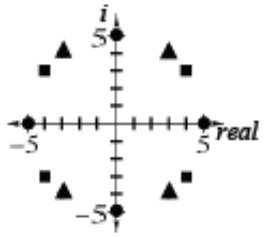


b. Students discuss strategies.

c. See graph above.

8-98. See below:

a. plotted as triangles in the graph below.

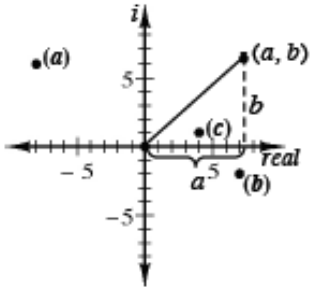


b. plotted as squares in the graph above

c. plotted as circular dots in the graph above

d. the points are all on a circle, 5 units.

8-99. See graph below.



a. 10

b. $\sqrt{53}$

c. $\sqrt{17}$

d. $\sqrt{a^2+b^2}$

8-100. See below:

a. 2

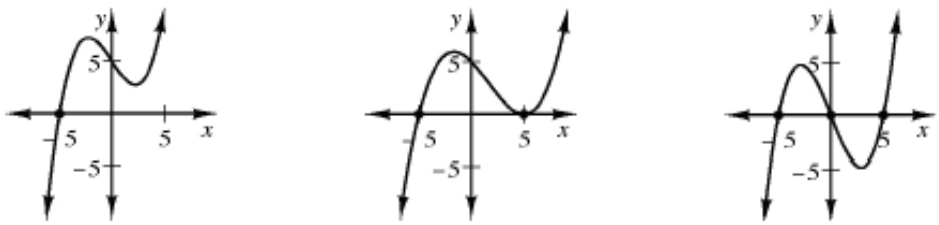
b. 3

c. 0

d. 1

8-101. See below:

a. See possible sketches below.



b. It changes direction twice or not at all, so one end goes up and the other goes down, and it must cross the x-axis.

8-102. See below:

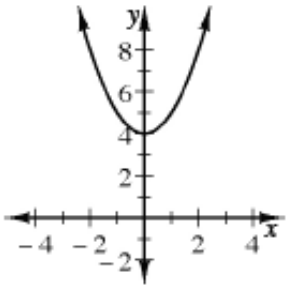
a. 1, 2, or 3

b. Students check answers

c. $x = 2,\ \frac{1 \pm i\sqrt{3}}{2}$

d. One real, two complex.

8-103. See graph below. roots: $x = \pm 2i$



a. vertex: (0, 4), axis of symmetry: $x = 0$

Review & Preview

8-104. See below:

a. three real linear factors (one repeated), therefore two real (one single, one double) and zero complex (non-real) roots

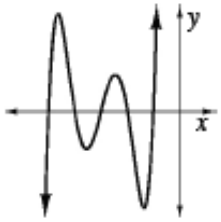
b. one linear and one quadratic factor, therefore one real and two complex (non-real) roots

c. four linear factors, therefore four real and zero complex (non-real) roots

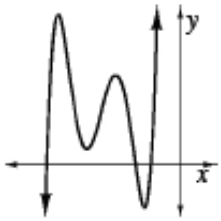
d. two linear and one quadratic factor, therefore two real and two complex (non-real) roots

8-105. See graphs below:

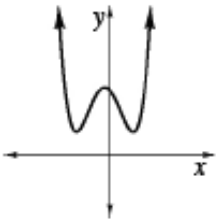
a.



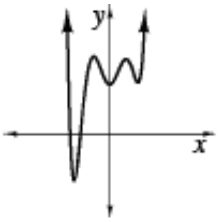
b.



c.



d.

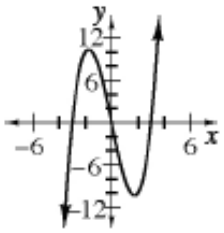


e. (a) 5, (b) 5, (c) 4, (d) 6

8-106. See below:

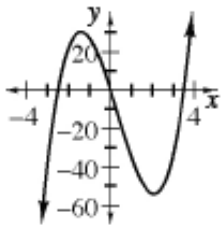
a. (3, 0), (0, 0), and (–3, 0)

b. See graph below.

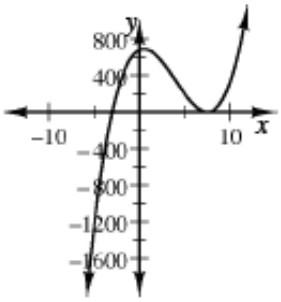


8-107. See below:

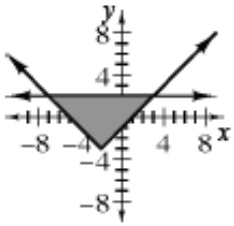
a. x-intercepts: $(-\frac{5}{2}, 0)$, (0, 0) , and $(\frac{7}{2}, 0)$, y-intercept: (0, 0)



b. x-intercepts: (−3, 0) and $(\frac{15}{2}, 0)$ (double root), y-intercept: (0, 675)



8-108. See graph below.



8-109. See below:

a. Platform is 11.27 meters off the ground. $h = -4.9(t - 5)^2 + 133.77$; therefore, the maximum height is 133.77 meters. Time when $h = 0$ is 10.22 seconds.

b. $h \approx -4.9(t - 10.22)(t + 0.22)$. Factored form reveals the intercepts, or how long it took the firework to reach the ground.)

8-110. $b \geq 20$ or $b \leq -20$

8-111. See below:

a. $(i - 3)^2 = i^2 - 6i + 9 = -1 - 6i + 9 = 8 - 6i$

b. $(2i - 1)(3i + 1) = 6i^2 - 3i + 2i - 1 = -6 - i - 1 = -7 - i$

c. $(3 - 2i)(2i + 3) = 6i - 4i^2 - 6i + 9 = 4 + 9 = 13$

8-112. $(\pm 6, \frac{1}{2})$