6-46. Justifications and order may vary: $a = 53º$, given; $b = 55º$, straight angle (with $\angle g$); $c = 72º$, triangle angle sum; $d = 53º$, when lines are parallel, alternate interior angles are equal; $e = 55º$, when lines are parallel, alternate interior angles are equal; $f = 127º$, straight angle (with $\angle a$), so they are supplementary.

6-47. See below.

a. For left-hand triangle: $c^2 = 9 + 36 - 2 \cdot 3 \cdot 6 \cos 60º$, $c = 3\sqrt{3} \approx 5.196$ units; For right-hand triangle: $c^2 = 36 + 27 - 2 \cdot 6 \cdot 3\sqrt{3} \cos 30º$, $c = 3$ units; They are congruent.

b. Yes; by SSS $\cong$ or SAS $\cong$.

6-48. See below.

a. Converse: If the ground is wet, then it is raining. Not always true.

b. Converse: If a polygon is a rectangle, then it is a square. Not always true.

c. Converse: If a polygon has four 90° angles, then it is a rectangle. Not always true.

d. Converse: If a polygon is a triangle, then it has three angles. Always true.

e. Converse: If vertical angles are congruent, then two lines intersect. Always true.

6-49. x-intercept: (4, 0), y-intercept: (0, 6)

6-50. See below.

a. $y = \dfrac{13}{4}$

b. $y = -2$

c. $4^{\frac{2}{3}}$ "

d. $x = \dfrac{8}{3}$

6-51. See below.

a. $\dfrac{3}{8}$

b. $\dfrac{1}{8}$

c. $\dfrac{3}{8}$

d. $\dfrac{1}{8}$; sum must be equal to one.

6-52. $\sin 40º = \dfrac{h}{600}$, $h \approx 385.67$ feet