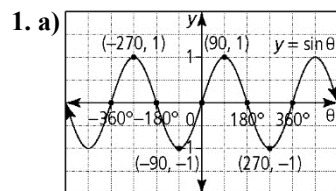


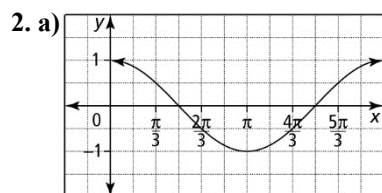
Chapter 5 BLM Answers

BLM 5-2 Section 5.1 Extra Practice



b) $y = -\frac{\sqrt{2}}{2}$

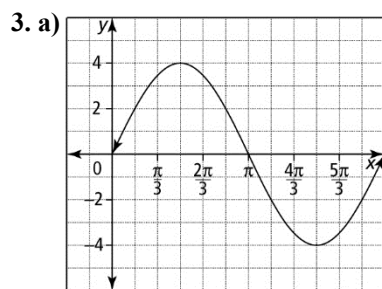
c) $(-360, 0), (-180, 0), (0, 0), (180, 0), (360, 0)$



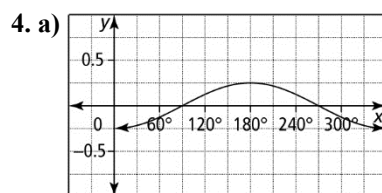
b) $y = -\frac{\sqrt{3}}{2}$

c) $y = -1$

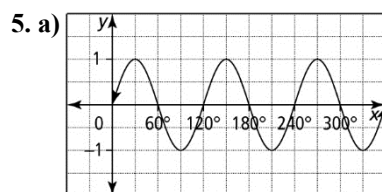
d) $(0, 1)$



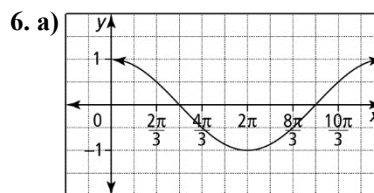
b) $\{y \mid -4 \leq y \leq 4, y \in \mathbb{R}\}$ c) 2π d) 4



b) $(0, -\frac{1}{4})$ c) $\{y \mid -\frac{1}{4} \leq y \leq \frac{1}{4}, y \in \mathbb{R}\}$ d) $\frac{1}{4}$



b) 120° c) $\{y \mid -1 \leq y \leq 1, y \in \mathbb{R}\}$ d) 1



b) $(0, 1)$ c) 4π d) 1

7. a) amplitude = 4, period = 180° or π

b) amplitude = 3, period = 180° or 10π

c) amplitude = $\frac{2}{3}$, period = 540° or 3π

d) amplitude = $\frac{1}{4}$, period = 120° or $\frac{2\pi}{3}$

8. a) vertical expansion by a factor of 2, horizontal compression by a factor of $\frac{1}{4}$

b) vertical reflection over the x -axis, horizontal expansion by a factor of 5

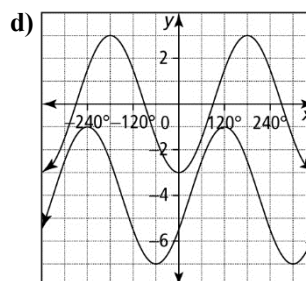
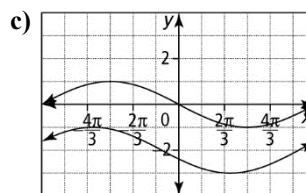
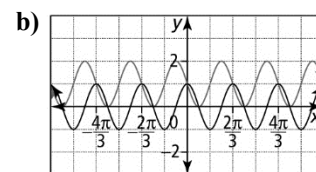
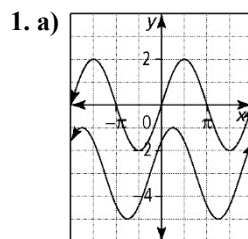
c) vertical reflection over the x -axis, vertical expansion by a factor of 3, horizontal compression by a factor of $\frac{2}{5}$

d) vertical expansion by a factor of 5, horizontal reflection over the y -axis

9. a) amplitude = $\frac{3}{4}$, period = $\frac{\pi}{3}$ or 60°

b) amplitude = 2, period = $\frac{3\pi}{2}$ or 270°

BLM 5-3 Section 5.2 Extra Practice



2. a) phase shift = 25, vertical displacement = 3.2
 b) phase shift = $-\frac{\pi}{6}$, vertical displacement = -7
 c) phase shift = $\frac{\pi}{8}$, vertical displacement = 5
 d) phase shift = $-\frac{2\pi}{3}$, vertical displacement = -1
3. a) period = 180° , range = $\{y \mid -10 \leq y \leq -2, y \in \mathbb{R}\}$
 b) period = 6π , range = $\{y \mid -1 \leq y \leq 5, y \in \mathbb{R}\}$
 c) period = 72° , range = $\{y \mid 1.9 \leq y \leq 6.5, y \in \mathbb{R}\}$
 d) period = $\frac{2\pi}{3}$, range = $\{y \mid -10 \leq y \leq 4, y \in \mathbb{R}\}$

4. period = $\frac{2\pi}{|b|}$,

range = $\{y \mid d - |a| \leq y \leq d + |a|, y \in \mathbb{R}\}$

5. a) $y = 3 \sin 4\left(x - \frac{\pi}{2}\right) + 5$ b) $y = \frac{1}{2} \sin 3(x + 50^\circ) - 4$

c) $y = \sin \frac{1}{4}\left(x - \frac{\pi}{2}\right)$ d) $y = \sin \frac{2}{3}x + 2$

6. Example: $y = 3 \sin 2\left(x + \frac{\pi}{4}\right)$

7. a) 5 b) -4 c) $\frac{2\pi}{3}$ d) $y = 5 \cos 3x - 4$

e) $y = 1$ for $x = 0, \frac{2\pi}{3}, \frac{4\pi}{3}, 2\pi$

f) $y = -9$ for $x = \frac{\pi}{3}, \pi, \frac{5\pi}{3}$

8. Example: $y = 3 \sin 6(x - 105^\circ) + 7$

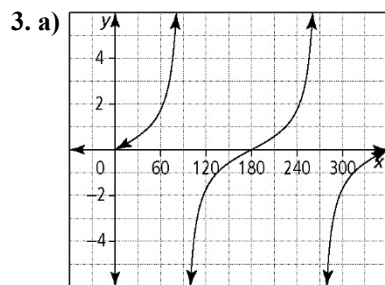
BLM 5-4 Section 5.3 Extra Practice

1. a) $\theta = 0, \theta = \pi, \theta = 2\pi$ b) $\theta = \frac{\pi}{4}, \theta = \frac{5\pi}{4}$

c) $\theta = \frac{3\pi}{4}, \theta = \frac{7\pi}{4}$ d) $\theta = \frac{\pi}{2}, \theta = \frac{3\pi}{2}$

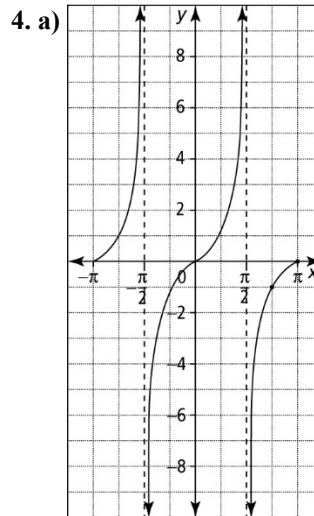
2. a) $\frac{1}{\sqrt{3}}$ b) 1 c) $\sqrt{3}$ d) undefined e) $-\sqrt{3}$

f) -1 g) $-\frac{1}{\sqrt{3}}$ h) 0



b) $\{x \mid 0^\circ \leq x \leq 360^\circ, x \in \mathbb{R}, x \neq 90^\circ \text{ or } 270^\circ\}$

c) $\{y \mid y \in \mathbb{R}\}$ d) 180°



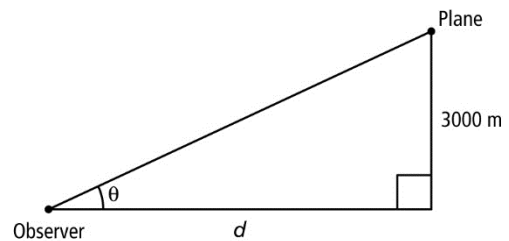
b) $(-\pi, 0), (0, 0), (\pi, 0)$ c) $x = \pm \frac{\pi}{2}$ d) 0

5. No, because it does not have maximum and minimum values.

6. asymptotes: $x = 90^\circ + 180^\circ n, n \in \mathbb{I}$;

domain: $\{x \mid x \neq 90^\circ + 180^\circ n, x \in \mathbb{R}, n \in \mathbb{I}\}$

7. a)



b) $d = \frac{3000}{\tan \theta}$ c) $\theta = 90^\circ, d = 0$

8. a) $x = n\pi, n \in \mathbb{I}$ b) at $x = \frac{\pi}{2} + n\pi, n \in \mathbb{I}$

c) $\{x \mid x \neq \frac{\pi}{2} + n\pi, x \in \mathbb{R}, n \in \mathbb{I}\}$ d) $\{y \mid y \in \mathbb{R}\}$

9. a) 0 b) -1 c) 1 d) undefined

BLM 5-6 Section 5.4 Extra Practice

1. $x = 21^\circ, 159^\circ, 201^\circ,$ and 339°

2. a) domain: $\{t \mid t \geq 0, t \in \mathbb{R}\}$

range: $\{h \mid 2 \leq h \leq 28, h \in \mathbb{R}\}$

period: 0.7 m

b) domain: $\{t \mid t \geq 0, t \in \mathbb{R}\}$

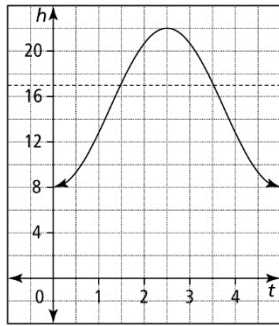
range: $\{F \mid 500 \leq F \leq 1500, F \in \mathbb{R}\}$

period: 24 foxes

3. a) $T(x) = 3.808 \cos \frac{2\pi}{365}(x + 10) + 6.375$

b) $T(x) = -3.875 \cos \frac{2\pi}{365}(x + 10) + 18.875$

4. a)



b) $b(t) = -7 \cos \frac{2\pi}{5}t + 15$

c) $b(4) = 12.8$ m

d) $3.52 - 1.48 = 2.04$ s

5. a) $T(d) = 20 \cos \frac{2\pi}{365} (d - 201) + 4$

b) 23.3 °C c) 76 days

6. a) $h(t) = 2 \cos \pi t + 18$

b) $h(t) = 2 \sin \pi(t - 1.5) + 18$

or $h(t) = -2 \sin \pi(t - 0.5) + 18$