

Chapter 7 BLM Answers

BLM 7-1 Prerequisite Skills

1.

	Coefficient	Base	Exponent	Power
a)	1	$-3x$	4	$(-3x)^4$
b)	-1	x	5	x^5
c)	1	x	-3	x^{-3}

2. a) 8 b) $\frac{16}{81}$ c) $\frac{1}{12}$ d) -64

3. a) 15 b) -35

4. a) $\frac{x^6}{y^{10}}$ b) $\frac{1}{y^2}$ c) $\frac{1}{g^3}$ d) $\frac{x^6}{y^{15}}$ e) $\frac{t^6}{s^2}$ f) $\frac{1}{n^{24}}$

5. a) $x = 5$ b) $x = 6$ c) $x = -4$

6. a) 64 b) 0.000 002 56 c) 38.4434 d) 0.1780

7. a) $x^{\frac{16}{3}}$ b) $2b^2$ c) $x^{\frac{1}{6}}y^2$ d) $\frac{2}{n}$

8. a) $I = 1200$ b) $I = 768$ c) $I = 491.52$

9. a) $x^{\frac{17}{5}}$ b) $\frac{1}{x^{7.5}y^{4.5}}$ c) $\frac{1}{m^{\frac{23}{6}}}$ d) $-2s^4$

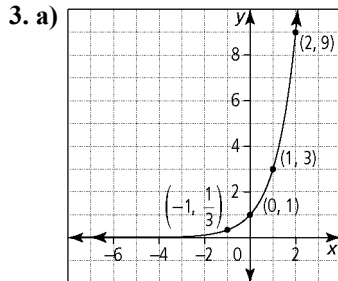
10. a) 6208.375 b) 256 c) $\frac{3}{4} = 0.75$ d) 49

11. a) $\approx 51\ 183$ b) $\approx 80\ 176$

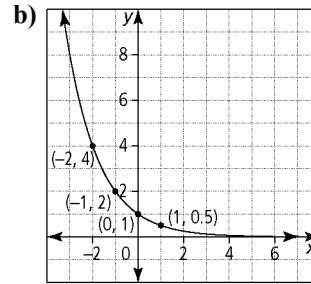
BLM 7-2 Section 7.1 Extra Practice

1. $y = 0.5^x$ and $y = 4^x$ are exponential since they are functions in the form $y = c^x$, where c is a constant greater than 0 and x is a variable.

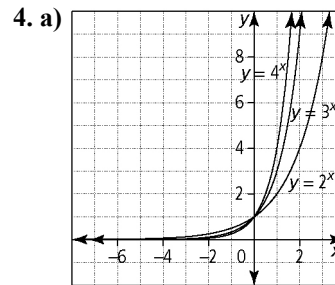
2. No. The constant is not a value greater than zero, so the graph is not a continuous decreasing or increasing function.



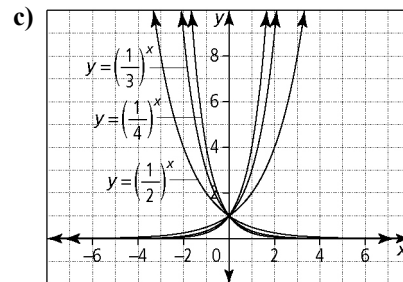
x-intercept: does not exist, y-intercept: 1;
function is increasing;
domain: $\{x \mid x \in \mathbb{R}\}$, range: $\{y \mid y > 0, y \in \mathbb{R}\}$;
 $y = 0$



x-intercept: does not exist, y-intercept: 1;
function is decreasing;
domain: $\{x \mid x \in \mathbb{R}\}$, range: $\{y \mid y > 0, y \in \mathbb{R}\}$;
 $y = 0$



b) 0; 1

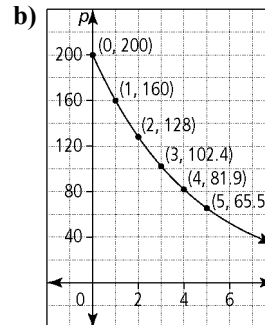


The graphs have the same y-intercept: $y = 1$. These graphs are the horizontal reflections of the graphs in part a).

5. a) $y = \left(\frac{1}{3}\right)^x$ b) $y = 6^x$ c) $y = 2^x$ d) $y = \left(\frac{1}{5}\right)^x$

6. 50 kPa

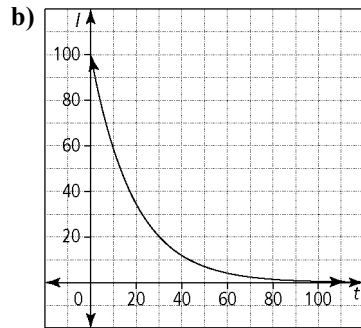
7. a) $P(t) = 200(0.80)^t$



c) $200(0.80)^5 = 65.5$



8. a) $I(t) = 100(0.5)^{\frac{t}{13}}$



c) 6.95 g

d) graph $f(t) = 15$ on the same axes as the original graph and find the intersection point; 35.5 days

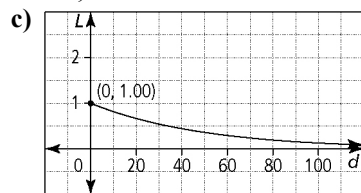
9. a) 1.7; the population is increasing by 70%, so 100% + 70%

b) $P = 200(1.7)^{\frac{t}{6}}$

c) ≈ 753

10. a) $L(d) = (0.98)^d$

b) domain: $\{d \mid d \geq 0, d \in \mathbb{R}\}$, range: $\{L \mid 0 < L \leq 1, L \in \mathbb{R}\}$



d) 114 m

BLM 7-3 Section 7.2 Extra Practice

1. a) A b) B c) E d) H

2. a) C b) A c) D d) B

3.

$y = 5^x$	$y = -5^x$	$y = -\frac{1}{2}(5)^x$	$y = -\frac{1}{2}(5)^{x+4} - 6$
$(-2, \frac{1}{25})$	$(-2, -\frac{1}{25})$	$(-2, -\frac{1}{50})$	$(-6, -6\frac{1}{50})$
$(-1, \frac{1}{5})$	$(-1, -\frac{1}{5})$	$(-1, -\frac{1}{10})$	$(-5, -6\frac{1}{10})$
$(0, 1)$	$(0, -1)$	$(0, -\frac{1}{2})$	$(-4, -6\frac{1}{2})$
$(1, 5)$	$(1, -5)$	$(1, -\frac{5}{2})$	$(-3, -8\frac{1}{2})$
$(2, 25)$	$(2, -25)$	$(2, -\frac{25}{2})$	$(-2, -18\frac{1}{2})$

4. a) $a = 4$: vertical stretch by a factor of 4, $b = 1$: no change, $h = 0$: no change, $k = 6$: translation 6 units up

b) $a = -1$: reflection over the x -axis, $b = 1$: no change, $h = 4$: translation 4 units right, $k = 0$: no change

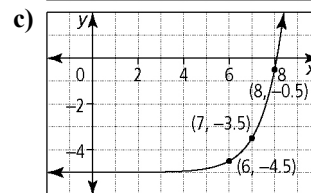
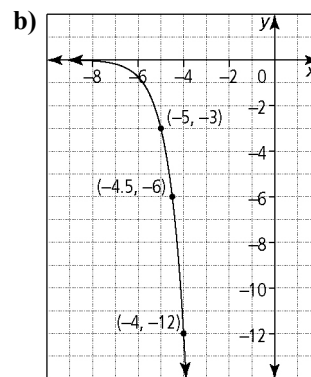
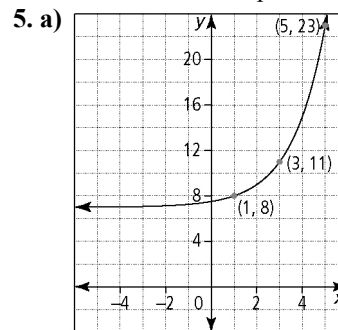
c) $a = \frac{3}{2}$: vertical stretch by a factor of $\frac{3}{2}$, $b = 4$:

horizontal stretch by a factor of $\frac{1}{4}$, $h = 9$: translation 9 units right, $k = -8$: translation 8 units down

d) $a = \frac{1}{2}$: vertical stretch by a factor of $\frac{1}{2}$, $b = -\frac{4}{5}$:

reflection over the y -axis and horizontal stretch by a factor of $\frac{5}{4}$, $h = -2$: translation 2 units left, $k = \frac{7}{4}$:

translation 1.75 units up



6. a) $y = 3(0.5)^{-(x+4)} - 3$

b) $y = -(3)^{2x} + 7$

c) $y = -4(2)^{2(x-3)} + 5$

d) $y = \frac{1}{3}\left(\frac{1}{5}\right)^{x+1}$



7. a) domain: $\{x \mid x \in \mathbb{R}\}$, range: $\{y \mid y < 2, y \in \mathbb{R}\}$; $y = 2$; x-intercept = $(-1, 0)$, y-intercept $(0, -4)$

b) domain: $\{x \mid x \in \mathbb{R}\}$, range: $\{y \mid y > -4, y \in \mathbb{R}\}$; $y = -4$; x-intercept $(-0.75, 0)$, y-intercept $(0, -3.5)$

c) domain: $\{x \mid x \in \mathbb{R}\}$, range: $\{y \mid y > 0, y \in \mathbb{R}\}$; $y = 0$; x-intercept does not exist, y-intercept $(0, 2)$

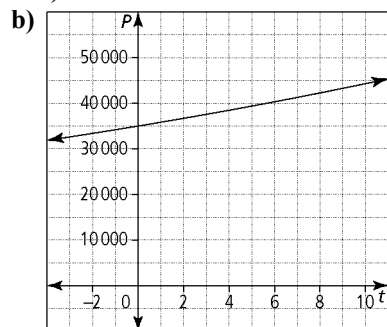
8. a) $a = 0.5, b = -2, h = -4, k = 7$

b) vertical stretch by a factor of 0.5, a reflection over the y-axis, a horizontal stretch by a factor of $\frac{1}{2}$, a

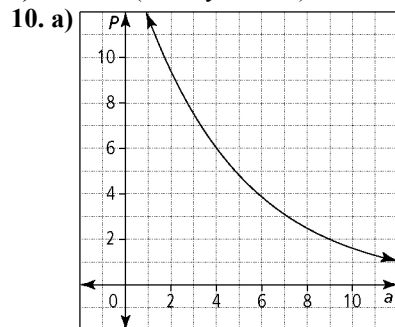
horizontal translation 4 units left, and a vertical translation 7 units up

c) $(0, 1)$ becomes $(-4, 7.5)$, $(1, 3)$ becomes $(-4.5, 8.5)$, $(2, 9)$ becomes $(-5, 11.5)$

9. a) 1.024



c) $\approx 39\,400$ (exactly 39 406)



b) $\approx 5 \text{ lb/in.}^2$ (exactly 4.8 lb/in.^2)

BLM 7-4 Section 7.3 Extra Practice

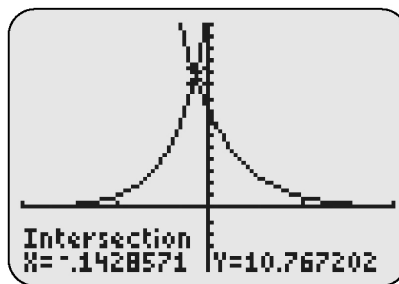
1. a) 2^{-1} b) $2^{\frac{5}{2}}$ c) 2^9 d) 2^{-20}

2. a) 5^2 and 5^{-3} b) 3^3 and $3^{\frac{4}{3}}$

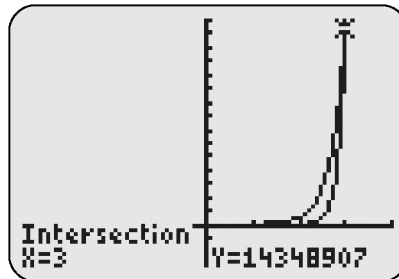
c) 2^{-2} and 2^3 d) $6^{\frac{1}{3}}$ and $6^{\frac{5}{2}}$

3. a) 0.5 or $\frac{1}{2}$ b) 3 c) -2 d) $-\frac{1}{7}$

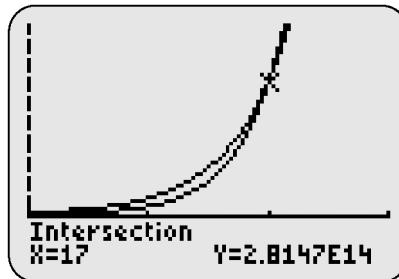
4. a) $-\frac{1}{7} \approx -0.14$



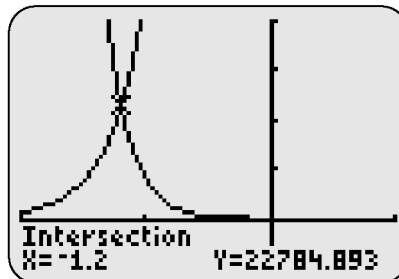
b) 3



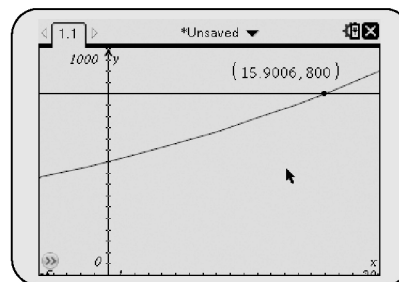
c) 17



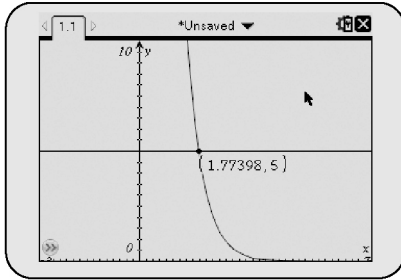
d) $-\frac{6}{5} = -1.2$



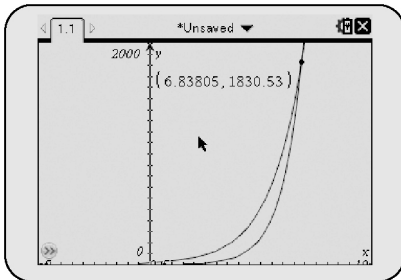
5. a) 15.90



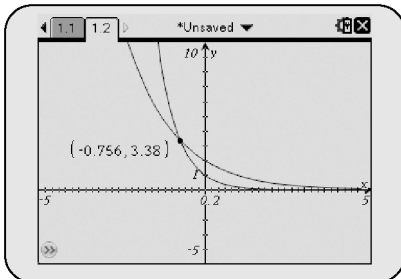
b) 1.77



c) 6.84



d) -0.76



6. a) $V = 3000(1.026)^{2t}$

b) $V = 2500(1.01)^{4t}$

c) $V = 8000(1.005)^{12t}$

d) $V = 6300(1.021)^t$

7. 6.55 years

8. a) \$4264.41 b) 14.04 years

9. a) \$15 817.96 b) 16.63 years

10. a) \$6040 b) \$6099.95

BLM 7-6 Chapter 7 Test

1. C

2. A

3. A

4. D

5. B

6. A

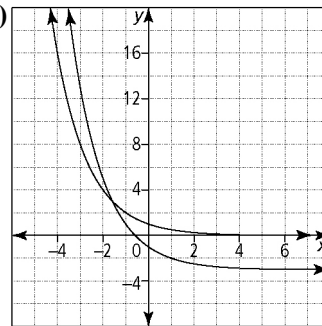
7. a) III b) I c) II d) IV

8. $x = 2$

9. vertical translation up 1 unit

10. a) 9 b) -4

11. a)



b) vertical stretch by a factor of 2 about the x -axis, and a vertical translation down 3

c) $y = 2^{-x}$: range is $y > 0$, horizontal asymptote is $y = 0$;
 $y = 2(2^{-x}) - 3$: range is $y > -3$, horizontal asymptote is $y = -3$

d) When $x = 400$, $y = 2^{-400} = 0$ and $y = 2(2^{-400}) - 3 = -3$, both of which correspond to each function's horizontal asymptote. These values of x are so large that the y -values are extremely close to the same value as the horizontal asymptote. However, the calculator rounds off the value.

12. a) $g(x) = 2^{x-4} + 2$

b) horizontal translation right 4, vertical translation up 2

c) $x = 1.09$

13. a) $A = 1\left(2^{\frac{n}{20}}\right)$, where A is the number of bacteria, and n is the time, in minutes.

b) 200 min

c) 4 722 366 kg

14. a) $P = 2200(0.9)^n$, where n = years since 1990 and P = population

b) 93

c) 36 years after 1990: 2026

