

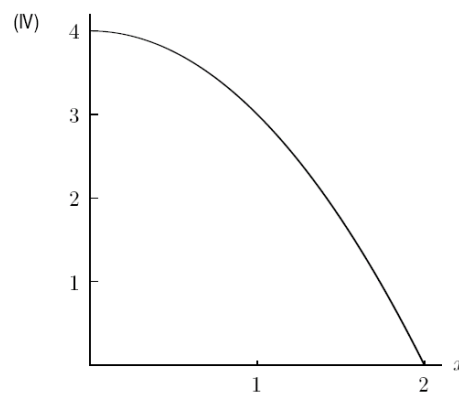
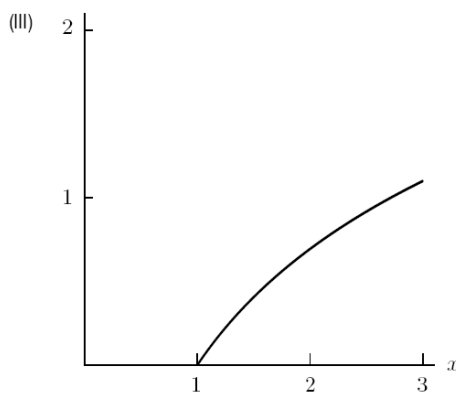
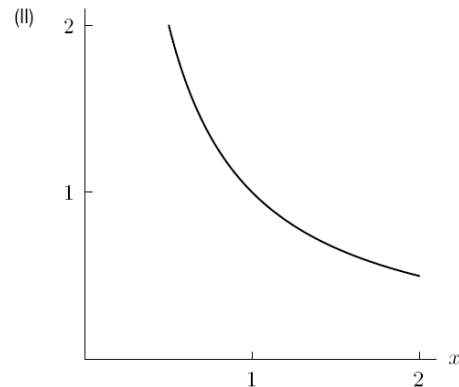
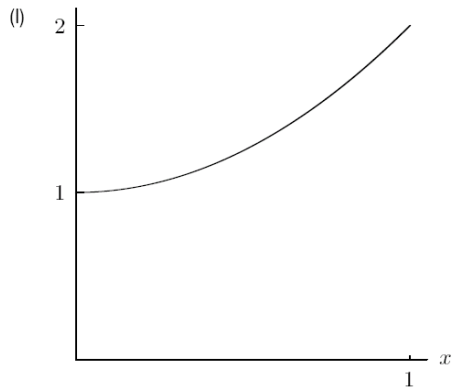
Classroom Voting Questions: Precalculus

Exponential Functions

1. The graph of a function is either concave up or concave down.

- (a) True, and I am very confident
- (b) True, but I am not very confident
- (c) False, but I am not very confident
- (d) False, and I am very confident

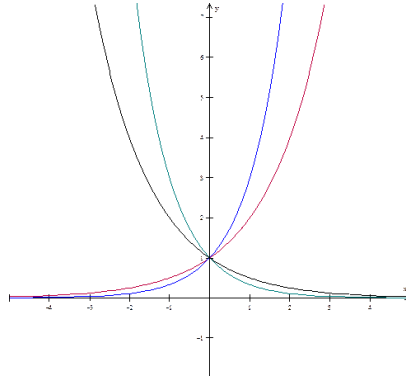
2. Which graph shows a function that is decreasing and concave up? Which graph shows a function that is increasing and concave down?



- (a) I, II
- (b) IV, I
- (c) II, I
- (d) II, III

(e) IV, III

3. Which exponential function has the largest base?



- (a) red
- (b) blue
- (c) green
- (d) black

4. Every exponential function has a vertical intercept.

- (a) True, and I am very confident
- (b) True, but I am not very confident
- (c) False, but I am not very confident
- (d) False, and I am very confident

5. Every exponential function has a horizontal intercept.

- (a) True, and I am very confident
- (b) True, but I am not very confident
- (c) False, but I am not very confident
- (d) False, and I am very confident

6. An exponential function of the form $f(x) = k \cdot a^x$ will always pass through the point $(0, 1)$.

- (a) True, and I am very confident.

- (b) True, but I am not very confident.
- (c) False, but I am not very confident.
- (d) False, and I am very confident.

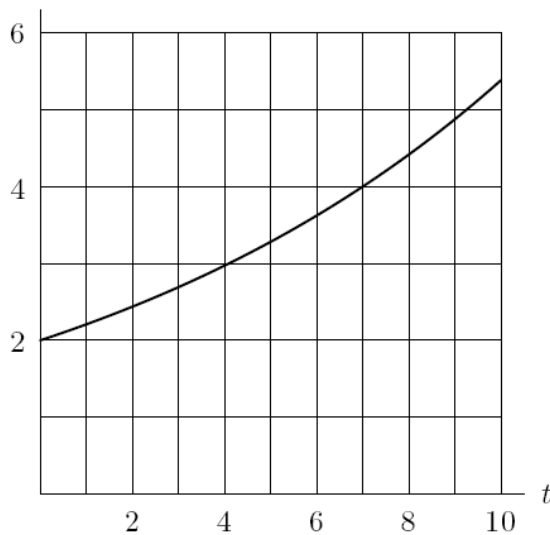
7. If \$5,000 is invested at 4 % annual interest, compounded continuously, the value of the investment after t years is $V(t) = 5000e^{.04t}$. What is the value after $t = 15$ years?

- (a) \$5204.05
- (b) \$9110.59
- (c) \$13591.41
- (d) \$78060.81

8. Let $f(x) = ab^x$, with $b > 0$. Then $\frac{f(x+h)}{f(x)} =$

- (a) b^h
- (b) h
- (c) $b^{x+h} - b^x$
- (d) a

9. Estimate the doubling time for the exponential growth shown in the figure below.



- (a) 4
- (b) 5
- (c) 7

(d) 10

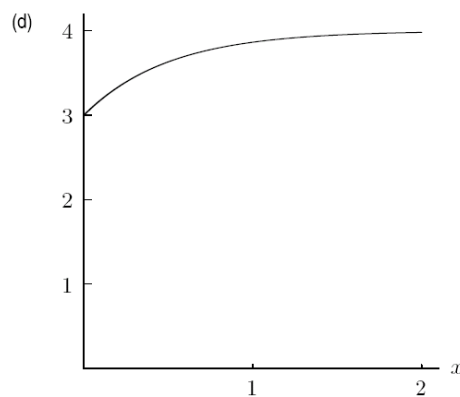
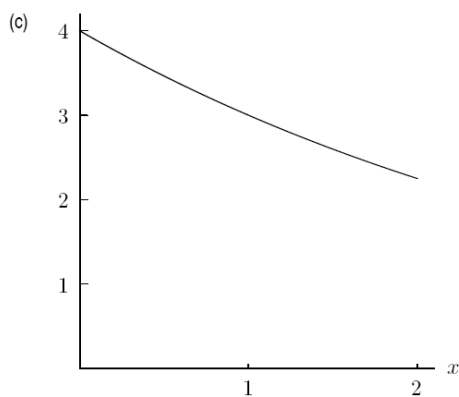
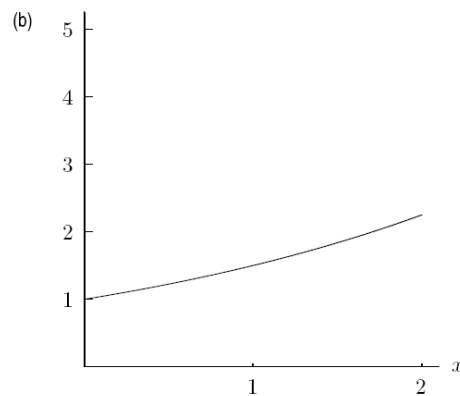
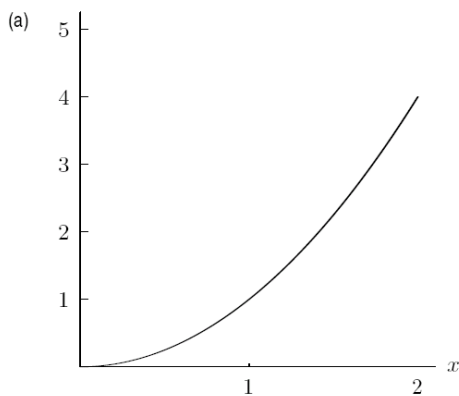
10. The exponential function $y = 3 \cdot (\frac{1}{2})^x$ could be an appropriate model for exponential growth.

- (a) True, and I am very confident.
- (b) True, but I am not very confident.
- (c) False, but I am not very confident.
- (d) False, and I am very confident.

11. Find the equation for an exponential function that passes through the points (1,2) and (3,18).

- (a) $f(t) = 2 \cdot 9^t$
- (b) $f(t) = (\frac{2}{9}) 9^t$
- (c) $f(t) = (\frac{2}{3}) 3^t$
- (d) $f(t) = 2 \cdot 3^t$

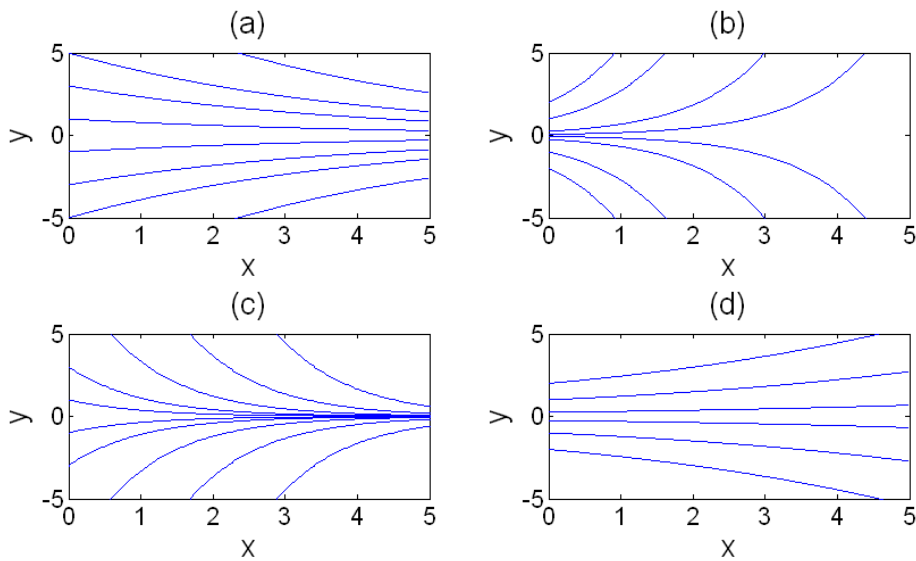
12. Which of the following graphics could be that of $y = ab^x$ if $b > 1$?



13. "During 1988, Nicaragua's inflation rate averaged 1.3% a day." Which formula represents the above statement? Assume t is measured in days.

- (a) $I = I_0 e^{0.013t}$
- (b) $I = I_0(1.013)^t$
- (c) $I = I_0(1.013)t$
- (d) $I = I_0(1.3)^t$

14. Graph (a) shows several functions of the form $y(x) = Q_0 e^{k_a x}$ with several different values of Q_0 but the same value of k_a . Graph (b) shows several functions of the form $y(x) = Q_0 e^{k_b x}$ with several different values of Q_0 but the same value of k_b , and similarly for graphs (c) and (d). Rank the constants k_a, k_b, k_c and k_d from smallest to largest.



- (a) $k_b < k_d < k_a < k_c$
- (b) $k_d < k_c < k_b < k_a$
- (c) $k_c < k_a < k_d < k_b$
- (d) $k_a < k_b < k_c < k_d$

15. Which of the following is an exponential function which has a y intercept of 4 and goes through the point (2,9)?

- (a) $f(x) = 4 \cdot 1.25^x$
- (b) $f(x) = 4 \cdot 1.5^x$
- (c) $f(x) = 4 \cdot 2.25^x$
- (d) $f(x) = 2 \cdot 1.25^x$

(e) $f(x) = 2 \cdot (\sqrt{9/2})^x$

(f) $f(x) = 2 \cdot 1.5^x$

16. Which of the following is an exponential function which goes through the points (2,3) and (3,1)?

(a) $f(x) = \frac{3}{4} \cdot 2^x$

(b) $f(x) = 12 \cdot \frac{1}{2}^x$

(c) $f(x) = 12 \cdot \frac{1}{4}^x$

(d) $f(x) = 27 \cdot \frac{1}{3}^x$

17. The following table shows the net sales at Amazon.com from 2003 to 2010 (*source: Amazon.com quarterly reports*):

Year	2003	2004	2005	2006	2007	2008	2009	2010
Billions of dollars	\$5.26	\$6.92	\$8.49	\$10.72	\$14.84	\$19.15	\$24.51	\$34.21

What would be the most appropriate type of function to model this data?

(a) linear

(b) exponential

(c) power

(d) It is impossible to tell from the data.

18. The following table shows the net sales at Amazon.com from 2003 to 2010 (*source: Amazon.com quarterly reports*):

Year	2003	2004	2005	2006	2007	2008	2009	2010
Billions of dollars	\$5.26	\$6.92	\$8.49	\$10.72	\$14.84	\$19.15	\$24.51	\$34.21

If the net sales are modeled using an exponential function $S(t) = a \cdot b^t$, where S is the net sales in billions of dollars, and t is the number of years after 2003, which of the following is an appropriate value for the base, b ?

(a) 1.31

(b) 5.26

(c) 34.21

(d) 6.5

19. The following table shows the net sales at Amazon.com from 2003 to 2010 (*source: Amazon.com quarterly reports*):

Year	2003	2004	2005	2006	2007	2008	2009	2010
Billions of dollars	\$5.26	\$6.92	\$8.49	\$10.72	\$14.84	\$19.15	\$24.51	\$34.21

If the net sales are modeled using an exponential function $S(t) = a \cdot b^t$, where S is the net sales in billions of dollars, and t is the number of years after 2003, which of the following is an appropriate value for a ?

- (a) 34.21
(b) 1
(c) 1.31
(d) 5.26
20. Which is better at the end of one year: An account that pays 8% annual interest compounded quarterly or an account that pays 7.95% interest compounded continuously?
- (a) 8% quarterly
(b) 7.95% continuously
(c) They are the same.
(d) There is no way to tell.
21. Caffeine leaves the body at a continuous rate of 17% per hour. How much caffeine is left in the body 8 hours after drinking a cup of coffee containing 100 mg of caffeine?
- (a) 389.62 mg
(b) 22.52 mg
(c) 25.67 mg
(d) There is no way to tell.
22. Caffeine leaves the body at a continuous rate of 17% per hour. What is the hourly growth factor?
- (a) .156
(b) .17
(c) .844
(d) There is no way to tell.