TEST BANK

CALCULUS
Early Transcendentals

JAMES STEWART | 6E

Chapter 1 Form A--Functions and Models

Student: _____

1. If $f(x) = x^2 - 2x + 3$, evaluate the difference quotient $\dfrac{f(a+h) - f(a)}{h}$.

2. Find the domain of the function.

$$f(x) = \frac{5}{(3x - 1)}$$

3. Find the range of the function.

$h(x) = \ln(x + 6)$

4. Find an expression for the function $y = f(x)$ whose graph is the bottom half of the parabola

$x + (8 - y)^2 = 0.$

5. A spherical balloon with radius r inches has volume $\frac{4}{3}\pi r^3$. Find a function that represents the amount of air required to inflate the balloon from a radius of r inches to a radius of $r + 1$ inches.

6. An open rectangular box with volume 3 m^3 has a square base. Express the surface area of the box as a function $S(x)$ of the length x of a side of the base.

7. Determine whether f is even, odd, or neither even nor odd.

$$f(x) = x^3 - x^5$$

8. In the function $f(x) = 3x + d$, what is the value of d, if $f(6) = 1$?

9. Suppose that the graph of f is given. Describe how the graph of the function $y = f(x - 3) - 3$ can be obtained from the graph of f.

10. Use transformations to sketch the graph of the function.

   $y = -\sin 2x$

11. If the point $(7, 3)$ is on the graph of an even function, what other point must also be on the graph?

12. Use the table to evaluate the expression $(f \circ g)(3)$.

x	1	2	3	4	5	6
f(x)	3	2	1	0	1	2
g(x)	6	5	2	3	4	6

13. Use the functions below to find a function g such that $g \circ f = h$.

If $f(x) = x + 3$ and $h(x) = 4x - 4$.

14. Jason leaves Detroit at 3:00 P.M. and drives at a constant speed west along I-90. He passes Ann Arbor, 40 mi from Detroit, at 3:30 P.M. The graph of the function of the distance traveled (in miles) in terms of the time elapsed (in hours) is given below. Find the slope of the function.
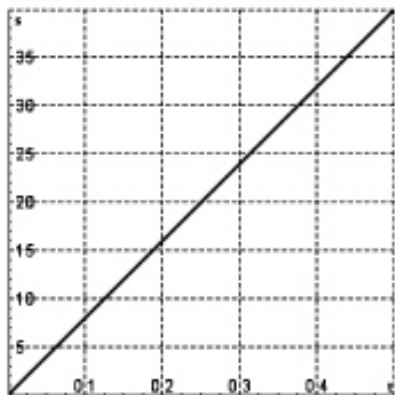

15. The monthly cost of driving a car depends on the number of miles driven. Samantha found that in October it cost her $312.5 to drive 500 mi and in February it cost her $375 to drive 1,000 mi.

Express the monthly cost C as a function of the distance driven d assuming that a linear relationship gives a suitable model.

16. Find the inverse function of $f(x) = \dfrac{x+1}{2x+1}$.

17. If $f(x) = 3x + \ln x$, find $f^{-1}(3)$.

18. Find the exponential function $f(x) = Ca^x$ whose graph is given.
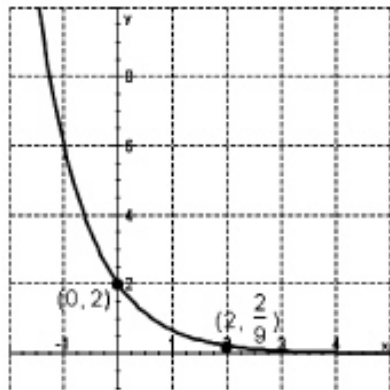
19. Find the exact value of the expression.

$$\tan\left(\arcsin\frac{1}{2}\right)$$

20. Solve each equation for x.

a) $\quad \ln x = 2$

b) $\quad e^{e^x} = 3$

Chapter 1 Form A--Functions and Models Key

1. If $f(x) = x^2 - 2x + 3$, evaluate the difference quotient $\dfrac{f(a+h) - f(a)}{h}$.

    $2a + h - 2$

2. Find the domain of the function.

    $f(x) = \dfrac{5}{(3x - 1)}$

    $\{x \mid x \neq 1/3\}$

3. Find the range of the function.

    $h(x) = \ln(x + 6)$

    $(-\infty, \infty)$

4. Find an expression for the function $y = f(x)$ whose graph is the bottom half of the parabola

    $x + (8 - y)^2 = 0.$

    $y = 8 - \sqrt{-x}$

5. A spherical balloon with radius r inches has volume $\dfrac{4}{3}\pi r^3$. Find a function that represents the amount of air required to inflate the balloon from a radius of r inches to a radius of $r+1$ inches.

$$\frac{4}{3}\pi(3r^2 + 3r + 1)$$

6. An open rectangular box with volume 3 m^3 has a square base. Express the surface area of the box as a function $S(x)$ of the length x of a side of the base.

$$S(x) = x^2 + \frac{12}{x}$$

7. Determine whether f is even, odd, or neither even nor odd.

$$f(x) = x^3 - x^5$$

odd

8. In the function $f(x) = 3x + d$, what is the value of d, if $f(6) = 1$?
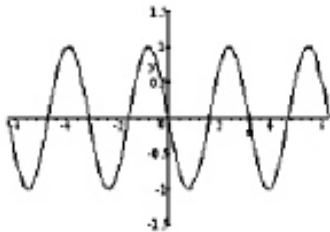
-17

9. Suppose that the graph of f is given. Describe how the graph of the function $y = f(x-3) - 3$ can be obtained from the graph of f.

Shift the graph 3 units to the right and 3 units down.

10.   Use transformations to sketch the graph of the function.

$y = -\sin 2x$

11.   If the point (7, 3) is on the graph of an even function, what other point must also be on the graph?

(-7, 3)

12.   Use the table to evaluate the expression $(f \circ g)(3)$.

| x	1	2	3	4	5	6
f(x)	3	2	1	0	1	2
g(x)	6	5	2	3	4	6

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13.   Use the functions below to find a function g such that $g \circ f = h$.

If $f(x) = x + 3$ and $h(x) = 4x - 4$.

$4x - 16$

14. Jason leaves Detroit at 3:00 P.M. and drives at a constant speed west along I-90. He passes Ann Arbor, 40 mi from Detroit, at 3:30 P.M. The graph of the function of the distance traveled (in miles) in terms of the time elapsed (in hours) is given below. Find the slope of the function.
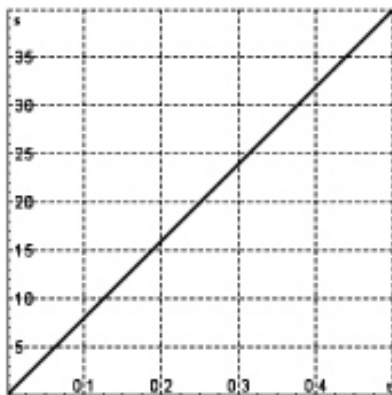
80

15. The monthly cost of driving a car depends on the number of miles driven. Samantha found that in October it cost her $312.5 to drive 500 mi and in February it cost her $375 to drive 1,000 mi.

Express the monthly cost C as a function of the distance driven d assuming that a linear relationship gives a suitable model.
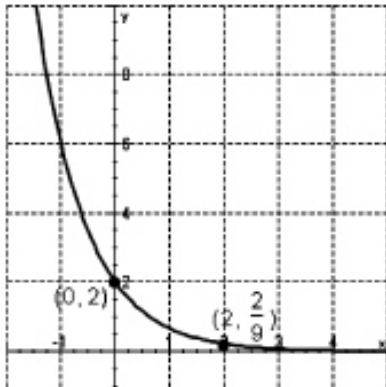
$C = 0.125d + 250$

16. Find the inverse function of $f(x) = \dfrac{x+1}{2x+1}$.

$f^{-1}(x) = -\dfrac{x-1}{2x-1}$

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17. If $f(x) = 3x + \ln x$, find $f^{-1}(3)$.

$f^{-1}(3) = 1$

18. Find the exponential function $f(x) = Ca^x$ whose graph is given.

$f(x) = 2(1/3)^x$

19. Find the exact value of the expression.

$\tan\left(\arcsin\dfrac{1}{2}\right)$

$\sqrt{3}/3$

20. Solve each equation for x.

    a) $\ln x = 2$

    b) $e^{e^x} = 3$

a) $x = e^2$, b) $x = \ln(\ln 3)$