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CONTENTS

This Online Test Bank is designed to accompany *College Algebra: Graphs and Models, 6e* by Bittinger/Beecher/Ellenbogen/Penna.

There are six alternate forms for each chapter test and the final examination. Alternate Forms A, B, C, and D are equivalent in length and difficulty. Synthesis questions occur at the end of the Form, and are separated from the rest of the questions by a solid line. Synthesis questions are meant to be more challenging than the previous questions, like those problems found in the last part of each exercise set in the text. The synthesis questions have been placed at the end to make it easy to omit them if the instructor wishes to do so.

All questions on Forms E and F are multiple choice. Effort was made to make the wrong answers as logically wrong as possible. In most cases answers were constructed to avoid students doing backward reasoning.

I. ALTERNATE TESTS, FORMS A, B, C, D, E, and F.....1

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Thanks are extended to Jennifer Blue for checking the accuracy of the manuscript, to Mike Penna for producing the graphs, and to Kelly Barber for keying the manuscript.

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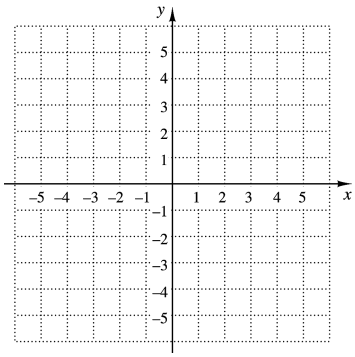
CHAPTER 1 **NAME**_____

TEST FORM A **CLASS**_____**SCORE**_____**GRADE**_____

1. Determine whether the ordered pair $\left(\frac{1}{2}, -\frac{3}{4}\right)$ is a solution of the equation $4x - 5 = 4y$.

2. Find the intercepts of $x - 4y = 4$ and graph the line.



3. Find the distance between $(4, -6)$ and $(-7, -9)$.

4. Find the midpoint of the segment with endpoints $(4, -6)$ and $(-3, -12)$.

5. Find the center and the radius of the circle $(x+6)^2 + y^2 = 9$.

6. Find an equation of the circle with center $(-8, -4)$ and radius $\sqrt{6}$.

7. a) Determine whether the relation $\{(-5, 5), (-4, 4), (3, -3), (1, 1)\}$ is a function. Answer yes or no.
   b) Find the domain of the relation.
   c) Find the range of the relation.

8. Given that $f(x) = x^2 + 3x - 4$, find each of the following.
   a) $f(-2)$ b) $f(a+5)$

9. Given that $f(x) = \frac{4+x}{2x}$, find each of the following.
   a) $f(-2)$ b) $f(0)$

ANSWERS

1. _____
2. _____
   _____
   See graph.
3. _____
4. _____
5. _____
6. _____
7. a) _____
   b) _____
   c) _____
8. a) _____
   b) _____
9. a) _____
   b) _____

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CHAPTER 1 **NAME**_____

TEST FORM A

ANSWERS

10. _____

11. a) _____

b) _____

12. _____

13. _____

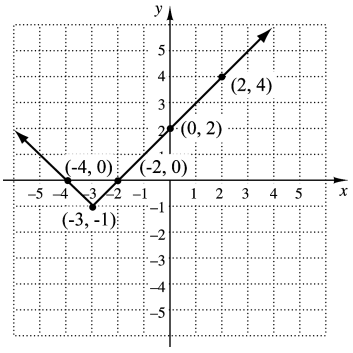
14. _____

15. a) See graph.

b) _____

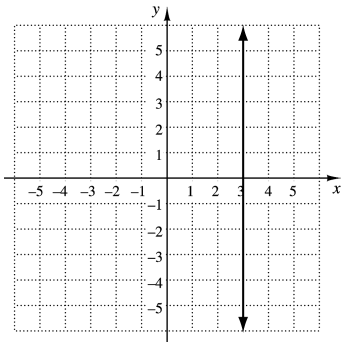
c) _____

10. Using the graph, find $f(0)$.

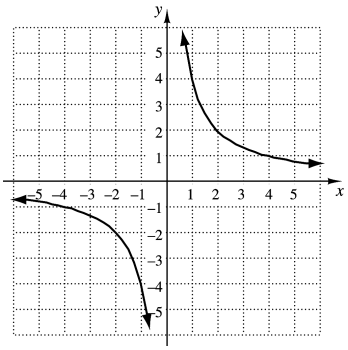


11. Determine whether each graph is that of a function. Answer yes or no.

a)



b)



Find the domain of the function.

12. $f(x) = \dfrac{4}{x-2}$

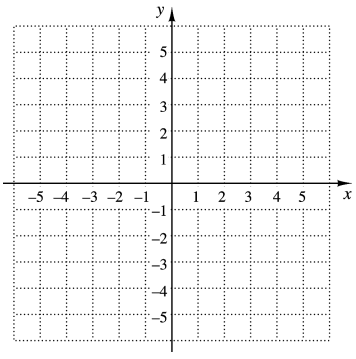
13. $g(x) = x^3 - 4$

14. $h(x) = \sqrt{x^2 - 16}$

15. a) Graph: $f(x) = |x+3| - 2$.

b) Visually estimate the domain of $f(x)$.

c) Visually estimate the range of $f(x)$.



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CHAPTER 1 **NAME**_____

TEST FORM A

Find the slope of the line containing the given points.

16. $(3, 6)$ and $(-7, -2)$

17. $(4, -3)$ and $(4, 9)$

18. $(1.5, 3.2)$ and $(-4.0, 3.2)$

19. In week one, the number of inquiries was 15. The number of inquiries increased to 79 in week four. Find the average rate of change in number of inquiries from week one to the week four.

20. Find the slope and the y-intercept of the graph of $5x - 2y = -10$.

21. *Total Cost*. Hideaway Vacation Cabins charges \$200 plus \$15 per person for a weekly rental fee during the off-season. Write an equation that can be used to determine the total cost, $C(p)$, of a weekly rental during the off-season for p persons. Then find the total cost for a weekly rental for five persons.

22. Write an equation for a line with $m = -\frac{1}{2}$ and y-intercept $(0, 7)$.

23. Write an equation for the line that passes through $(-2, -1)$ and $(4, -6)$.

24. Write an equation of the horizontal line that passes through $(-0.6, 5.4)$.

25. Determine whether the lines are parallel, perpendicular, or neither.

$$4x - 5y = 6$$
$$10y - 8x = 22$$

ANSWERS

16. _____

17. _____

18. _____

19. _____

20. _____

21. _____

_____

22. _____

23. _____

24. _____

25. _____

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CHAPTER 1 **NAME**_____

TEST FORM A

ANSWERS

26. _____

27. _____

28. a) _____

b) _____

29. _____

30. _____

31. _____

32. _____

26. Find an equation of the line containing the point $(-2,-4)$ and parallel to the line $-3x+y=6$.

27. Find an equation of the line containing the point $(-2,-4)$ and perpendicular to the line $-3x+y=6$.

28. The table below shows the average price, in dollars, of a bike shop for several years.

Year, x	Total Revenue, R (in thousands)
2008, 0	$ 85
2010, 2	94
2012, 4	97
2014, 6	100
2015, 7	105

a) Without using a graphing calculator, model the data with a linear function using years 2 and 6, and using this function predict the revenue in year 12. Round to the nearest thousand.

b) Using a graphing calculator, fit a regression line to the data and use it to estimate, to the nearest thousand dollars, the revenue of the bike shop in year 12. What is the correlation coefficient for the regression line?

Solve.

29. $4x-6=8$

30. $12x-5=14+12x$

31. $-\frac{4}{3}n+5=\frac{3}{4}n-1$

32. $3(y+4)=5-3(2y-3)$

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CHAPTER 1 **NAME**_____

TEST FORM A

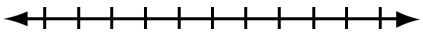
33. *Room Dimensions*. A rectangular room has a perimeter of 84 ft. The width is three-fourths of the length. What are the dimensions of the room.

34. *Sales Commission*. Gary earns a base salary of $1600 per month and a commission of 6% on the amount of sales he makes. One month he received a paycheck for $2350. Find the amount of his sales for the month.

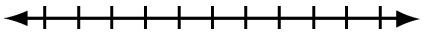
35. Find the zero(s) of the function $f(x) = 4x - 8$.

Solve and write interval notation for the solution set. Then graph the solution set.

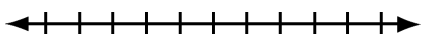
36. $4 + x \geq 3x - 6$



37. $-3 \leq 5x + 2 < 12$



38. $3x - 2 \leq -5$ *or* $4x + 1 \geq 9$



39. Country Plumbing charges a $25 transportation fee plus $50 per hour for a service call. Tip Top Plumbing charges $62.50 per hour for a service call. For how long a service call is Country Plumbing the less expensive option?

ANSWERS

33. _____

34. _____

35. _____

36. _____
See graph.

37. _____
See graph.

38. _____
See graph.

39. _____

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CHAPTER 1 **NAME**_____

TEST FORM A

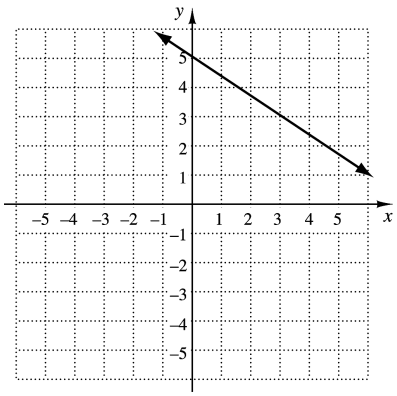
ANSWERS

40. _____

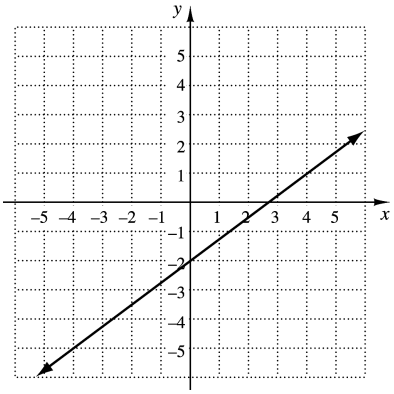
41. _____

40. The graph of $y = 5 - \frac{3}{2}x$ is which of the following?

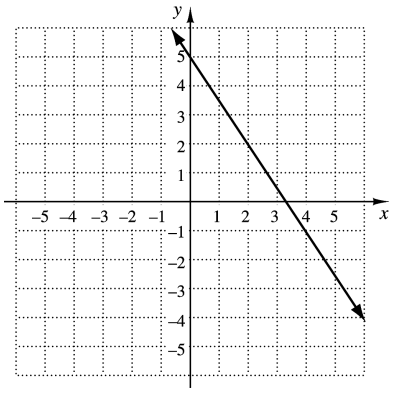
A.



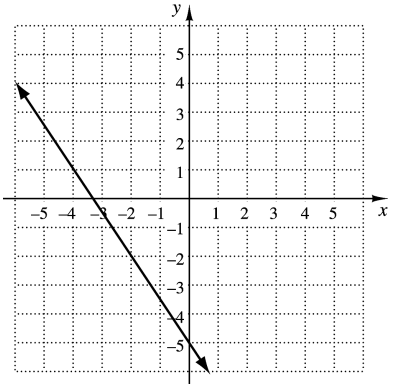
B.



C.



D.



41. Find the domain of $f(x) = \frac{\sqrt{16 - x}}{x^3}$.

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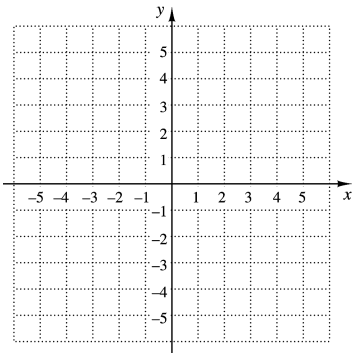
CHAPTER 1 **NAME**_____

TEST FORM B **CLASS**_____**SCORE**_____**GRADE**_____

1. Determine whether the ordered pair $\left(\frac{3}{4}, -\frac{1}{5}\right)$ is a solution of the equation $12x - 8 = 5y$.

2. Find the intercepts of $3x - 2y = 6$ and graph the line.



3. Find the distance between $(4, 8)$ and $(-7, 6)$.

4. Find the midpoint of the segment with endpoints $(7, -2)$ and $(10, 4)$.

5. Find the center and the radius of the circle $(x+5)^2 + (y+2)^2 = 100$.

6. Find an equation of the circle with center $(-3, 2)$ and radius $\sqrt{5}$.

7. a) Determine whether the relation $\{(-2, 0), (-1, 1), (-2, 4), (1, 3)\}$ is a function. Answer yes or no.
   b) Find the domain of the relation.
   c) Find the range of the relation.

8. Given that $f(x) = x^2 - 6x + 2$, find each of the following.
   a) $f(-1)$ b) $f(a+3)$

9. Given that $f(x) = \frac{3-x}{3x}$, find each of the following.
   a) $f(0)$ b) $f(4)$

ANSWERS

1. _____
2. _____
   _____
   See graph.
3. _____
4. _____
5. _____
6. _____
7. a) _____
   b) _____
   c) _____
8. a) _____
   b) _____
9. a) _____
   b) _____

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CHAPTER 1 **NAME**_____

TEST FORM B

ANSWERS

10. _____

11. a) _____

b) _____

12. _____

13. _____

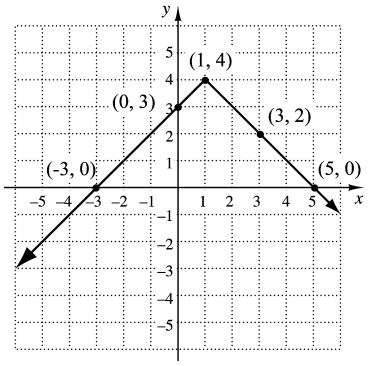
14. _____

15. a) See graph.

b) _____

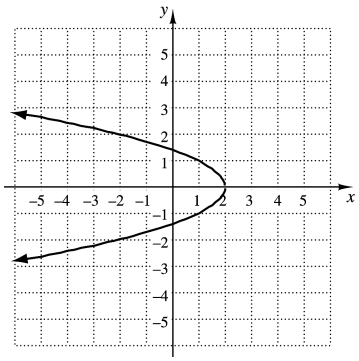
c) _____

10. Using the graph of f at the right, find $f(3)$.

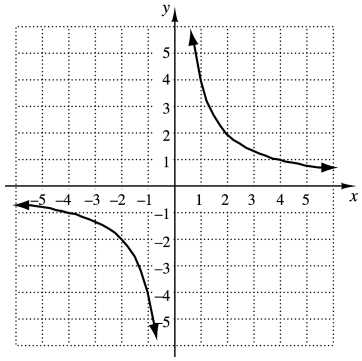


11. Determine whether each graph is that of a function. Answer yes or no.

a)



b)



Find the domain of the function.

12. $f(x)=\dfrac{5}{x+6}$

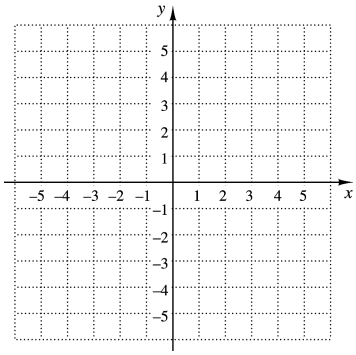
13. $g(x)=5-x^3$

14. $h(x)=\sqrt{1-x^2}$

15. a) Graph: $f(x)=\sqrt{x^2-9}$.

b) Visually estimate the domain of $f(x)$.

c) Visually estimate the range of $f(x)$.



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CHAPTER 1 **NAME**_____

TEST FORM B

Find the slope of the line containing the given points.

16. $(4, -2)$ and $(-4, 6)$

17. $(-6, -2)$ and $(8, -2)$

18. $(0.5,\ 8)$ and $(-0.5,\ 3)$

19. The population of a town was 12,000 residents in 2000. In 2015, the population was 8000 residents. Find the average rate of change in population from 2005 to 2015.

20. Find the slope and the y-intercept of the graph of $6x - 5y = 12$.

21. *Total Cost*. Jackson Park Field Days charges a \$5 entrance fee plus \$1.25 per ride. Write an equation that can be used to determine the total cost, $C(r)$, of going on r rides at Jackson Park Field Days. Then find the total cost of going on six rides.

22. Write an equation for a line with $m = -\frac{3}{4}$ and y-intercept $(0, 6)$.

23. Write an equation for the line that passes through $(5,\ 4)$ and $(-9,\ 6)$.

24. Write an equation of the horizontal line that passes through $(5.2,\ 4.6)$.

25. Determine whether the lines are parallel, perpendicular, or neither.

$$y + 2x = 8$$
$$8x = 15 - 4y$$

ANSWERS

16. _____

17. _____

18. _____

19. _____

20. _____

21. _____

_____

22. _____

23. _____

24. _____

25. _____

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CHAPTER 1 **NAME**_____

TEST FORM B

ANSWERS

26. _____

27. _____

28. a) _____

b) _____

29. _____

30. _____

31. _____

32. _____

26. Find an equation of a line containing the point $(6,-3)$ and parallel to the line $2x + y = -8$.

27. Find an equation of the line containing the point $(6,-3)$ and perpendicular to the line $2x + y = -8$.

28. The table below shows the average annual price, in dollars, of copier maintenance agreements sold at Johnson Office Supply in several recent years.

Year, x	Average Price, P
2003, 3	$ 295
2006, 6	300
2009, 9	300
2012, 12	336
2015, 15	360

a) Without using a graphing calculator, model the data with a linear function using years 6 and 12, and using this function, predict the average price in 2018. Round to the nearest dollar.

b) Using a graphing calculator, fit a regression line to the data and use it to estimate, to the nearest dollar, the average annual price of a copier maintenance agreement in 2018. What is the correlation coefficient for the regression line?

Solve.

29. $-8x+3=-24$

30. $-4+3x=3x-4$

31. $\frac{4}{5}n+2=\frac{3}{4}n-8$

32. $9(y-2)=8-3(y+4)$

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