MATHS

BOOKS - PRINCETON MATHS (ENGLISH)

FUNCTIONS AND GRAPHS

Example

1. If $f(x) = x^3 - 4x + 8$, then f(5)=

A. 67

B. 97

C. 113

D. 147

Answer: C

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2. If $f(x) = x^2 + 2$, which of the following could be a value of f(x)?

A. -1

B. 0

C. 1

D. 2

Answer: D

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3. Let the function g be defined by $g(x) = 5x + 2$. If $\sqrt{g\left(\frac{a}{2}\right)} = 6$, what is the value of a?

A. $\frac{1}{\sqrt{6}}$

B. $\frac{1}{\sqrt{2}}$

C. $\frac{34}{5}$

D. $\frac{68}{5}$

Answer: D

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4. If $f(g(a)) = 6, f(x) = \frac{x}{2} + 2, \text{ and } g(x) = |x^2 - 10|$, which of the following is a possible value of a?

A. $\sqrt{2}$

B. 2

C. 6

D. 18

Answer: A

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5. Rock climbing routes are rated on a numbered scale with the highest number representing the most difficult route. Sally tried a range of shoe sizes on each of several routes of varying difficulty and found that when she wore smaller shoes, she could climb routes of greater difficultly. If D represents the difficultly rating of a route sally successfully climbed and s represents the size of the shoes she wore on such a route, then which

of the following could expresses D as a function of s?

A. $D(s) = s^2$

B. $D(s) = \sqrt{s}$

C. $D(s) = s - 3.5$

D. $D(s) = \frac{45}{s}$

Answer: D

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6. If the xy-plane, which of the following ordered pairs is a point on the line $y = 2x - 6$?

A. $(6, 7)$

B. $(7, 7)$

C. $(7, 8)$

D. $(8, 7)$

Answer: C

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7. The graph of which of the following equation is parallel to the line with equation $y = -3x - 6$?

A. $x - 3y = 3$

B. $x - \frac{1}{3}y = 2$

C. $x + \frac{1}{6}y = 4$

D. $x + \frac{1}{3}y = 5$

Answer: D

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8. Which of the following is the graph of a line perpendicular to the line defined by the equation $2x + 5y = 10$?

A. 

B. 

C. 

D. 

Answer: D

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9. $gx - hy = 78$

$4x + 3y = 13$

In the system of equations above, g and h are constants. If the system has infinity many solutions, what is the value of gh?

A. -432

B. -6

C. 6

D. 432

Answer: A

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10. Which of the following accurately the set of solutions for the lines $6x + 12y = -24$ and $y = -\frac{1}{2}x + 2$?

A. $(0, -4)$

B. $(0, 4)$

C. There are no solutions

D. There are infinitely many solutions

Answer: C

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11. In the xy-plane, which of the following is a point of intersection between the graphs of $y = x + 2$ and $y = x^2 + x - 2$?

A. $(0, -2)$

B. $(0, 2)$

C. $(1, 0)$

D. $(2, 4)$

Answer: D

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12. In the xy-plane, what is the midpoint of the line segment with endpoints at (3, 4) and (0, 0)?

A. $(1.5, 2)$

B. $(5, 0)$

C. $(2.5, 0)$

D. $(3.5, 3.5)$

Answer: A

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13. Which of the following points lies the greatest distance from the origin in the xy-plane?

A. $\left(-\frac{3}{2}, -\frac{3}{2}\right)$

B. $(-1, -1)$

C. $\left(-\frac{1}{2}, 0\right)$

D. $(0, 1)$

Answer: A

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14. What is the distance between the x-intercept and the y-intercept of the line $y = \frac{2}{3}x - 6$?

A. 9

B. 15

C. $\sqrt{89}$

D. $\sqrt{117}$

Answer: D

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15. Which of the following is the equation of a circle with center (2, 0) and a radius with endpoint $\left(5, \sqrt{7}\right)$?

A. $(x-2)^2+y^2=4$

B. $(x+2)^2+y^2=4$

C. $(x-2)^2+y^2=16$

D. $(x+2)^2+y^2=16$

Answer: C

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Functions And Graphs Drill 1 No Calculator Section

1. Let the function f be defined such that $f(x) = x^2 - c$, where c is constant. If $f(-2) = 6$, what is the value of c?

A. -10

B. -2

C. 0

D. 2

Answer: B

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2. The graph of line l in the xy-plane passes through the points $(2, 5)$ and $(4, 11)$. The graph of line m has a slope of -2 and an x-intercept of 2. If point (x, y) is the point of intersection of line l and m, what is the value of y?

A. $\frac{3}{5}$

B. $\frac{4}{5}$

C. 1

D. 2

Answer: D

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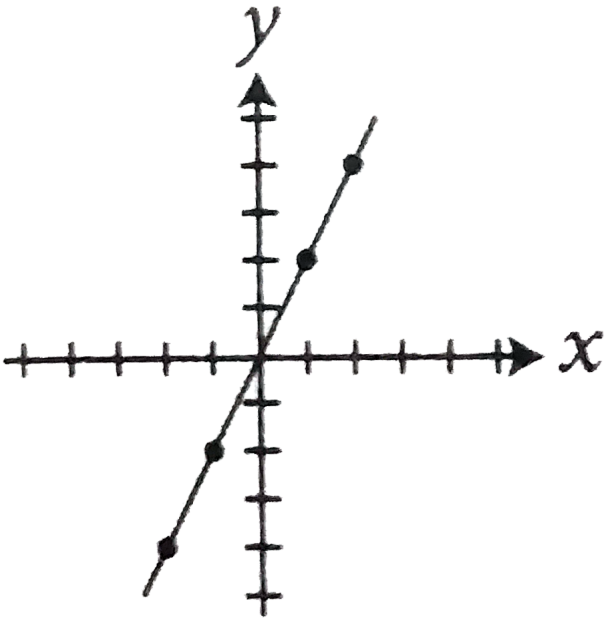
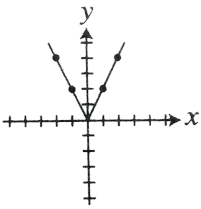


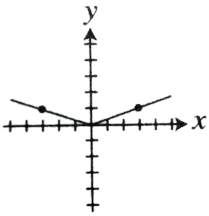
4.

The graph above shows y=2x. Which of the following graphs represents $y = |2x|$?

A.



B.



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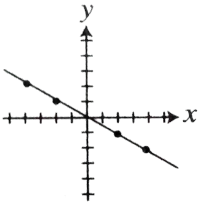
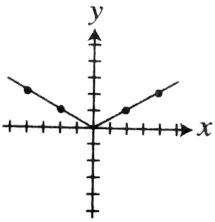


D.



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A. $\frac{3}{5}$

B. $\frac{4}{5}$

C. 1

D. 2

Answer: D

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Functions And Graphs Drill 2 Calculator Permitted Section

1. If $f(x) = \sqrt{3x - 2}$, what is the smallest possible value of f(x)?

A. 0

B. $\frac{2}{3}$

C. 1

D. 2

Answer: A

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2. Line l contains points (3, 2) and (4, 5). If line m is perpendicular to line l, then which of the following could be the equation of line m?

A. $x + 5y = 15$

B. $x + 3y = 15$

C. $3x + y = 5$

D. $-5x + y = \frac{1}{3}$

Answer: B

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3. If $f(x) = 2x^2 + 4$ for all real numbers x, which of the following is equal to $f(3) + f(5)$?

A. $f(4)$

B. $f(6)$

C. $f(10)$

D. $f(15)$

Answer: B

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4. Carlos and Katherine are estimating acceleration by rolling a ball from rest down a ramp. At 1 second, the ball is moving at 5 meters per second (m/s), at 2 seconds, the ball is moving at 10 m/s, at 3 seconds, the ball is moving at 15 m/s, and at 4 seconds, it is moving at 20 m/s. When graphed on an xy-plane, which equation best describes the ball's estimated acceleration where y expresses speed and x expresses time?

A. $y = 5x + 5$

B. $y = 25x$

C. $y = 5x$

D. $y = (4x + 1)^2 + 5$

Answer: C

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Examples

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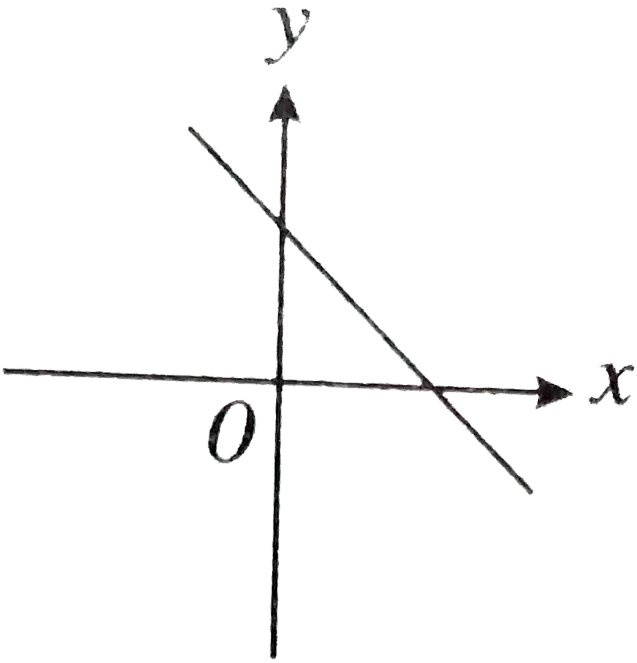

7.

Which of the following could be the equation of the line represented in the graph above?

A. y=2x+4

B. y=2x-4

C. y=-2x-1

D. y=-2x+4

Answer: D

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8. The graph of which of the following equation is parallel to the line with equation $y = -3x - 6$?

A. x-3y=3

B. $x - \frac{1}{3}y = 2$

C. $x + \frac{1}{6}y = 4$

D. $x + \frac{1}{3}y = 5$

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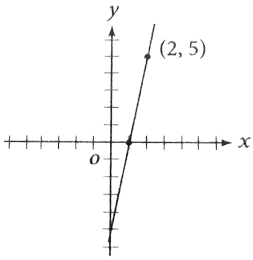
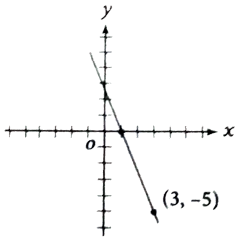
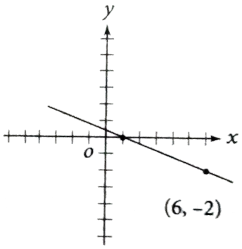


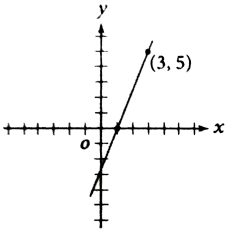
B.



C.



D.



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D. (0,1)

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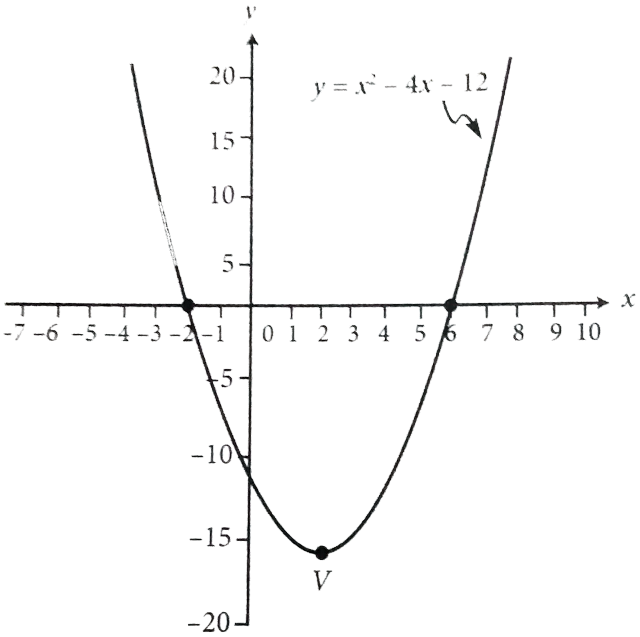

16.

Which of the following is an equivalent form of the equation of the graph shown in the xy-plane above, from which the coordinates of vertex V can be identified from constants in the equation?

A. $y = (x - 2)^2 - 16$

B. $y = x(x - 4) - 12$

C. $y = (x - 6)(x + 2)$

D. $y = (x + 6)(x - 2)$

Answer: A

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17. Which of the following is the equation of a circle with center (2, 0) and a radius with endpoint $\left(5, \sqrt{7}\right)$?

A. $(x - 2)^2 + y^2 = 4$

B. $(x+2)^2+y^2=4$

C. $(x-2)^2+y^2=16$

D. $(x+2)^2+y^2=16$

Answer: C

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Functions And Graphs Drill 2 Calculator Permitted Section

1. If $f(x)=\sqrt{3x-2}$, what is the smallest possible value of f(x)?

A. 0

B. $\frac{2}{3}$

C. 1

D. 2

Answer: A

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x	y
-3	-7
-1	-3
2	3

2.

Based on the chart above, which of the following could express the relationship between x and y?

A. y=x-4

B. $y = 2x - 1$

C. $y = 2x + 2$

D. $y = 3x - 3$

Answer: B

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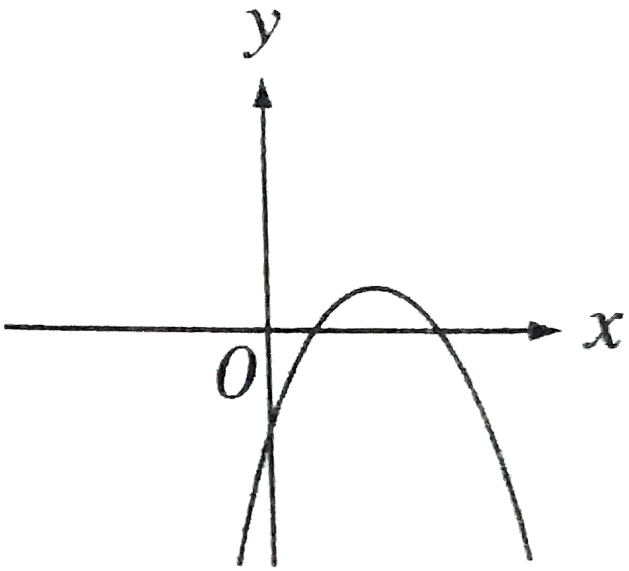

5.

The graph of y=g(x) is shown in the figure above. If $g(x) = ax^2 + bx + c$ for constants a,b and c and if $abc \neq 0$, then which of the following must be true?

A. $ac > 1$

B. $c > 1$

C. $ac > 0$

D. $a > 0$

Answer: C

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per second m/s, at 2 seconds, the ball is moving at 10 m/s, at 3 seconds, the ball is moving at 15m/s, and at 4 seconds, it is moving at 20m/s. When graphed on an xy-plane, which equation best describes the ball's estimated acceleration where y expresses speed and x ecpresses time?

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B. y=25x

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D. $y = (4x + 1)^2 + 5$

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