2009 SAMPLE QUESTIONS

73. If the graph of $2x+3y=5$ is translated 4 units up, determine an equation of the new graph.

A. $2x+3y=1$ B. $2x+3y=9$ C. $2x+3(y+4)=5$ D. $2x+3(y-4)=5$

74. If (a, b) is a point on the graph of $y=f(x)$, determine a point on the graph of $y=f(x-2)+3$.

A. $(a-2, b+3)$ B. $(a-2, b-3)$ C. $(a+2, b+3)$ D. $(a+2, b-3)$

75. If the point $(2, -8)$ is on the graph of $y=f(x-3)+4$, what point must be on the graph of $y=f(x)$.

A. $(-1, -12)$ B. $(-1, -4)$ C. $(5, -12)$ D. $(5, -4)$

76. How is the graph of $y=7^{3x}$ related to the graph of $y=7^x$?

A. the graph of $y=7^x$ has been expanded vertically by a factor of 3
B. the graph of $y=7^x$ has been compressed vertically by a factor of 3
C. the graph of $y=7^x$ has been expanded horizontally by a factor of 3
D. the graph of $y=7^x$ has been compressed horizontally by a factor of 3

77. If the graph of $x^2+y^2=4$ is vertically compressed by a factor of 5, then reflected in the y-axis, determine an equation for the new graph.

A. $x^2+\frac{y^2}{25}=4$ B. $-x^2+25y^2=4$ C. $x^2+25y^2=4$ D. $-x^2+\frac{y^2}{25}=4$

78. The graph of $y=-f(x)$ is a reflection of the graph of $y=f(x)$ in

A. the y-axis. B. the x-axis. C. the line $y=x$. D. the line $y=-x$.

79. What is the inverse of the relation $y=x^3$?

A. $y=\frac{1}{x^3}$ B. $x=y^3$ C. $y=(-x)^3$ D. $x=y^{\frac{1}{3}}$

80. The point $(6,-12)$ is on the graph of the function $y=f(x)$. Which point must be on the graph of the function $y=3f(-x)$?

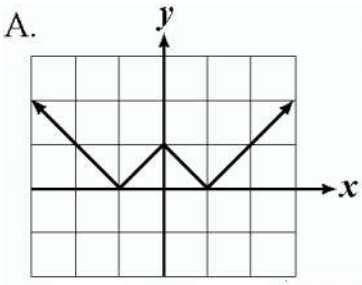
A. $(-6,-36)$ B. $(6,36)$ C. $(-6,-4)$ D. $(6,4)$

81. If $f(x)=\dfrac{2x}{x-1}$, determine the equation of $f^{-1}(x)$, the inverse of $f(x)$.

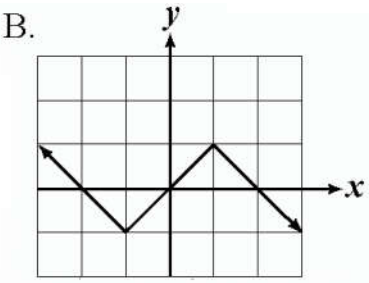
A. $f^{-1}(x)=\dfrac{x}{x-2}$ B. $f^{-1}(x)=\dfrac{2x}{2x-1}$ C. $f^{-1}(x)=\dfrac{x-1}{2x}$ D. $f^{-1}(x)=\dfrac{1}{x-2}$

82. For which graph of $y=f(x)$ would $f(-x)=-f(x)$?

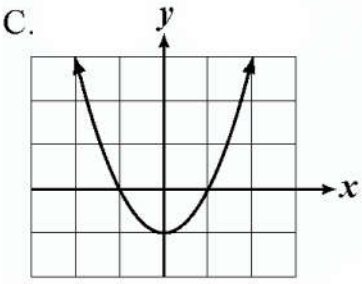
A.



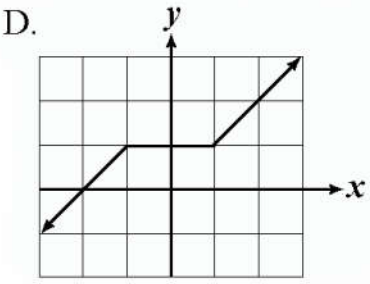
B.



C.



D.



83. When the graph of $y=f(x)$ is transformed to the graph of $y=f(-x)$, on which line(s) will the invariant points lie?

A. $y=0$ B. $x=0$ C. $y=x$ D. $y=1, y=-1$

84. If the range of $y=f(x)$ is $-1\le y\le 2$, what is the range of $y=\dfrac{1}{f(x)}$?

A. $-1\le y\le \dfrac{1}{2}$ B. $-1\le y\le \dfrac{1}{2}, y\neq 0$ C. $y\ge \dfrac{1}{2}$ or $y\le -1$ D. $y\ge 2$ or $y\le -1$

85. The range of $y=f(x)$ is transformed to the graph of $y=\dfrac{1}{f(x)}$. If the following points are on the graph of $y=f(x)$, which point would be invariant?

A. $(1,2)$ B. $(2,1)$ C. $(3,0)$ D. $(0,3)$

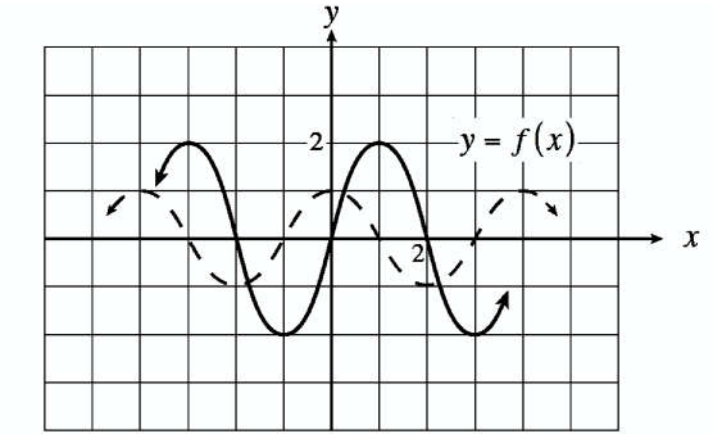
86. If the range of $y = f(x)$ is $-3 \le y \le 5$, what is the range of $y = |f(x)|$?

A. $-3 \le y \le 5$ B. $0 \le y \le 3$ C. $0 \le y \le 5$ D. $3 \le y \le 5$

87. Determine an equation that will cause the graph of $y = f(x)$ to expand vertically by a factor of 4 and then translate 3 units up.

A. $y = \frac{1}{4}f(x) + 3$ B. $y = \frac{1}{4}f(x) - 3$ C. $y = 4f(x) + 3$ D. $y = 4f(x) - 3$

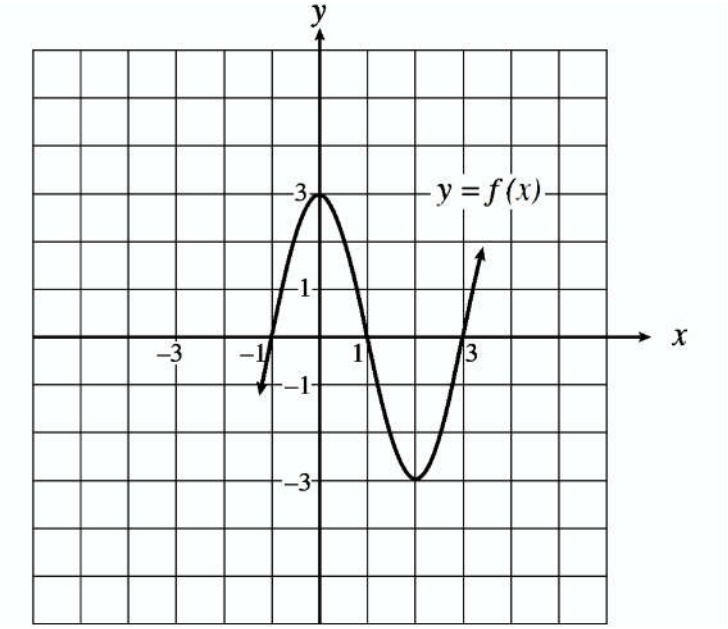
88. In the diagram below, $y = f(x)$ is graphed as a broken line.



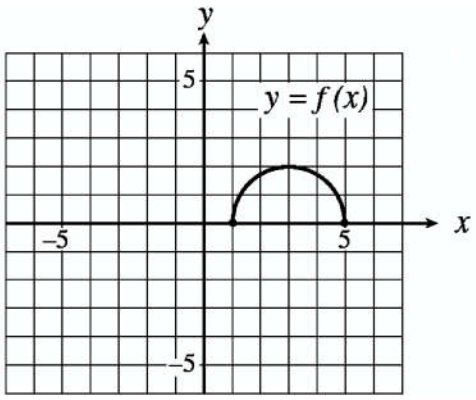
Which equation is defined by the solid line?

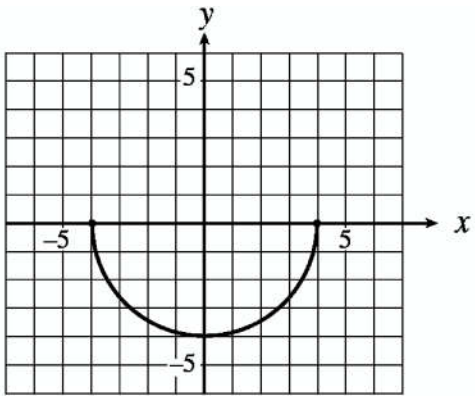
A. $y = 2f(x + 1)$ B. $y = f(2x - 1)$ C. $y = f(2x + 1)$ D. $y = 2f(x - 1)$

89. The graph of $y = f(x)$ is shown below. Sketch the graph of $y = -f\left(\frac{1}{2}(x + 2)\right)$.



90. The graph of $y=f(x)$ is shown below on the left. Which equation represents the graph shown on the right?



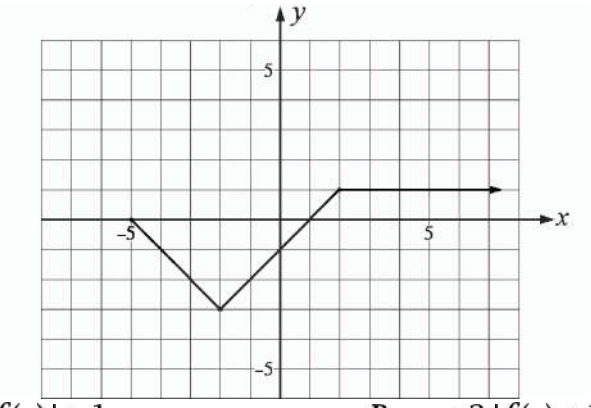


A. $y=-2f(2x+3)$ B. $y=-2f(2x+6)$ C. $y=-2f\left(\frac{1}{2}x+3\right)$ D. $y=-2f\left(\frac{1}{2}x+6\right)$

91. If the point $(6,-2)$ is on the graph $y=f(x)$, which point must be on the graph of $y=\frac{1}{f(-x)+4}$?

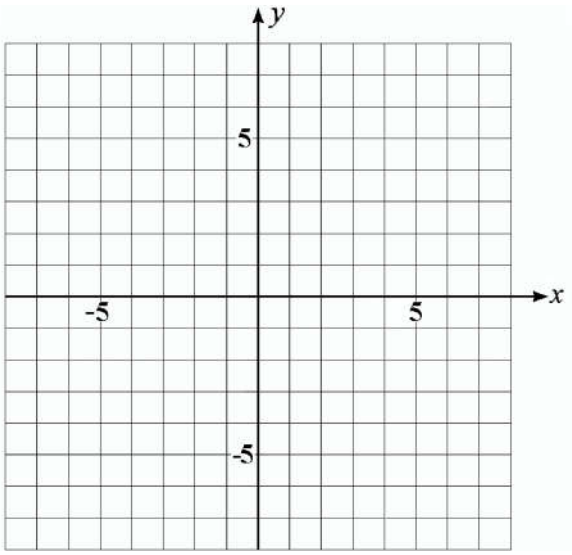
A. $\left(-10,-\frac{1}{2}\right)$ B. $\left(-6,\frac{1}{2}\right)$ C. $\left(-6,\frac{7}{2}\right)$ D. $\left(-\frac{1}{6},2\right)$

92. The graph of $y=f(x)$ is shown:

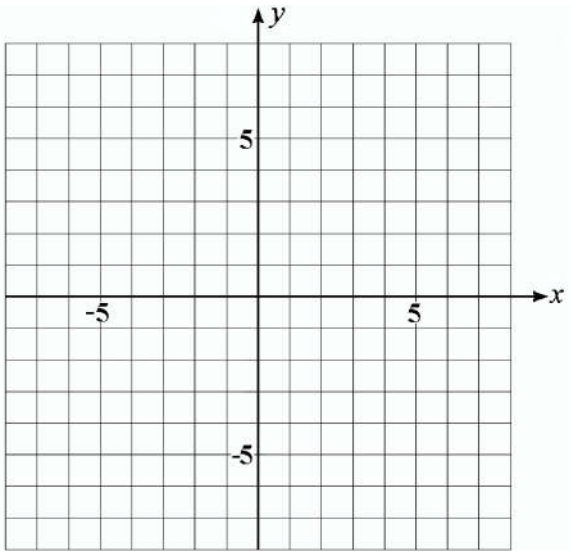


Sketch the graphs of: A. $y=2|f(x)|+1$ B. $y=2|f(x)+1|$

A.



B.



ADDITIONAL QUESTIONS

93. If $y = f(x)$ is a function with domain $[-8, 12]$, determine the domain of $y = \frac{1}{2}f(x-3)$.

A. $[-5, 6]$ B. $[-7, 12]$ C. $[-5, 15]$ D. $[-11, 9]$

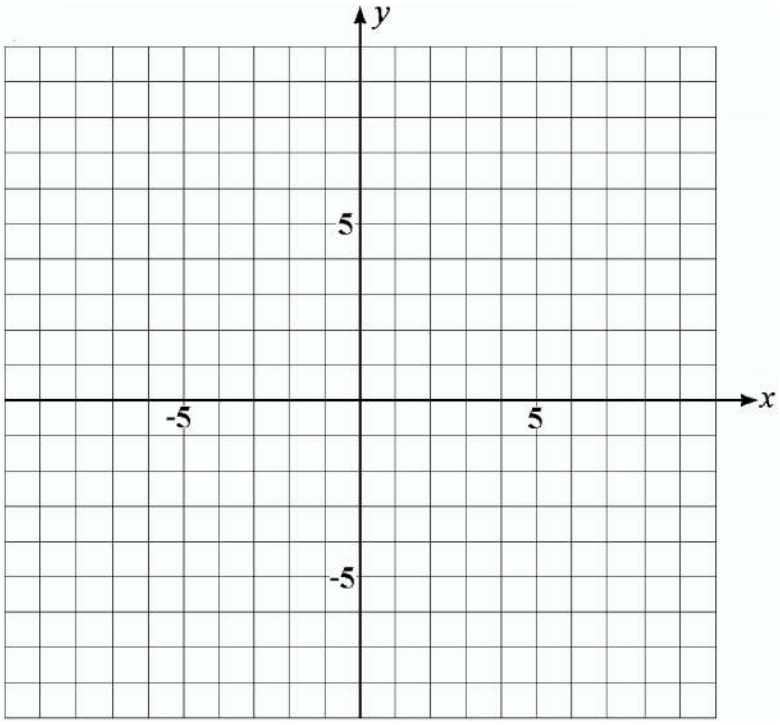
94. The graph of $y = -g(2x)$ is obtained by transforming the graph of $y = g(x)$ in the following way:

A. Shrink horizontally and reflect across the x-axis.
B. Shrink horizontally and reflect across the y-axis.
C. Stretch vertically and reflect across the x-axis.
D. Stretch vertically and reflect across the y-axis.

95. If $(-4, 7)$ is a point on the graph of $y = h(t)$, which of the following must be a point on the graph of $y = h(-t) - 2$?

A. $(-4, -9)$ B. $(-4, -5)$ C. $(4, 5)$ D. $(4, 9)$

96. If $f(x) = |x-2|$, sketch the graph of $y = f\left(\frac{x}{2}\right)$



97. The relation $x = \sqrt{9 - y^2}$ is multiplied vertically by a factor of $\frac{1}{3}$, then translated 1 unit to the right. Determine the equation of the transformed relation.

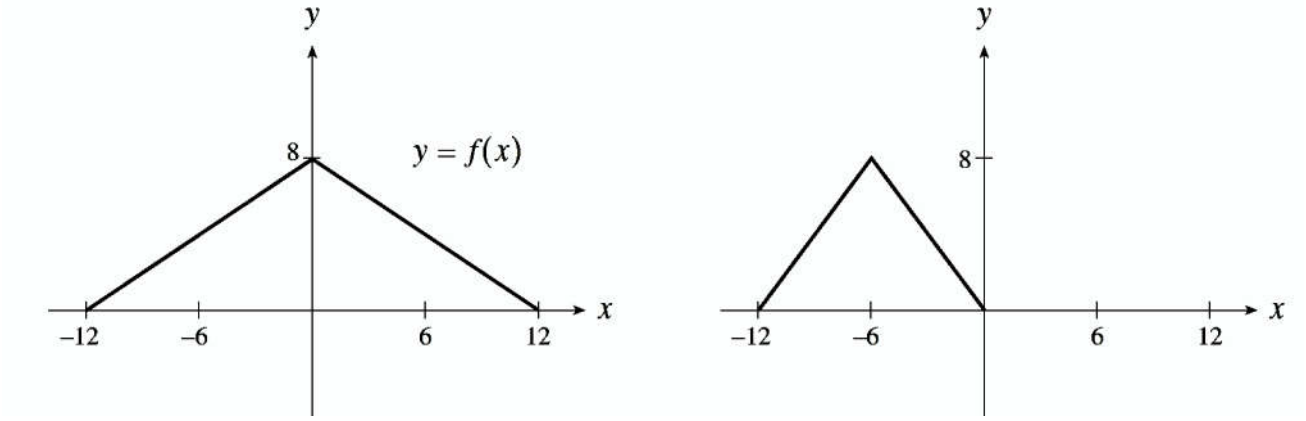
A. $x = \sqrt{9 - 9y^2} + 1$ B. $x = \sqrt{9 - 9y^2} - 1$ C. $x = \sqrt{9 - \frac{y^2}{9}} + 1$ D. $x = \sqrt{9 - \frac{y^2}{9}} - 1$

98. The zeros of the function $y = f(x)$ are -4, 1 and 2. Determine the zeros of the new function $y = -f(x - 1)$.

A. $-5,\ 0,\ 1$ B. $-3,\ -2,\ 3$ C. $-3,\ 2,\ 3$ D. $-1,\ 0,\ 5$

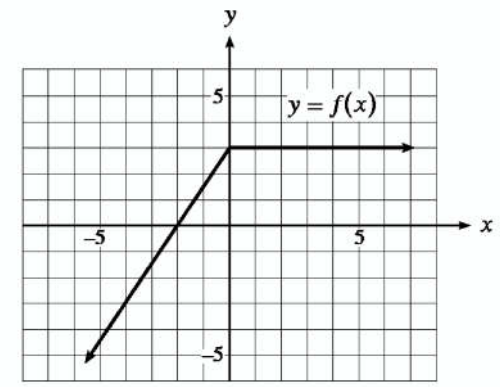
99. Given the function $f(x) = \frac{3x}{x+1}$, determine the equation of the inverse function $f^{-1}(x)$.

100. The function $y = f(x)$ is graphed to the left below. Determine an equation of the function shown on the right.



A. $y = f(2x)$ B. $y = f(2x + 6)$ C. $y = f(2x - 6)$ D. $y = f(2x + 12)$

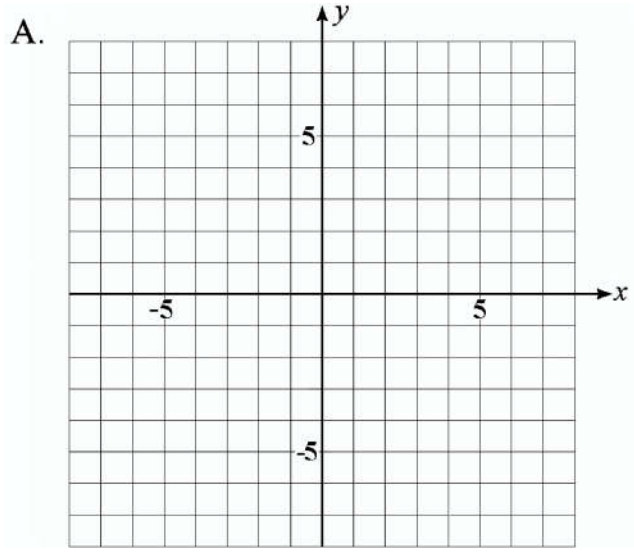
101. The graph of $y = f(x)$ is shown below.



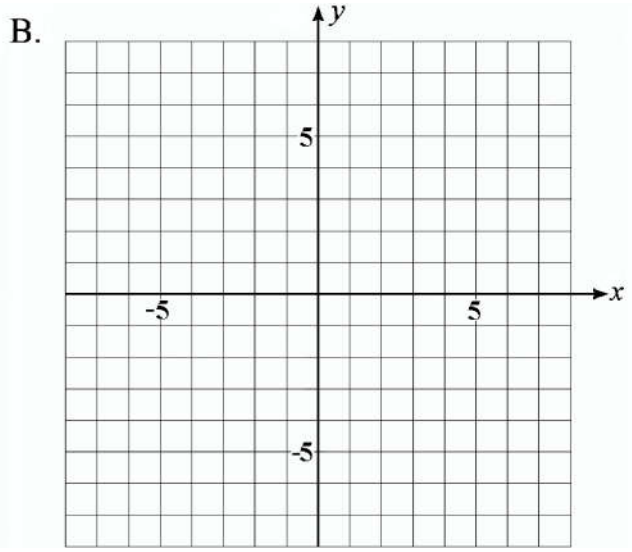
On the grid provided, sketch the graphs of

A. $y = -f(x+3)$ B. $y = 2|f(x)| - 3$

A.



B.



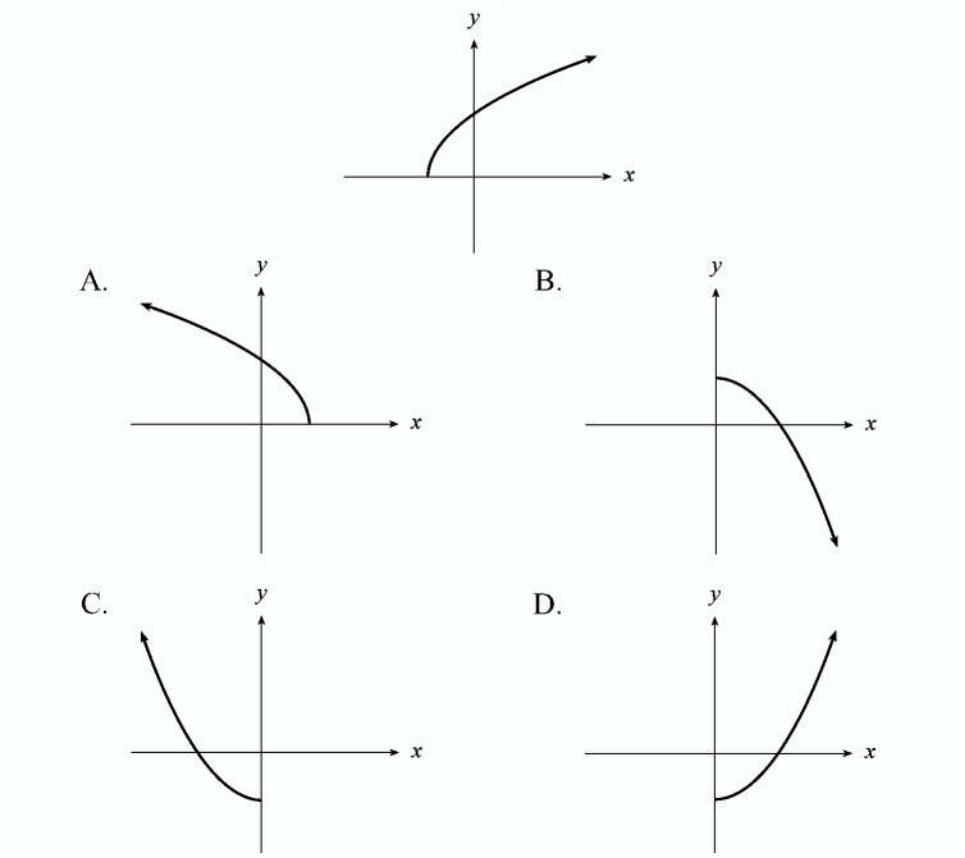
102. If the graph of $x^2 + y^2 = 4$ is compressed vertically by a factor of 2, which of the following equations represents this transformation?

A. $4x^2 + y^2 = 4$ B. $x^2 + 4y^2 = 4$ C. $x^2 + 2y^2 = 4$ D. $2x^2 + y^2 = 4$

103. The point $(-2, 6)$ is on the graph of $y = f(x)$. Which of the following points must be on the graph of $y = \frac{1}{3} f(2(x-1))$?

A. $(0, 2)$ B. $(-6, 2)$ C. $(-3, 18)$ D. $(-5, 18)$

104. Which graph best represents the inverse relation of the graph shown?



105. Determine the inverse of $f(x) = x - 2$.

A. $f^{-1}(x) = x + 2$ B. $f^{-1}(x) = \frac{1}{x} - \frac{1}{2}$ C. $f^{-1}(x) = -\frac{x}{2}$ D. $f^{-1}(x) = \frac{1}{x - 2}$

106. Determine $Q^{-1}(t)$ if $Q(t) = \frac{C}{4t - 1}$, and C is a non-zero constant.

A. $Q^{-1} = \frac{C}{4}t + C$ B. $Q^{-1} = \frac{4t - 1}{C}$

C. $Q^{-1} = \frac{C + t}{4t}$, $t \neq 0$ D. $Q^{-1} = \frac{C - 4t}{t}$, $t \neq 0$

107. Suppose $g(4) = 30$ means the volume of water in a container is 30 mL when the depth of the water is 4 cm. What is the meaning of $g^{-1}(50) = 10$?

A. The volume of the water is 10 mL when the depth of the water is 50 cm.

B. The depth of the water is 10 cm when the volume of the water is 50 mL.

C. The depth of the water is 0.2 cm when the volume of the water is 50 mL.

D. The volume of the water is 5 mL when the depth of the water is 10 cm.

108. The function $y = f(x)$ has a domain of $[-3, 15]$ and a range of $[-5, 12]$. Determine the range for each of the following:

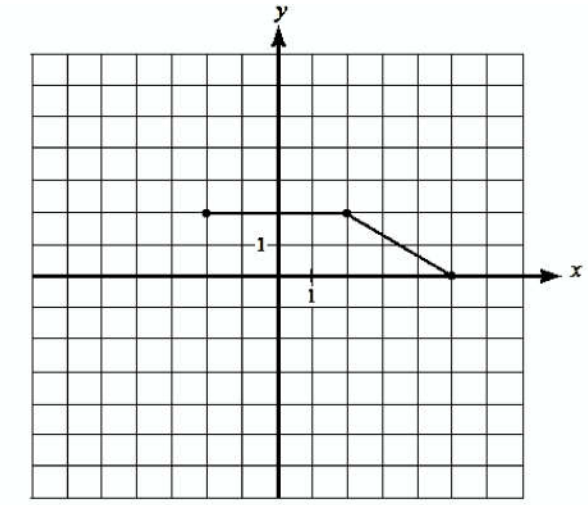
a) $y = |f(x)|$

b) $y = \sqrt{f(x)}$

c) $y = f^{-1}(x)$

d) $y = \dfrac{1}{f(x)}$

109. The graph of $y = 2f(x - 1)$ is sketched below.

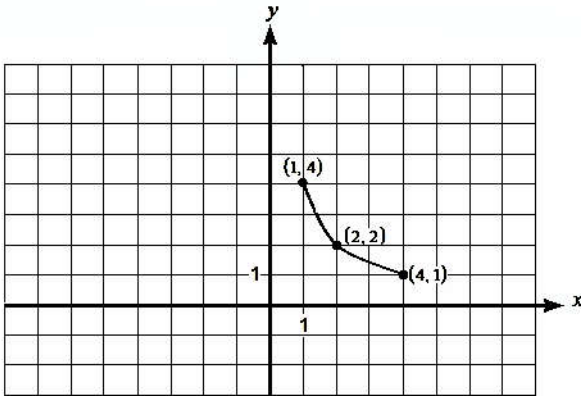


On the same grid, sketch a clearly labelled graph of $y = f(x)$.

110. For which of the following functions is $f(x) = f^{-1}(x)$, where $f^{-1}(x)$ is the inverse function of $f(x)$?

A. $f(x) = x^2$ B. $f(x) = \dfrac{1}{x}$ C. $f(x) = |x|$ D. $f(x) = \log x$

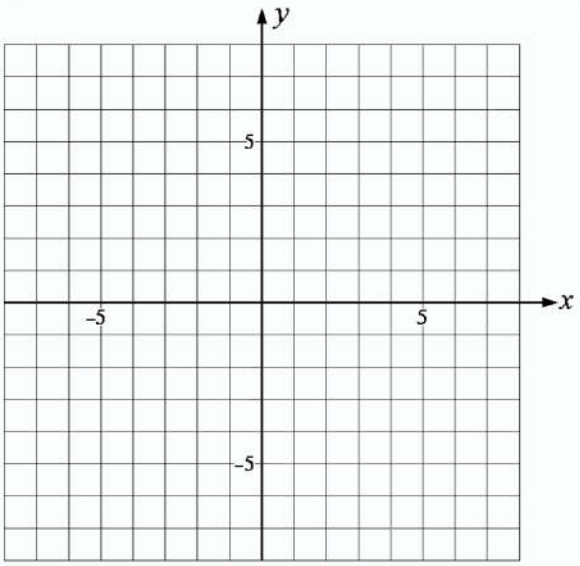
111. The graph of $y = f(x)$ is shown below.



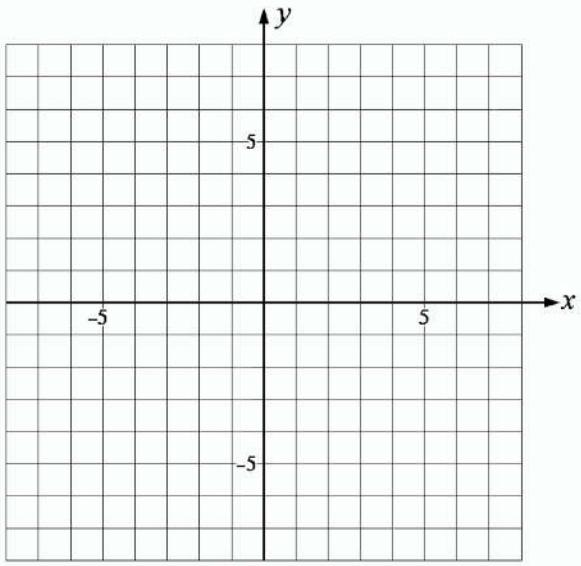
On the grids provided, sketch the graphs of

A. $y = -f(x+1)$ B. $y = \dfrac{1}{f(x)}$ C. $y = 2f(2x)$

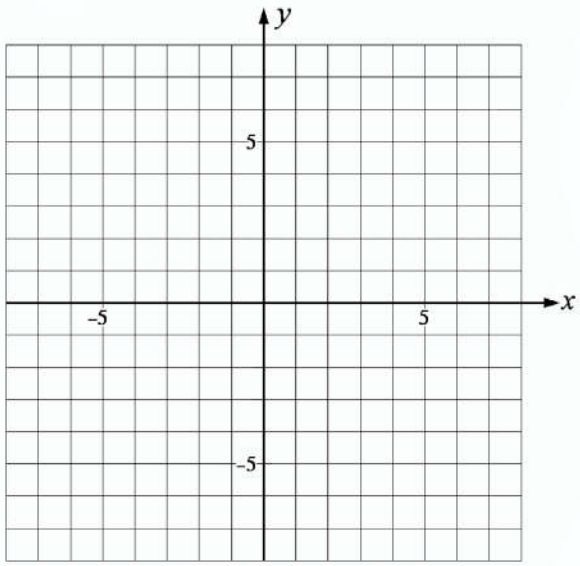
A.



B.



C.

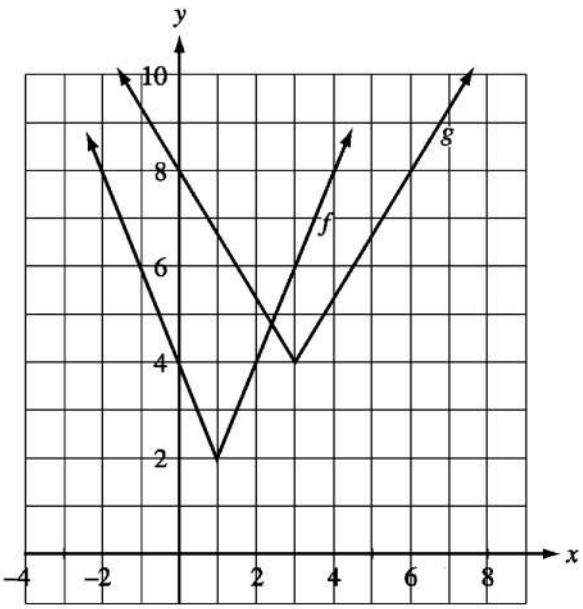


112. Given the functions $f(x) = |x - 2| + 3$ and $g(x) = |x + 2| + 1$, determine the correct set of translations that will transform $y = f(x)$ into $y = g(x)$.

A. 4 units left and 2 units down
B. 4 units right and 2 units up
C. 1 unit left and 3 units up
D. 2 units left and 4 units down

113. The graph of the function $y = f(x)$ is transformed to produce the graph of the function $y = g(x)$ as shown. Determine an equation for $y = g(x)$ in terms of $y = f(x)$.

A. $g(x) = \frac{1}{2}f(3x)$
B. $g(x) = 2f(3x)$
C. $g(x) = \frac{1}{2}f\left(\frac{x}{3}\right)$
D. $g(x) = 2f\left(\frac{x}{3}\right)$



114. The graph of $y = f(x)$ is transformed into the graph of $g(x) + 4 = 2(f(x - 3))$.
For $y = f(x)$, the domain is $[-1, 3]$ and the range is $[2, 6]$.
For $y = g(x)$, the domain is $[a, b]$ and the range is $[c, d]$.
For the graph of $y = g(x)$, the values of a, b, c, and d are, respectively

A. $-4, 0, 0, 8$
B. $2, 6, 0, 8$
C. $-4, 0, -4, 4$
D. $2, 6, -4, 4$

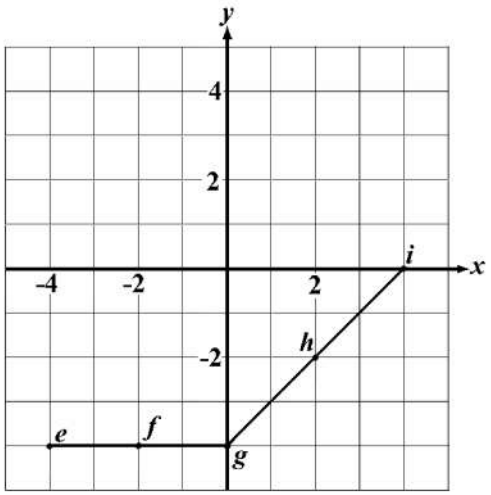
115. Consider the following transformations on the graph of $y = f(x)$.

I. $y = f(x + 2)$
II. $y = 2f(x)$
III. $y = f(-x)$
IV. $y = -f(x)$

Which transformations will have no effect on the zeros of the original graph of $y = f(x)$?

A. I and II only
B. II and III only
C. II and IV only
D. III and IV only

116. The graph of $y = f(x)$ is shown below.



Determine the location of invariant points under each of the following transformations on $y = f(x)$:

A. $y = -f(x)$ B. $y = f(-x)$ C. $x = f(y)$

117. The ordered pairs below represent possible transformations of the point $P(a,\ b)$ on the graph of the function $y = f(x)$.

Point 1: $(4a,\ b)$ Point 2: $(-a,\ b)$

Point 3: $(a,\ -b)$ Point 4: $\left(a,\ \frac{b}{4}\right)$

Point 5: $\left(\frac{a}{4},\ b\right)$ Point 6: $(a,\ 4b)$

Match each of the following single transformations with the correct ordered pairs of the corresponding point P on the new graph.

a) $y = -f(x)$ b) $y = f\left(\frac{1}{4}x\right)$ c) $y = \frac{1}{4}f(x)$ d) $y = f(-x)$

118. Given $f(x) = -3x + 7$, evaluate $y = f^{-1}(-2)$.