

1. If $r(t) = e^t$ for $t > 0$, what is the formula for $s(t) = r(t-2)$?

- (A) $s(t) = e^{t-2}$
 B) $s(t) = e^t - 2$
 C) $s(t) = e^{t+2}$
 D) $s(t) = e^t + 2$

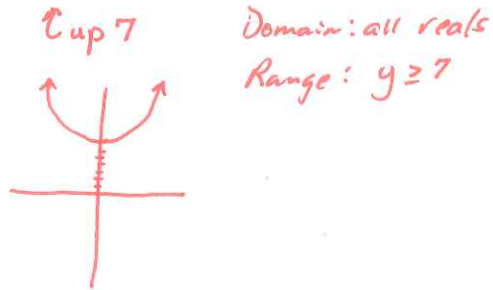
$$e^{t-2}$$

2. If $f(x) = 4x^2 + 4x$ and $g(x) = f(x-2)$, what is $g(0)$?

$$\begin{aligned} g(0) &= f(0-2) & f(-2) &= 4(-2)^2 + 4(-2) \\ &= f(-2) & &= 4 \cdot 4 - 8 \\ & & &= 16 - 8 \\ & & &= 8 \end{aligned}$$

3. Find the domain and range of $h(x) = x^2 + 7$.

- A) $0 \leq x < \infty, 7 \leq h(x) < \infty$
 (B) $-\infty < x < \infty, 7 \leq h(x) < \infty$
 C) $-\infty < x < \infty, 0 \leq h(x) \leq 7$
 D) $0 \leq x < \infty, 0 \leq h(x) \leq 7$
 E) $0 \leq x < 7, -\infty \leq h(x) < \infty$

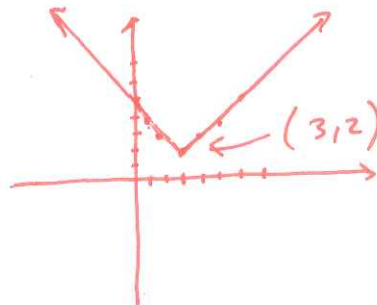


4. The graph of $g(x)$ contains the point $(-2, 5)$. Which formula for a translation of g has a graph containing the point $(1, 9)$?

- (A) $g(x-3) + 4$
 B) $g(x+3) - 4$
 C) $g(x-1) + 9$
 D) $g(x+1) - 9$

Right three, up 4

5. Sketch the graph of $f(x) = |x-3| + 2$



6. The following table gives some values for the function $h(x)$. If $h(x)$ has even symmetry, what is $h(3)$? *(same as $h(-3)$) - reflect across y-axis*

x	-3	-2	-1	0
$h(x)$	0	-8	3	-3

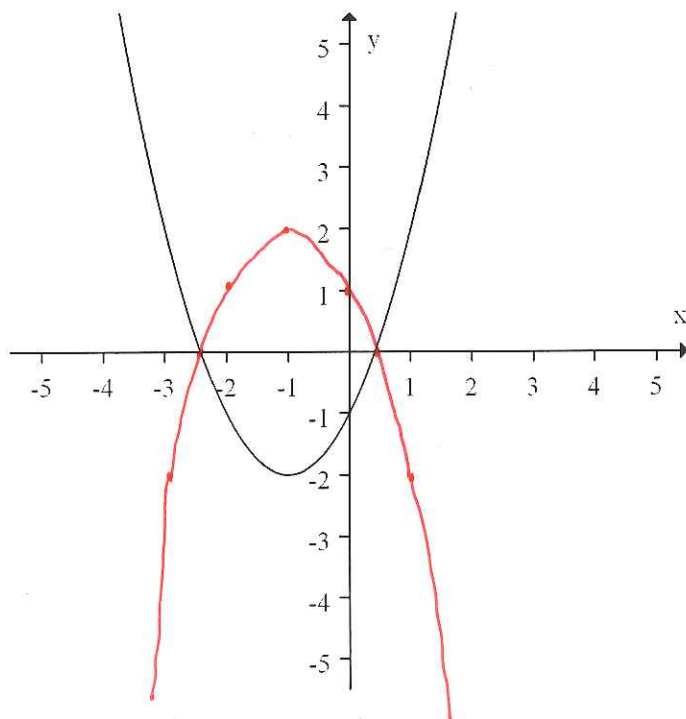
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7. The graph of $P(t)$ contains the point $(5, -5)$. What is the corresponding point on the graph if $P(t)$ is an odd function? *Reflect about origin $\rightarrow (-5, 5)$*

(x and y axis)

8. The graph of $f(x)$ contains the point $(2, 4)$. What point must lie on the reflected graph if the graph is reflected about the x-axis? *x-value remains the same, y-value changes*
 $(2, -4)$

9. If the following is the graph of $f(x)$.



Sketch the graph of $-f(x)$. *Reflect about x-axis (vertical reflection)*

10. The domain of $f(x)$ is $-2 \leq x \leq 5$ and the range is $-4 \leq f(x) \leq 3$. What is the domain and range of $-2f(x)$?

↑
VERTICAL STRETCH SF 2
REFLECTION VERTICALLY ACROSS X-AXIS
(Multiply y-value by -2)

Domain: $-2 \leq x \leq 5$
Range: $-6 \leq f(x) \leq 8$

11. Let $f(x) = -2x^2 + 3$. Write a formula for the following transformations of f .

A) $g(x) = 2f(x)$ B.) $h(x) = 3f(x-1)$ C.) $m(x) = -f(x) + 4$

$2(-2x^2 + 3)$ $3(-2(x-1)^2 + 3)$ $-(-2x^2 + 3) + 4$

$g(x) = -4x^2 + 6$ $3(-2(x^2 - 2x + 1) + 3)$ $2x^2 - 3 + 4$

$3(-2x^2 + 4x - 2 + 3)$ $2x^2 - 3 + 4$

$3(-2x^2 + 4x + 1)$ $m(x) = 2x^2 + 1$

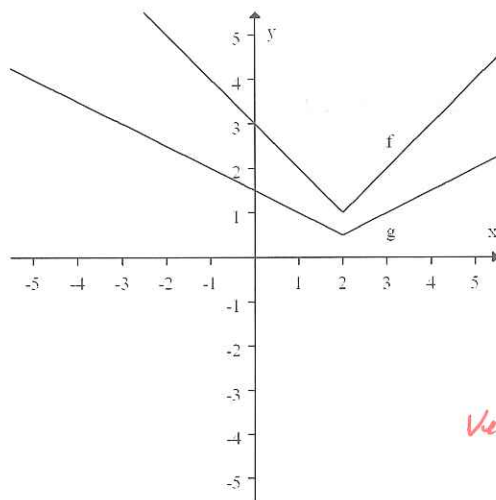
$h(x) = -6x^2 + 12x + 3$

12. The amount of money in your bank account is given by $V(t)$. Which of the following formulas matches the description "\$140 more than I have in my bank account"?

- (A) $V(t) + 140$ $V(t) + 140$
- B) $V(t + 140)$
- C) $140V(t)$ $V(t + 140)$
- D) $V(t - 140)$
- Means amount in bank account 140 years later

13.

The graphs of f and g are shown below.



Vertical compression SF of $\frac{1}{2}$

Which of the following gives a formula for $g(x)$ in terms of $f(x)$?

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

14. Let 2 and 5 be the zeros of the quadratic function $f(x)$. What are the zeros of the function $g(x) = f(-2x)$?

- A) 2
- B) 5
- C) -1
- D) -2.5
- E) -4
- F) -10

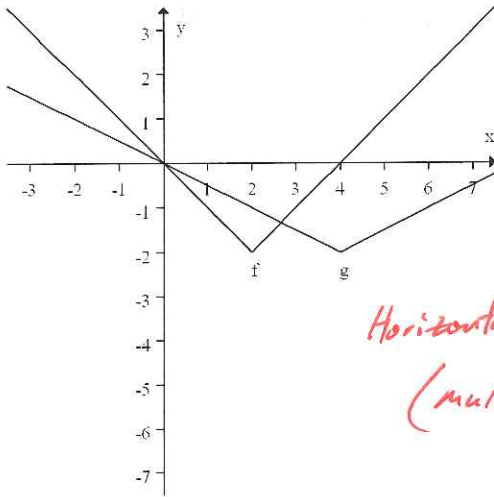
*Horizontal compression
sf of $\frac{1}{2}$ and reflect
horizontally across
y-axis*

or

$$\begin{aligned} x-2 &= 0 & x-5 &= 0 \\ -2x-2 &= 0 & -2x-5 &= 0 \\ -2x &= 2 & -2x &= 5 \\ x &= -1 & \frac{-2}{-2} &= \frac{5}{-2} \\ & & x &= -2.5 \end{aligned}$$

$(2,0) (5,0)$
 $(1,0) (2.5,0)$
 $(-1,0) (-2.5,0)$

15. The graphs of f and g are shown at the right.



*Horizontal stretch sf 2
(multiplier is $\frac{1}{2}$)*

Which of the following gives a formula for $g(x)$ in terms of $f(x)$?

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

16. The domain of $f(x)$ is $-16 \leq x \leq 16$ and the range is $0 \leq f(x) \leq 11$. What is the domain and range of $g(x) = f(-4x)$?

Domain: $-4 \leq x \leq 4$

Range: $0 \leq f(x) \leq 11$

*Horizontal compression sf $\frac{1}{4}$ and horizontal reflection across y-axis
(Multiply x by $\frac{1}{4}$ and -1 ($-\frac{1}{4}$))*

17. Let $V = f(m)$ be the value of an investment m months after the account was open. Write an expression that represents the value of the investment increased by 15%.

$$V = 1.15 f(m)$$

18. Let $g(x) = \frac{1}{x^2}$. Which of the following formulas transforms the graph of g by shifting it 7 units to the right, reflecting it about the x -axis, and then shifting it up 3 units?

A) $3 - \frac{1}{(x-7)^2}$

B) $-\frac{1}{3+(x-7)^2}$

C) $\frac{1}{3-(x-7)^2}$

D) $3 - \frac{1}{(x)^2 - 7}$

VERTICAL REFLECTION

$-\frac{1}{(x-7)^2} + 3$

19. The point $(2, -8)$ lies on the graph of f . If the graph of f is compressed vertically by a factor of $\frac{1}{5}$ and stretched horizontally by a factor of 11, what point must lie on the transformed graph?

$(2, -\frac{8}{5})$ multiply y by $-\frac{1}{5}$

$(22, -\frac{8}{5})$ multiply x by 11

20. Let $f(x) = e^x$. Which of the following could describe how the function $g(x) = 5e^{6(x-3)}$ transforms the graph of f ? (More than one will apply.)

Horizontal Comp SF 1/6
Vertical Stretch SF 5
Translation Right 3

- A) The graph of f is compressed horizontally by a factor of $\frac{1}{6}$, then shifted to the right 3 units and stretched vertically by a factor of 5.

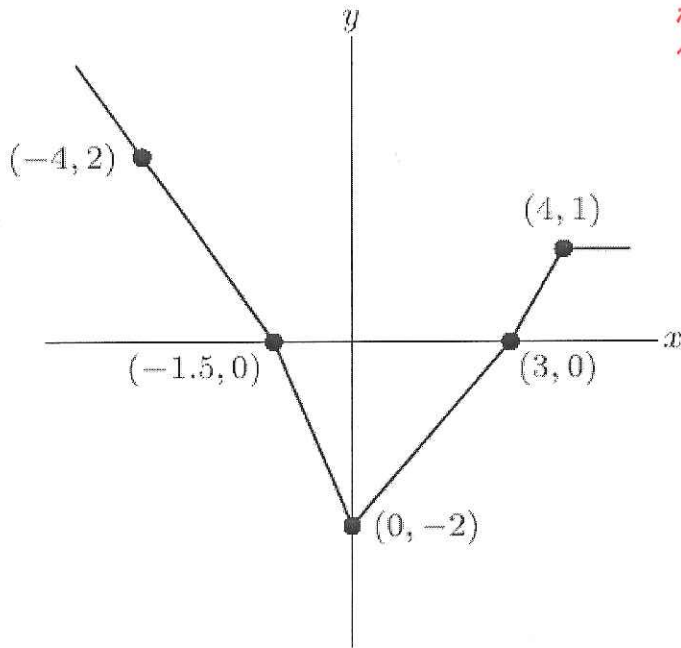
- B) The graph of f is shifted to the right 3 units, then compressed horizontally by a factor of $\frac{1}{6}$ and stretched vertically by a factor of 5.

- C) The graph of f is shifted 18 units to the right, and then compressed horizontally by a factor of $\frac{1}{6}$ and stretched vertically by 5.

$g(x) = 5e^{6x-18}$
Translate right 18 first then horizontal comp SF 1/6

- D) The graph of f is stretched vertically by a factor of 5, and compressed horizontally by a factor of $\frac{1}{6}$.

21. Below is a graph of the function $f(x)$. If you were to sketch a graph of $y = -f(x+1) + 6$, what point would the point $(-1.5, 0)$ correspond to?



TRANSLATE LEFT 1
REFLECT VERTICALLY ABOUT X-AXIS
TRANSLATE UP 6

$(-2.5, 0)$ (Sub 1 from x)
 $(-2.5, 0)$ (mult y by -1)
 $(-2.5, 6)$ (add 6 to y)

22. The graph of a function f has been shifted down 3 units, shifted 6 units to the right, and then stretched vertically by a factor of 9, and ^{stretched} compressed horizontally by a factor of 4. The new graph is produced by a function g . Find a formula for g in terms of f .

$$g(x) = f(x) - 3$$

$$g(x) = f(x-6) - 3$$

$$g(x) = 9(f(x-6) - 3)$$

$$g(x) = 9(f(\frac{1}{4}x-6) - 3)$$

$$g(x) = 9f(\frac{1}{4}x-6) - 27$$