p 031, q15

15. The graph of a function $y = f(x)$ is contained completely in the fourth quadrant. Copy and complete each statement.

a) If $y = f(x)$ is transformed to $y = -f(x)$, it will be in quadrant ■.

b) If $y = f(x)$ is transformed to $y = f(-x)$, it will be in quadrant ■.

c) If $y = f(x)$ is transformed to $y = 4f(x)$, it will be in quadrant ■.

d) If $y = f(x)$ is transformed to $y = f\left(\frac{1}{4}x\right)$, it will be in quadrant ■.

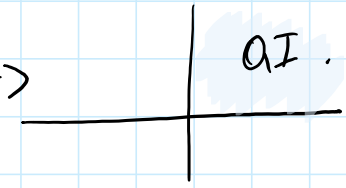
a)

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

flipped y-s

V. refl. into the x-axis

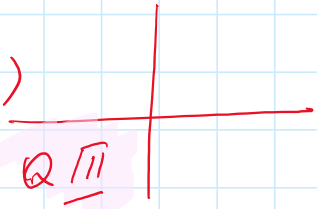
$\Rightarrow$



answer: QI.

b)

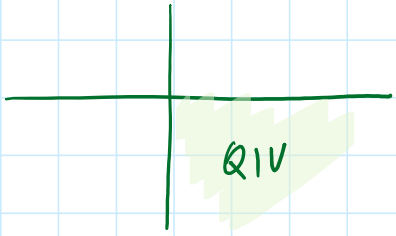
$g(x) = f(-x)$



x flipped; H. reflection into the y-axis

answer QIII

c)



$g(x) = 4f(x)$

a vertical stretch will not cross the quadrant b/c the parent function is totally contained in QIV, and there all y values

Examples

parent function is ... in QIV, and there all y values are negative.

When stretching those negative y-s by a factor of 4 we just move them lower into deeper negative y-s which will continue to reside in QIV.

Examples

y	4y
-1	-4
-2	-8
-3	-12
⋮	⋮

answer: QIV

d)

$g(x) = f\left(\frac{1}{4}x\right)$

this is a horiz. stretch by a factor of $\frac{1}{\frac{1}{4}} = 1 \cdot \frac{4}{1} = 4$

i.e. $(x, y) \to (4x, y)$

Since the $f(x)$ is completely in QIV, that means all x values are positive. This stretch moves the x values further to the Right and does nothing to y-s. Therefore, the transformation stays in QIV.

answer: QIV