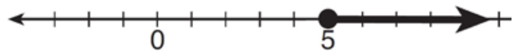
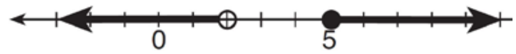
A.APR.D.7: Rational Inequalities

1 Which graph represents the solution set of $\frac{x+16}{x-2} \le 7$?

1) 

3) 

2) 

4) 

2 The cost (C) of selling x calculators in a store is modeled by the equation $C = \frac{3,200,000}{x} + 60,000$. The store profit ($P$) for these sales is modeled by the equation $P = 500x$. What is the minimum number of calculators that have to be sold for profit to be greater than cost?

A.APR.D.7: Rational Inequalities
Answer Section

1 ANS: 3

$$\frac{x+16}{x-2}-\frac{7(x-2)}{x-2}\le 0 \qquad -6x+30=0 \qquad x-2=0$$

$$\frac{-6x+30}{x-2}\le 0 \qquad -6x=-30 \qquad x=2$$

$$x=5$$

Check points such that $x<2$, $2<x<5$, and $x>5$. If $x=1$, $\frac{-6(1)+30}{1-2}=\frac{24}{-1}=-24$, which is less than 0. If $x=3$, $\frac{-6(3)+30}{3-2}=\frac{12}{1}=12$, which is greater than 0. If $x=6$, $\frac{-6(6)+30}{6-2}=\frac{-6}{4}=-\frac{3}{2}$, which is less than 0.

REF: 011424a2

2 ANS:

$$\frac{3,200,000}{x}+60,000<500x.$$

$$-500x+60,000+\frac{3,200,000}{x}<0$$

$$x-120-\frac{6,400}{x}>0$$

$$x^2-120x-6400>0$$

$$(x-160)(x+40)>0$$

$x-160<0$ and $x+40<0$.

$x<160$ and $x<-40$

$x<-40$

or

$x-160>0$ and $x+40>0$

$x>160$ and $x>-40$

$x>160$

161

REF: 080227b