p 234 q8

8. Determine the period (in degrees) of each function. Then, use the language of transformations to describe how each graph is related to the graph of $y = \cos x$.
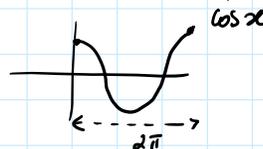
a) $y = \cos 2x$ **b)** $y = \cos(-3x)$

c) $y = \cos \frac{1}{4}x$ **d)** $y = \cos \frac{2}{3}x$

period f base functions is standard:

$$\cos x \rightarrow 2\pi$$

when Horiz. stretched th period is also stretched

$$\cos bx \rightarrow \text{new period} = \frac{2\pi}{|b|}$$

← periods hv no signs !

a) $2x \rightarrow P = \frac{2\pi}{2} = \pi = 180°$

Hl. stretch factor $= \boxed{\frac{1}{2}}$

b) $-3x \rightarrow P = \frac{2\pi}{3} =$ 2*180/3 = 120

Hl. stretch factor $= \boxed{\frac{1}{3}}$ & Hl. reflection into y-axis (y-axis= vertical = opposite of Horiz.)

c) $\frac{1}{4}x \rightarrow P = \frac{2\pi}{\frac{1}{4}} = 2\pi \cdot \frac{4}{1} = 8\pi$ = 8*180 = 1,440

Hl. stretch factor $= \frac{1}{\frac{1}{4}} = 1 \cdot \frac{4}{1} = \boxed{4}$

d) $\frac{2}{3}x \rightarrow P = \frac{2\pi}{\frac{2}{3}} = 2\pi \cdot \frac{3}{2} = 3\pi$ = 3*180 = 540

Hl. stretch factor $= \frac{1}{\frac{2}{3}} = 1 \cdot \frac{3}{2} = \boxed{\frac{3}{2}}$

8. a) Period is 180°; stretched horizontally by a factor of $\frac{1}{2}$ about the y-axis.
   b) Period is 120°; stretched horizontally by a factor of $\frac{1}{3}$ about the y-axis and reflected in the y-axis.
   c) Period is 1440°; stretched horizontally by a factor of 4 about the y-axis.
   d) Period is 540°; stretched horizontally by a factor of $\frac{3}{2}$ about the y-axis.