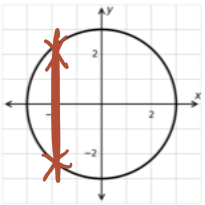
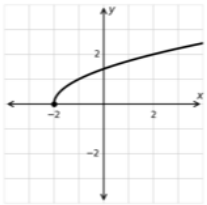
Self-Test

Work each problem in the space provided without your notes. Then check the answers box.

1. Use the Vertical Line Test. Is each graph a function?





(a) Yes / No *(b) Yes / No*

2. Determine the zeros algebraically: $f(x) = 2x^2 + x - 15$ and graphically.

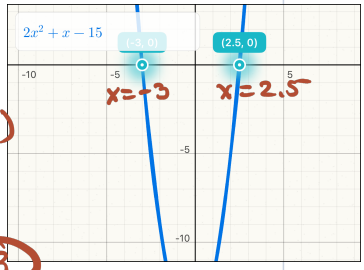
$f(x) = 2x^2 + x - 15$ (-30)

$= \frac{(2x-5)(2x+6)}{2}$

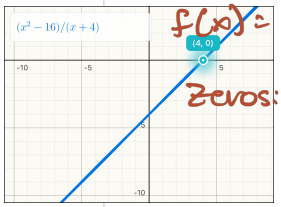
$= (2x-5)(x+3)$

$2x-5=0$ $x=-3$

$x = 5/2$



3. Determine the zeros algebraically $f(x) = \frac{x^2 - 16}{x + 4}$ and graphically.



$f(x) = \frac{x^2-16}{x+4}$ Domain $x+4 \neq 0$, $x \neq -4$

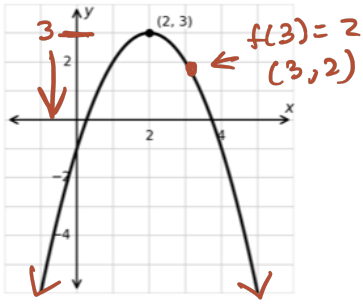
Zeros: set numerator $=0$

$x^2 - 16 = 0$

$(x-4)(x+4)$ ← $x=4$, $x \neq -4$

Zeros: $x = 4$

4. Use the graph of g.



Domain: $(-\infty, \infty)$

Range: $(3, -\infty)$

Increasing: $(-\infty, 2)$

Decreasing: $(2, \infty)$

Rel. max / min: $y = 3$

$f(3) =$ 2

5. f is a linear function with f(−2) = 11 and f(4) = −1. Find the rate of change (slope) of f.

$m = \frac{-1-11}{4-(-2)} = \frac{-12}{6} = -2$

m = −2

6. Find the average rate of change of $f(x) = x^3 - 2x$ from $x_1 = -1$ to $x_2 = 2$.

① $f(-1) = (-1)^3 - 2(-1)$ $= -1 + 2 = 1$

② $f(2) = (2)^3 - 2(2)$ $= 8 - 4 = 4$

③ A.R.o.C. $= \frac{4-1}{2-(-1)} = \frac{3}{3} = 1$

A.R.o.C. = 1

7. $f(x) = x^5 - 4x^3$ (Must show justification)

$f(-x) = (-x)^5 - 4(-x)^3$

$= -x^5 + 4x^3$

$-f(x) = -x^5 + 4x^3$

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

$f(-x) \neq f(x)$

Circle: Even Odd Neither

8. $f(x) = 2x^4 + x^2 - 7$. (Must show justification)

$f(-x) = 2(-x)^4 + (-x)^2 - 7$

$= 2x^4 + x^2 - 7$

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

Circle: Even Odd Neither

9. $f(x) = x^3 + 1$. (Must show justification)

$f(-x) = (-x)^3 + 1$

$= -x^3 + 1$

$-f(x) = -x^3 - 1$

$f(-x) \neq -f(x)$

$f(-x) \neq f(x)$

Circle: Even Odd Neither

10. Review: $f(x) = x^2 + 5$ determine the difference quotient: $\frac{f(x+h) - f(x)}{h}$

$f(x+h) = (x+h)^2 + 5$

$= x^2 + 2xh + h^2 + 5$

$-f(x) = -x^2 - 5$

$\frac{2xh + h^2}{h} = 2x + h$