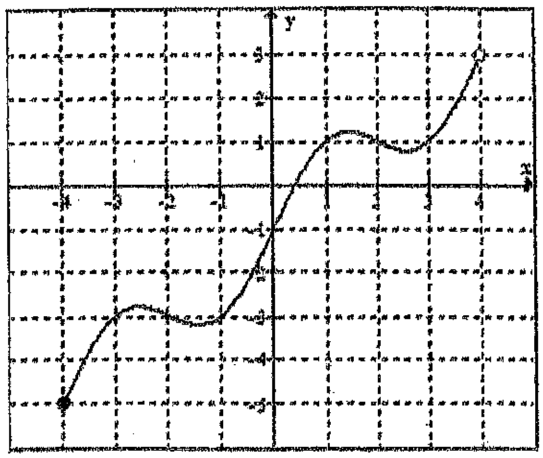
R U Ready 4 MTH 111?

Below are some skills you should have BEFORE taking MTH 111.

1) Use the graph of the function f(x) below to answer the questions.



f(x)

a) State the domain using interval notation.
b) State the range using interval notation.
c) Evaluate $f(2)$.
d) Solve $f(x) = 1$
e) Solve $f(x) \leq -1$

2) Algebraically determine the domain of $\sqrt{x+5}$. Sketch a graph and clearly label both x and y intercepts.

3) Find a linear function f(x) such that $f(-2) = 11$ and $f(4) = -1$.

4) Write $y = x^2 - 6x + 7$ in vertex form by completing the square. Identify the vertex. $y = a(x-h)^2 + k$

5) Solve $|-2x+7| > 1$ both symbolically and graphically. State the solution set using interval notation and sketch your graph to prove it.

6) Solve $\sqrt{2x+18}+3=x$ both algebraically and graphically.

7) Solve $-5<-2x+3<6$ algebraically and graph your solution set on a number line.

8) Solve for x by using the quadratic formula $x=\frac{-b\pm\sqrt{b^2-4ac}}{2a}$

$$5x^2-4x=-1$$

9) Solve for x by factoring: $x^2-5x+6=0$

10) Solve for x: $6|x+3|-3=21$

11) Solve for x: $1-\frac{3}{x-1}=\frac{-6}{x^2-1}$

Simplify:

12) $\frac{2x+4}{x^2-5x+6}\div\frac{x^2+4x+4}{4x-8}$

13) $\frac{x+2}{x-1}-\frac{x+3}{x+4}$

14) $\frac{\frac{1}{x}}{\frac{3}{x}+2}$

{SOLUTIONS}

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① a) $[-4, 4)$

b) $[-5, 3)$

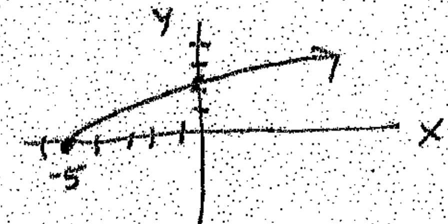
c) $f(2) = 1$

d) $f(x) = 1 \quad \{1, 2, 3\}$

e) $[-4, 0]$

② $x + 5 \geq 0$

$x \geq -5$



x int $(-5, 0)$

y int $(0, \sqrt{5})$

③ $f(-2) = 11 \qquad \dfrac{11-(-1)}{-2-4} = \dfrac{12}{-6} = -2$

$f(4) = -1$

$y = mx + B$

$-1 = (-2)(4) + B$

$-1 = -8 + B$

$+8 \quad +8$

$7 = B$

$\boxed{f(x) = -2x + 7}$

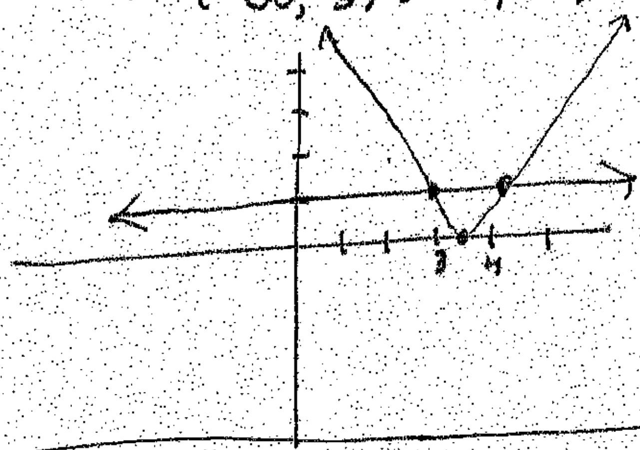
④ $\underbrace{x^2 - 6x + 9}$ $- 9 + 7$

$y = (x-3)^2 - 2$

$\boxed{V(3, -2)}$

⑤ $|-2x + 7| > 1$

$(-\infty, 3) \cup (4, \infty)$



⑥ $\sqrt{2x+18} + 3 = x$

$-3 \qquad -3$

$\left(\sqrt{2x+18}\right)^2 = (x-3)^2$

$2x + 18 = x^2 - 6x + 9$

$-2x \;\; -18 \qquad -2x \;\; -18$

$0 = x^2 - 8x - 9$

$0 = (x-9)(x+1)$

$x = 9, \cancel{-1}$

check... only $x = 9$ ✓

⑦ $-5 < -2x + 3 < 6$

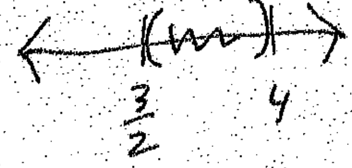
$-3 \qquad\quad -3 \quad -3$

$\dfrac{-8}{-2} < \dfrac{-2x}{-2} < \dfrac{3}{-2}$ FLIP!

$4 > x > \frac{3}{2}$

or

$\frac{3}{2} < x < 4$



M111 Ruggery 4

(8) $5x^2 - 4x = -1$

$+1 \quad +1$

$5x^2 - 4x + 1 = 0$

$a = 5$, $b = -4$, $c = 1$

$\dfrac{4 \pm \sqrt{16 - 4(5)(1)}}{10}$

$\dfrac{4 \pm \sqrt{-4}}{10}$

$\dfrac{4 \pm 2i}{10} = \dfrac{2(2 \pm i)}{10}$

$= \dfrac{2 \pm i}{5}$

(9) $x^2 - 5x + 6 = 0$

$(x-3)(x-2) = 0$

$x - 3 = 0 \quad x - 2 = 0$

$x = 3, \; x = 2$

(10) $6|x+3| - 3 = 21$

$+3 \quad +3$

$\dfrac{6}{6}|x+3| = \dfrac{24}{6}$

$|x+3| = 4$

$x + 3 = 4 \qquad x + 3 = -4$

$-3 \quad -3 \qquad -3 \quad -3$

$x = 1, \qquad x = -7$

(11) $\left[1 - \dfrac{3}{x-1} = \dfrac{-6}{(x+1)(x-1)}\right](x+1)(x-1)$

multiply by LCD $(x+1)(x-1)$ both sides of equation

$(x+1)(x-1) - 3(x+1) = -6$

$x^2 - 1 - 3x - 3 = -6$

$+6$

$x^2 - 3x + 2 = 0$

$(x-2)(x-1) = 0$

$x = 2, 1$ check $x = 2$ since 1 is not in DOMAIN.

(12) $\dfrac{2x+4}{x^2-5x+6} \div \dfrac{x^2+4x+4}{4x-8}$

$\dfrac{2(x+2)}{(x-3)(x-2)} \cdot \dfrac{4x-8}{x^2+4x+4}$

$\dfrac{2(x+2)}{(x-3)(x-2)} \cdot \dfrac{4(x-2)}{(x+2)(x+2)}$

$= \dfrac{8}{(x-3)(x+2)}, \; x \neq -2$

(13) $\dfrac{x+2}{x-1} - \dfrac{x+3}{x+4}$ get common denom

$\dfrac{(x+2)(x+4)}{(x-1)(x+4)} - \dfrac{(x+3)(x-1)}{(x+4)(x-1)}$

$= \dfrac{(x+2)(x+4) - (x+3)(x-1)}{(x+4)(x-1)}$

$= \dfrac{x^2 + 6x + 8 - (x^2 + 2x - 3)}{(x+4)(x-1)}$

$= \dfrac{4x + 11}{(x+4)(x-1)}$

(14) $\dfrac{1}{x} \div \left(\dfrac{3}{x} + \dfrac{2}{1}\right)$ ← common den

$\dfrac{1}{x} \div \left(\dfrac{3+2x}{x}\right)$

$\dfrac{1}{x} \cdot \dfrac{x}{(3+2x)} = \dfrac{1}{3+2x}, \; x \neq 0$