Answer Key Mid-Term 1

1. $\frac{14x+6y+8}{2}=$ $\frac{14x}{2}+\frac{6y}{2}+\frac{8}{2}=7x+3y+4$	2. $(4x+10)-(7x-6)=4x+10-7x+6=$ $4x-7x+10+6=-3x+16$
3. Using FOIL $(2x-3)(x+5)=2x^2+10x-3x-15=$ $2x^2+7x-15$	4. $A\cap B=\{3,4\}$
5. Using FOIL $(4+3i)(2-i)=8-4i+6i-3i^2=$ $8+2i-3i^2$ Since $i^2=-1$ $8+2i-3i^2=8+2i+3=11+2i$	6. $\{x\mid -5\le x<-2\ or\ x>3\}$
7. $[-5,2)\cup(3,\infty)$	8. $\frac{(2x^3y^{-3}z^2)^2}{2x^2y^{-2}z}=\frac{2^2x^6y^{-6}z^4}{2x^2y^{-2}z}$ $=\frac{2^2}{2}\cdot\frac{x^6}{x^2}\cdot\frac{y^{-6}}{y^{-2}}\cdot\frac{z^4}{z}=$ $2x^4y^{-4}z^3=\frac{2x^4z^3}{y^4}$
9. $\frac{\sqrt{6^3}}{\sqrt{2}\cdot\sqrt{3^2}}=\sqrt{\frac{6^3}{2\cdot 3^2}}=\sqrt{\frac{6\cdot 6\cdot 6}{2\cdot 3\cdot 3}}=$ $\sqrt{\frac{6\cdot 6\cdot 6}{6\cdot 3}}=\sqrt{2\cdot 6}=\sqrt{2\cdot 2\cdot 3}=2\sqrt{3}$	10. $(x^{-12}y^{1/5})^{-5/6}=(x^{-12})^{-5/6}(y^{1/5})^{-5/6}=$ $x^{-12\cdot\frac{-5}{6}}y^{\frac{1}{5}\cdot\frac{-5}{6}}=x^{10}y^{-1/6}=\frac{x^{10}}{y^{1/6}}=\frac{x^{10}}{\sqrt[6]{y}}$
11. $-4<2x+6\le 10$ $-4-6<2x+6-6\le 10-6$ $-10<2x\le 4$ $-5<x\le 2$	12. $(x+1)^2=-(2+3x+x^2)$ $x^2+2x+1=-2-3x-x^2$ $2x^2+5x+3=0$ $(2x+3)(x+1)=0$ $x+1=0\to x=-1$ $2x+3=0\to x=-3/2$ $x=\left\{-1,\frac{-3}{2}\right\}$

13.

$$\frac{x}{x-2}+\frac{1}{x+2}=\frac{8}{x^2-4}$$

$$\frac{x}{x-2}+\frac{1}{x+2}-\frac{8}{x^2-4}=0$$

$$\frac{x}{x-2}\cdot\frac{x+2}{x+2}+\frac{1}{x+2}\cdot\frac{x-2}{x-2}-\frac{8}{x^2-4}=0$$

$$\frac{x^2+2x}{x^2-4}+\frac{x-2}{x^2-4}-\frac{8}{x^2-4}=0$$

$$\frac{x^2+2x+x-2-8}{x^2-4}=0$$

$$\frac{x^2+3x-10}{x^2-4}=0$$

$$x^2+3x-10=$$

$$(x-2)(x+5)=0$$

So x=2 and x=-5 are solutions, however since the original problem has x-2 in the denominator, it is not a valid solution.
x=-5 is the only solution

14.

a)

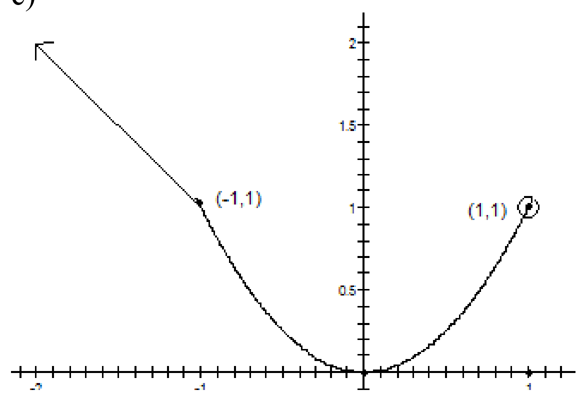
$$f(-4)=4$$

$$f(1)=\mathit{Undefined} \text{ however}$$

$$f(1)=1 \text{ is acceptable}$$

b) f is increasing on [0,1)

c)



15.

$$\frac{3x}{2-\sqrt{x}}\cdot\frac{2+\sqrt{x}}{2+\sqrt{x}}=\frac{6x+3x\sqrt{x}}{4-x}$$

16.

$$|2x-5|<8$$

if $2x-5\ge 0$	if $2x-5<0$
$2x-5<8$ $2x<13$ $x<\frac{13}{2}$	$-(2x-5)<8$ $2x-5>-8$ $2x>-3$ $x>\frac{-3}{2}$

$$\frac{-3}{2}<x<\frac{13}{2}$$

17.

$$x^3+4x^2+6x=0$$

$$x(x^2+4x+6)=0$$

So x=0 or

$$x^2+4x+6=0$$

Using the Quadradic formula

$$\frac{-4\pm\sqrt{16-20}}{2}=-2\pm\sqrt{2i}$$

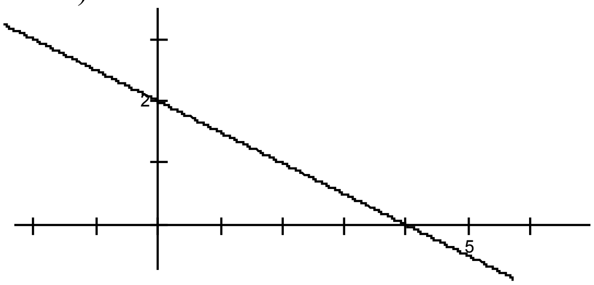
So $\{0,2+\sqrt{2}i,2-\sqrt{2}i\}$

18.

a) $y=-\frac{1}{2}x+2$

b) $m=-\frac{1}{2}$

c) y-intercept = 2

18. d)  	19. Since parallel lines have the same slope, the new equation has the form $y=-2x+b$ Plugging in (4,6) we find $6=-8+b$ $b=14$ So the new equation is $y=-2x+14$
20. $D=\sqrt{(8-5)^2+(4-8)^2}=\sqrt{9+16}=$ $\sqrt{25}=5$	21. $MP=\left(\frac{5+8}{2},\frac{8+4}{2}\right)=\left(\frac{13}{2},6\right)$
22. This question was worded wrong. It should have been, What is the average rate of change of the function? Extra credit answers were Average Rate of Change $\frac{f(4)-f(2)}{4-2}=\frac{19-7}{2}=6$ or Net Rate of Change $f(4)-f(2)=19-7=12$	23. Is a function: Domain = [2,20] Range = [2,5]
23. Is not a function, fails the vertical line test	