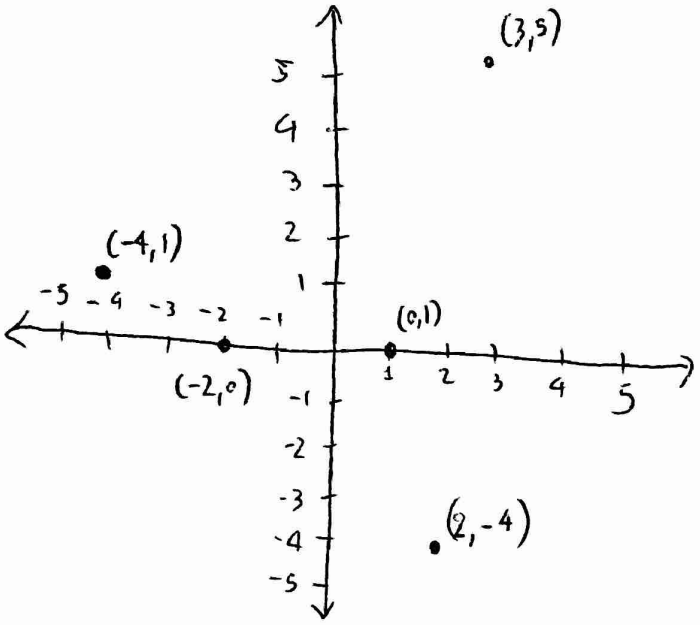
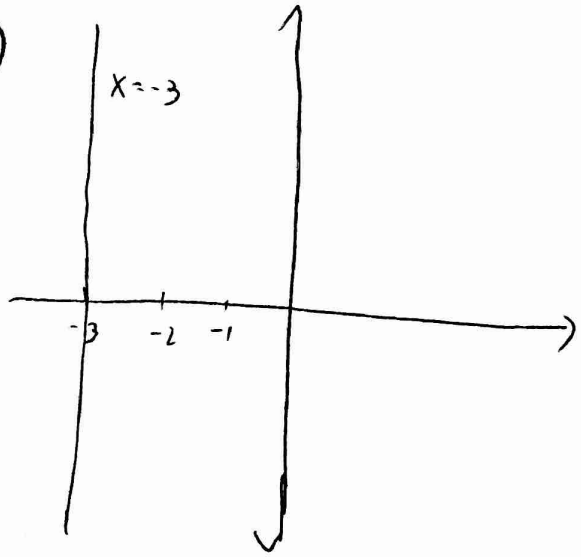
MATH 2 HW 4

Additional problems

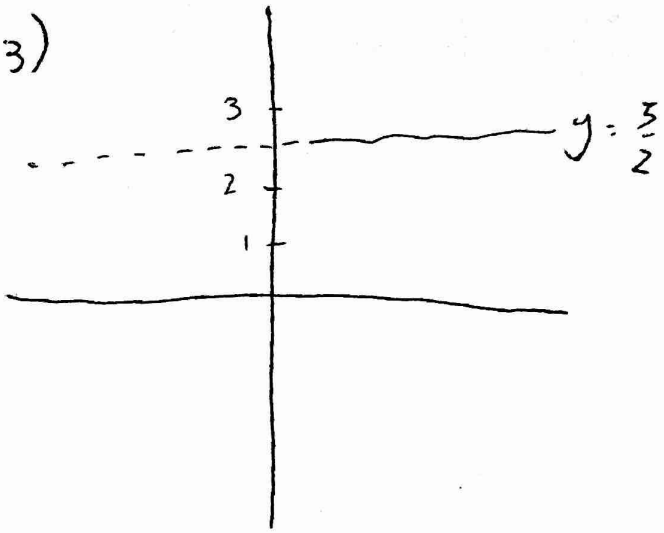
1)



2)



3)



3.3

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

$\Rightarrow x^2-9=0$ or $x+6=0$

$x^2-9=0$

$\hookrightarrow (x-3)(x+3)=0$

$x=3$ or $x=-3$

$x+6=0$

$x=-6$

---

3 solutions

$x=3,-3,-6$

---

9) $(x^2+1)(\frac{x}{3}-4)=0$

$x^2+1=0$ or $\frac{x}{3}-4=0$

$x^2+1=0$

$x^2=-1$

$x=i$ or $-i$

$\frac{x}{3}-4=0$

$\frac{x}{3}=4 \Rightarrow x=12$

3 solutions:

$x=i,-i,12$

---

10) $(x^2+4x-5)(3x^2-81)=0$

$x^2+4x-5=0$ or $3x^2-81=0$

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

$(x+5)(x-1)=0$

$x=-5,1$

$3x^2-81=0$

$x^2-27=0$

$x=\pm\sqrt{27}$

$=\pm 3\sqrt{3}$

4 answers

$x=1,-5,3\sqrt{3},-3\sqrt{3}$

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18) $(\sqrt{2x}-3)^3+1=0$

$(\sqrt{2x}-3)^3=-1$

$\sqrt[3]{}$ on both sides

$\sqrt{2x}-3=\sqrt[3]{-1}$

$\sqrt{2x} - 3 = -1$

$\sqrt{2x} = 2$

square on both sides.

$2x = 4$

$\boxed{x = 2}$

---

19) $\left(\frac{1}{\sqrt{x}} - 3\right)^4 - 1 = 0$

$\left(\frac{1}{\sqrt{x}} - 3\right)^4 = 1$

$\sqrt[4]{\quad}$ on both sides

$\frac{1}{\sqrt{x}} - 3 = 1$ or -1 ***

see comment

$\boxed{\frac{1}{\sqrt{x}} - 3 = 1}$

$\frac{1}{\sqrt{x}} = 4$

$\sqrt{x} = \frac{1}{4}$

$x = \frac{1}{16}$

$\boxed{\frac{1}{\sqrt{x}} - 3 = -1}$

$\frac{1}{\sqrt{x}} = 2$

$\sqrt{x} = \frac{1}{2}$

$x = \frac{1}{4}$

2 solutions

$x = \frac{1}{4}, \frac{1}{16}$

---

when undoing $x^4 = 1$, the textbook says there are two cases:

$x = 1$ or $x = -1$,

which is actually not the case.

$x^4 = 1$ has 4 solutions:

$x = 1, -1, i$ and $-i$

to see that $x = i$ is a solution:

compute i^4

$i^4 = i \cdot i \cdot i \cdot i$

$= (i \cdot i) \cdot (i \cdot i)$

$= (-1) \cdot (-1) = 1$

so i is a solution to $x^4 = 1$

4.1

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

a) $f(2) = 2^3 + 2 \cdot 2 = 8 + 4 = 12$

b) $f(x+h) = (x+h)^3 + 2(x+h)$

$= x^3 + 3x^2h + 3xh^2 + h^3 + 2x + 2h$

c) $f(-x) = (-x)^3 + 2(-x)$

$= -x^3 - 2x$

---

2) $u(t) = \frac{1}{2}t^2 + t$

a) $u(2) = \frac{1}{2} \cdot 2^2 + 2 = 2 + 2 = 4$

b) $u(t+\Delta t)$

$= \frac{1}{2}(t+\Delta t)^2 + (t+\Delta t)$

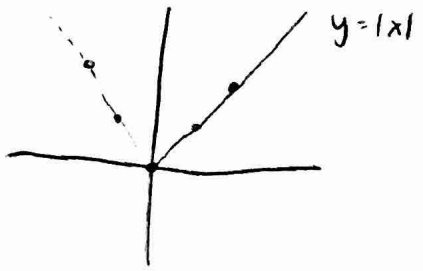
$= \frac{1}{2}(t^2 + 2t\Delta t + (\Delta t)^2) + t + \Delta t$

$= \frac{1}{2}t^2 + t\Delta t + \frac{1}{2}(\Delta t)^2 + t + \Delta t$

3) $|0| = 0$

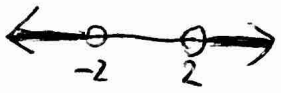
a) $|1| = 1 \quad |-1| = 1$

$|2| = 2 \quad |-2| = 2$



b) $|x| > 2$ when

$x > 2$ or $x < -2$



c) Domain = all real number

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8) $f(x) = \sqrt{x+2} - 3$

Domain: $x + 2 \geq 0$

$x \geq -2$

$= [-2, \infty)$

---

11) a) April = P(4) = 0.3

June = P(6) = 0.1

b) yes! b/c foreach x, there is P(x) associated to it.

c) $x = 2, 4, 7, 12$

(4)

4.2

#6) point-slope formula:

$$y - y_1 = m(x - x_1)$$

$$y - 7 = \frac{2}{3}(x - 2)$$

$$y = \frac{2}{3}x - \frac{4}{3} + 7$$

$$\boxed{y = \frac{2}{3}x - \frac{17}{3}}$$

---

7) $y - 2 = -6(x - (-3))$

$$y - 2 = -6(x + 3)$$

$$y = -6x - 18 + 2$$

$$\boxed{y = -6x - 16}$$

---

8) $m = \frac{1 - 2}{-2 - 1} = \frac{-1}{-3} = \frac{1}{3}$

$$(y - 2) = \frac{1}{3}(x - 1)$$

$$y - 2 = \frac{1}{3}x - \frac{1}{3}$$

$$y = \frac{1}{3}x + \frac{5}{3}$$

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9) $m = \frac{4 - 1}{-1 - 2} = \frac{3}{-3} = -1$

$$(y - (4)) = -1(x - (-1))$$

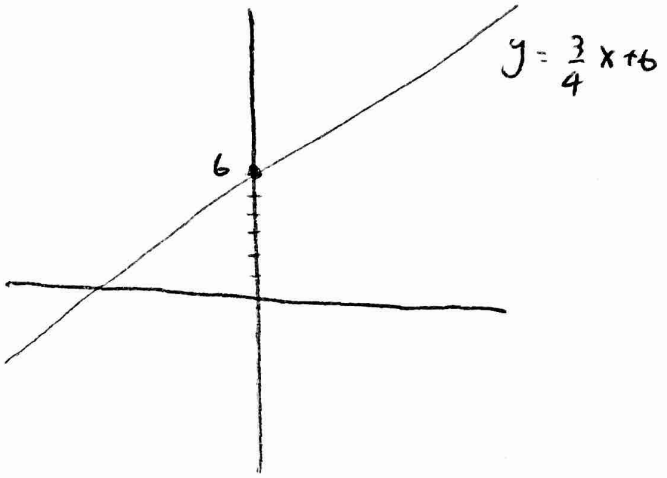
$$y - 4 = -x - 1$$

$$\boxed{y = -x + 3}$$

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10) $4y = 3x + 24$

$$y = \frac{3}{4}x + 6$$

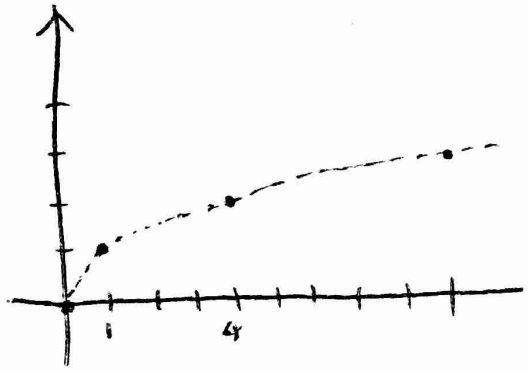


4.3

1) $f(x) = \sqrt{x}$

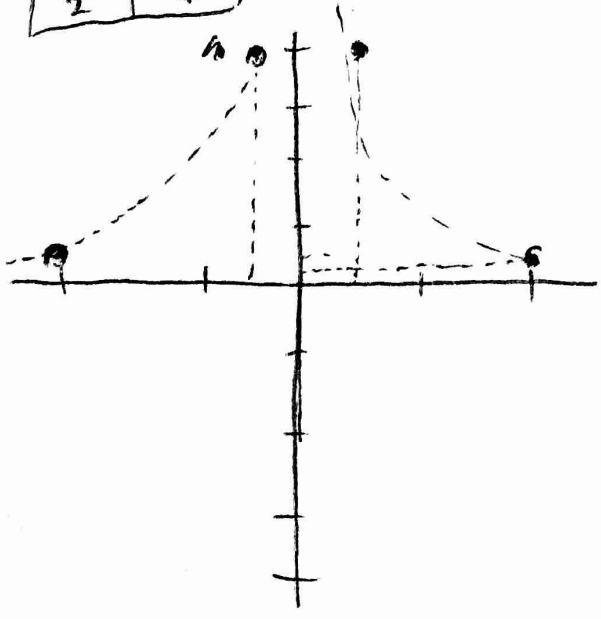
$x = 0, 1, 4, 9$

$f(x) = 0, 1, 2, 3$



5) $g(x) = \frac{1}{x^2}$

x	g(x)
-2	$\frac{1}{4}$
$-\frac{1}{2}$	4
$\frac{1}{2}$	4
2	$\frac{1}{4}$



6) $w(x) = x^{-3} = \frac{1}{x^3}$

x	f(x)
-2	$-\frac{1}{8}$
$-\frac{1}{2}$	-8
$\frac{1}{2}$	8
2	$\frac{1}{8}$

