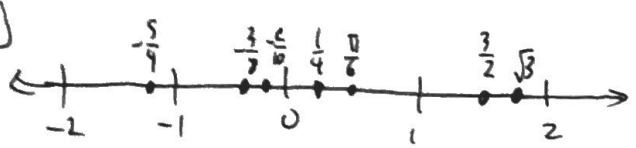
MA 202 Exam 1 Review Solutions

1)



2) a) Because the integers are: $\frac{a}{b}\cdot\frac{c}{d}=\frac{ac}{bd}$ is a rational number since ac, bd are integers and $bd\neq 0$ if b and $d\neq 0$.

b) $\frac{1}{3}-\frac{2}{3}=-\frac{1}{3}$. For rationals, $\frac{a}{b}-\frac{c}{d}=\frac{ad-bc}{bd}$ is rational since $ad-bc, bd$ are integers.

3) Final elevation is $3(-4\frac{3}{5})+8\frac{1}{2}=3\left(-\frac{23}{5}\right)+\frac{17}{2}=-\frac{69}{5}+\frac{17}{2}=-\frac{138}{10}+\frac{85}{10}=$ $\boxed{-\frac{53}{10}\text{ m}}$

4) Let x = length of the man's life. Then $\frac{1}{2}x=\frac{1}{4}x+\frac{1}{6}x+6$, so $\frac{1}{4}x-\frac{1}{6}x=6$, so $\frac{1}{12}x=6$, so $x=72$.

5) See book.

6) Find two irrationals between 1 and 6 and divide by 10.

e.g. $1<\sqrt{2},\sqrt{3}<6$.

$0.1<\frac{\sqrt{2}}{10},\frac{\sqrt{3}}{10}<6$.

7) False. The irrationals are by definition the real numbers that are not rational.

8) $\sqrt{2}+(-\sqrt{2})=0$.

9) a) Use Pythagorean Theorem repeatedly.

$1^2+1^2=r^2 \Rightarrow \boxed{r=\sqrt{2}}$, $1^2+(\sqrt{2})^2=s^2 \Rightarrow \boxed{s=\sqrt{3}}$, $1^2+(\sqrt{3})^2=t^2 \Rightarrow \boxed{t=\sqrt{4}=2}$

continuing: $\boxed{u=\sqrt{5}, v=\sqrt{6}, w=\sqrt{7}}$

b) The pattern will continue, with new longest hypotenuse $\boxed{\sqrt{9}=3}$

10) a) Sometimes.  but not 

b) True, (Always) Integers are rational numbers,

c) Sometimes. (True except with 0).

d) ~~Always~~ Sometimes. It is true if the hexagon is convex,

e) ~~Always~~ Sometimes  vs. 

f) Sometimes. Yes if equilateral, no otherwise.

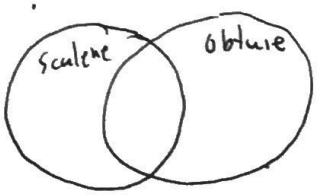
g) Always.

11] No, see HW.5 #34

12] a) Concave nonagon. $100+110+i+30+55+260+85+265+75 = 1260°$, $i = 280°$

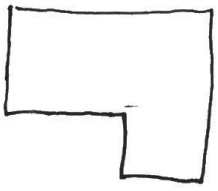
b) Concave quadrilateral. $60+30+25+c = 360°$, $c = 245°$

13]

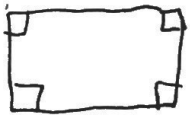


14]

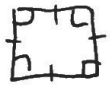
a) Plus variations on side length. So Many



b) ~~One~~ Just two:

 rectangles

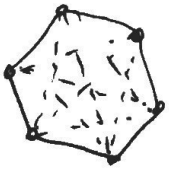
and

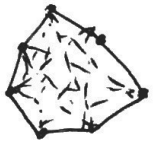
 squares.

15] n=3: 0 diagonals

n=4: 2 diagonals

n=5:  5 diagonals

n=6:  9 diagonals

n=7:  14 diagonals

In general, $\frac{n(n-3)}{2}$.