Name:	
MATH 101	"People make fun of the guy who stays
Fall 2021 HW 3: Due 09/24	home every night doing nothing. But the truth is that guy is a genius."
	– Ted Mosby, How I Met Your Mother

**Problem 1.** (2pt) What are the approximate values of  $\pi$  and e?

**Problem 2.** (2pt) You may have recalled in school that  $\pi \approx \frac{22}{7}$ . Is it possible to find integers a and b such that  $\pi = \frac{a}{b}$ ? Explain.

Problem 3. (8pt) Express the following rational numbers as a decimal. Show all your work.

(a) 
$$\frac{5}{4} =$$

(b) 
$$-\frac{1}{8} =$$

(c) 
$$\frac{170}{9}$$
 =

(d) 
$$\frac{13}{99} =$$

Problem 4.	(8pt)	Express t	the following	decimals	as r	ational	numbers,	reducing	your	rational	ex-
pression as	much a	as possibl	le and showin	ng all your	wo	rk:					

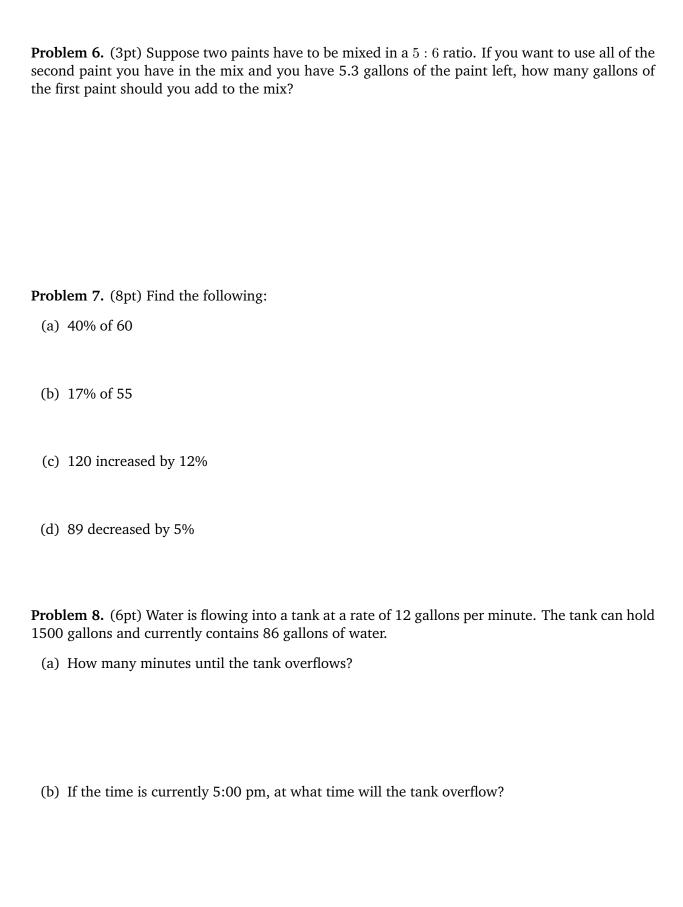
- (a) 3.0 =
- (b) -1.5 =
- (c) 1.25 =
- (d) -0.94 =

**Problem 5.** (9pt) Express the following decimals as a rational number, reducing your rational expression as much as possible and showing all your work:

(a)  $0.7777\overline{7}$ 

(b)  $0.212121\overline{21}$ 

(c)  $0.25555\overline{5}$ 



Problem 9.	(6pt)	The travel	distance	between	Sparkill,	NY a	and Boston,	MA is 20	)3 miles.	The spe	eed
limit on this	highv	vay is 65 n	nph.								

(a) How long will it take to travel from Sparkill, NY to Boston, MA using this highway?

(b) Is it possible to make the drive in 3 hours or less without speeding? Explain.

## **Problem 10.** (8pt) Convert the following:

(a) 165 lbs to kg [1 kg = 2.205 lb]

(b) 16 km to miles [1 mi = 1.609 km]

- (c) 3.6 ft/s to mph [5280 ft = 1 mi]
- (d)  $9.8 \text{ m/s}^2$  to ft/hr [1 m = 3.2808 ft]

**Problem 11.** (8pt) Write the following numbers as complex numbers:

(a) 
$$5 =$$

(b) 
$$\sqrt{-4} =$$

(c) 
$$\sqrt{16} =$$

(d) 
$$1 - \sqrt{-24} =$$

**Problem 12.** (12pt) Compute the following:

(a) 
$$(1+3i)+(-6+7i)=$$

(b) 
$$2i - (8 - 3i) =$$

(c) 
$$(1-i)(6+i) =$$

(d) 
$$(7+9i)^2 =$$

(e) 
$$\frac{10+i}{1-i} =$$

(f) 
$$\frac{16-12i}{(2i)^2} =$$