College Algebra — Joysheet 4
MAT 140, Fall 2023 — D. Ivanšić

Name: Saul Ocean

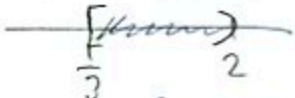
Covers: 1.5, 1.6 *Show all your work!*

Solve the inequalities. Write your solution in interval notation.

1. (5pts) $-2 < 4 - 3x \leq 3$ $|-4$

$-6 < -3x \leq -1$ $|\div(-3)$

$2 > x \geq \frac{1}{3}$



$[\frac{1}{3}, 2)$

2. (7pts) $2x + 1 < 7$ or $3x - 7 > 20$

$2x < 6$ $\quad 3x > 27$

$x < 3$ or $x > 9$

$(-\infty, 3) \cup (9, \infty)$

3. (6pts) Find the domain of the function in interval notation: $f(x) = \dfrac{\sqrt{4x+7}}{x-3}$.

Must have $4x+7 \geq 0$

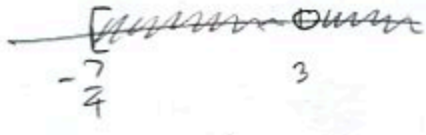
$4x \geq -7$

$x \geq -\frac{7}{4}$

Can't have

$x - 3 = 0$

$x = 3$



$[-\frac{7}{4}, 3) \cup (3, \infty)$

4. (14pts) Cab service Jiffy Jaunt charges \$2.25 cents per mile for a ride. Their competitor Speedy Sis charges \$7 for trips up to 2 miles, and then \$2.05 per mile for miles past 2. Suppose the trips you are considering are longer than 2 miles. For which number of miles is Speedy Sis the better deal? Solve as an inequality.

x = number of miles driven

JJ cost: $2.25x$

SS cost: $7 + 2.05(x-2)$

number of miles past 2

SS is better deal when

$7 + 2.05(x-2) \leq 2.25x$

$7 + 2.05x - 4.1 \leq 2.25x \quad |-2.05x$

$2.9 \leq 0.2x$

$x \geq \frac{2.9}{0.2} = 14.5$

SS is the better deal

for trips of more than 14.5 miles

5. (14pts) Hitchhiker Phil first catches a ride with a truck going 58 miles per hour. Luckily, shortly after he leaves the truck, he catches a ride in a car going 66 miles per hour, but rides in the car 30 minutes shorter than in the truck. After Phil leaves the car, he finds that he has traveled a total of 184 miles.
a) How much time did Phil spend in the truck and how much in the car ?
b) How far did he travel in the car?

truck ride — car ride

$d_1, 58, t$ $\quad d_2, 66, t-\frac{1}{2}$

$d_1 = 58t$

$d_2 = 66(t-\frac{1}{2})$

$d_1 + d_2 = 184$

$58t + 66(t-\frac{1}{2}) = 184$

$58t + 66t - 33 = 184 \quad |+33$

$124t = 217$

$t = \frac{217}{124} = 1.75$

a) Phil spent 1.75 hours in truck
1.25 hours in car

b) In car, he traveled
$d_2 = 66 \cdot 1.25 = 82.5$ miles

6. (14pts) Rudy, Sidney and Jeffrey share the cost of their lawyers, for which the bill was $285,000. Sidney pays twice the amount Rudy and Jeffrey pay together, and Rudy pays $10,000 more than Jeffrey. How much does each of them contribute to the bill?

Let x = amount Jeffrey pays, in thousands

$x+10$ = -- Rudy

$2(x+x+10)$ = -- Sidney

$x + x + 10 + 2(x+x+10) = 285$

$2x + 10 + 2(2x+10) = 285$

$2x + 10 + 4x + 20 = 285$

$6x + 30 = 285 \quad |-30$

$6x = 255$

$x = \frac{255}{6} = 42.5$

Jeffrey pays 42,500
Rudy pays 52,500
} total = 95,000

Sidney pays $2 \cdot 95{,}000 = 190{,}000$.