



ASSIGNMENTS and ANSWERS

dcm 4/15/2024

Except as noted, all problem numbers refer to the 3rd edition of the textbook (Fitts 2024).

Green text gives equivalent problems for the 2nd edition of the textbook (Fitts 2013).

Brown text gives equivalent problems for the 1st edition of the textbook (Fitts 2002).

The problem numbering convention follows: 1-7 means Chapter 1, Problem 7.

week	notes	assignment
1		1-7, 1-8, 1-9, 1-11 1-7, 1-8, 1-9, 1-11 <i>1-1, 1-2, 1-3, 1-6</i> → For last problem, <i>derive</i> equation with lecture Method #1.
2	Lab #1	2-3, 2-15, 2-17, 2-20, 2-21, 3-1, 3-4, 3-5 2-3, 2-15, 2-17, 2-20, 2-21, 3-1, 3-4, 3-5 <i>2-2, 2-7, 2-9, 2-11, 2-12, 3-1, 3-3, 3-4</i>
3		(see handout)
4		3-3, 3-6, 3-13, 3-14, 3-17, 6-20, 6-21, 6-22 7-16, 7-17, 7-18, 3-3, 3-6, 3-13, 3-14, 3-17 <i>6-11, 6-12, 6-13, 3-2, 3-5, 3-9, 3-10, 3-13</i>
5		7-1, 7-8, 7-12, 7-13, 7-18, 7-20, 7-21 6-1, 6-8, 6-12, 6-13, 6-18, 6-20, 6-21 <i>5-1, 5-3, 5-7, 5-8, 5-11, 5-12, 5-13</i>
6		(see handout)
7		(see handout)
8	Lab #2	(see handout)
9		6-1, 6-2, 6-6, 6-10, 6-11 7-1, 7-2, 7-6, 7-10, 7-11 <i>6-1, 6-2, 6-5, 6-6, 6-7</i>
10		(see handout)
11		10-1, 10-2, 10-4, 10-11(a-c) 10-1, 10-2, 10-4, 10-11(a-c) <i>9-1, 9-2, 9-3, 9-7(a-c)</i> → Plus article summary on groundwater contamination (see HW#7).
12		(see handout)
13		(see handout)
14	Lab #3	(see handout)

Answers ← Not here? Check the back of the book.

These partial answers will help determine whether you are on track. Some have been rounded.

Week 1

1-11, $G = 9.6 \times 10^5 \text{ ft}^3$ (not $9.4 \times 10^5 \text{ ft}^3$ as stated in the back of the book)

Week 2

2-3, at lake bottom, density $\rho = 1.0026 \text{ g/cm}^3$

2-17, *hints*, (a) flow from high head to low head, (b) flow seeks path of least resistance

2-21, head at Well C is 476.69 m.

3-1, $K = 2.8 \times 10^{-3} \text{ cm/s}$

Week 3

(answers included in homework assignment)

Week 4

3-3, *hint*, think about the “no slip boundary condition” in fluid mechanics

3-14(a), $T = 35 \text{ ft}^2/\text{d}$

6-22, $Q = 210 \text{ ft}^3/\text{d} \pm 20\%$

Week 5

7-8, *hints*, (a) where is the sediment thickest? (b) where are the farms?

7-12, *hint*, compressive soil rapidly drains to sand above, but does not drain to sand below

7-21, $\Delta h = -1.7 \text{ m}$

Week 6

Problem 2(f), $h_P = 118 \text{ m}$

Problem 2(g), $v = 0.00073 \text{ m/d}$ at 73° south of east

Week 7

6-15(c), $x_{\text{divide}} = 42.8 \text{ ft}$

Week 8

9-8, the bottom row of the 10×10 $h(x,y)$ grid is as follows [m]:

BC	1	2	3	4	5	6	7	8	9	10	BC
200	200.9	201.7	202.5	203.3	203.8	204.3	206.3	209.9	213.4	216.7	220

9-9, *hint*, use the default porosity of 0.25, and assume aquifer thickness $b = 1.00 \text{ m}$.

Week 9

6-2, $Q = 549 \text{ m}^3/\text{d}$

6-10, $1976 \text{ ft}^2/\text{d}$

Week 10

8-2, $K_h = 3.5 \text{ m/d}$

Week 11

10-1, *hints*, (a) more salt, more TDS (b) more time, more TDS

10-2, *hint*, think about the water in relation to its surroundings

10-11(b), total cations 8.91 meq/L , total anions 9.20 meq/L

Week 12

11-11, PCE $K_d = 0.56$ L/kg with data from 0-350 d, and 0.97 L/kg with data from 350-650 d.

11-16(a), diffusive flux 0.66 mg/m²/d

11-16(b), advective flux 4500 mg/m²/d

11-17, macrodispersive flux 220 mg/m²/d

Week 13

11-20(c), $dh/dx = -3.4 \times 10^{-3}$

11-21, $D_{mx} = 0.032$ m²/d, $D_{my} = 0.0035$ m²/d, $D_{mz} = 0.0021$ m²/d

Week 14

Problem 1(c), $I_x/L_x = 0.1$ and $I_y/L_y = 0.2$