

Written assignments  
to hand in.

Section 1.6

24, 32, 44, 50

Due Friday 10/6

Sec 1.6 Find all solutions.

⑥  $3x^3 - 6x^2 = 0$

$$3x^2(x-2) = 0$$

$$3x^2 = 0 \text{ OR } x-2 = 0$$

$$\boxed{x=0} \text{ OR } \boxed{x=2}$$

9+12 omit

⑮  $x^3 - 5x^2 + 6x = 0$

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

$$x(x-3)(x-2) = 0$$

$$\boxed{x=0} \text{ OR } x-3=0 \text{ OR } x-2=0$$

$$\boxed{x=3}$$

$$\boxed{x=2}$$

Discussion Problems  
From the department syllabus  
These are not to hand in.

Section 1.6, 1.8

WebAssign

Remember  
 $a^2 - b^2 = (a-b)(a+b)$

⑳  $x^3 - 5x^2 - 2x + 10 = 0$

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

$$x^2(x-5) - 2(x-5) = 0$$

$$(x^2 - 2)(x-5) = 0$$

$$(x-\sqrt{2})(x+\sqrt{2})(x-5) = 0$$

$$x-\sqrt{2} = 0, x+\sqrt{2} = 0, x-5 = 0$$

$$\boxed{x=\sqrt{2}} \text{ OR } \boxed{x=-\sqrt{2}} \text{ OR } \boxed{x=5}$$

㉒  $7x^3 - x + 1 = x^3 + 3x^2 + x$

↑  
move  
terms  
to the left side  
to get zero on right.

$$\textcircled{27} \quad \frac{1}{x-1} + \frac{1}{x+2} = \frac{5}{4} \quad \underline{\text{LCD}} \quad 4(x-1)(x+2)$$

$$4(x-1)(x+2) \left[ \frac{1}{x-1} + \frac{1}{x+2} \right] = \frac{5}{4} 4(x-1)(x+2)$$

$$\frac{4(x-1)(x+2)}{\cancel{x-1}} + \frac{4(x-1)(x+2)}{\cancel{x+2}} = 5(x-1)(x+2)$$

$$4(x+2) + 4(x-1) = 5(x-1)(x+2)$$

$$4x+8 + 4x-4 = 5(x^2+x-2)$$

$$\begin{array}{r} 8x+4 = 5x^2+5x-10 \\ -8x-4 \quad \quad -8x-4 \end{array}$$

$$0 = 5x^2 - 3x - 14$$

$$0 = (5x+7)(x-2)$$

$$5x+7=0 \quad \text{or} \quad x-2=0$$

$$\boxed{x = -\frac{7}{5}}$$

$$\boxed{x = 2}$$

30

$$\frac{2x}{x^2+1} = 1$$

LCD  $x^2+1$

$$\cancel{(x^2+1)} \frac{2x}{\cancel{x^2+1}} = x^2+1$$

$$2x = x^2+1$$

$$-2x \quad -2x$$

$$0 = x^2 - 2x + 1$$

$$0 = (x-1)(x-1) = (x-1)^2$$

$$x-1=0$$

$$\boxed{x=1}$$

32

$$\frac{x}{x+3} = \frac{2}{x-3} - \frac{1}{x^2-9}$$

step 1 Factor all denominators.

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

step 2 Find LCD.

⋮

36

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

example done in lecture.

35

$$\frac{x + \frac{2}{x}}{3 + \frac{4}{x}} = 5x$$

$$\boxed{\frac{\frac{A}{B}}{\frac{C}{D}} = \frac{A}{B} \cdot \frac{D}{C}}$$

$$\frac{x \frac{x}{x} + \frac{2}{x}}{3 \frac{x}{x} + \frac{4}{x}} = 5x$$

$$\frac{\frac{x^2}{x} + \frac{2}{x}}{\frac{3x}{x} + \frac{4}{x}} = 5x$$

$$\frac{\frac{x^2+2}{x}}{\frac{3x+4}{x}} = 5x$$

$$\frac{x^2+2}{x} \frac{x}{3x+4} = 5x$$

$$\frac{x^2+2}{3x+4} = 5x \quad \text{LCD } 3x+4$$

$$\cancel{(3x+4)} \frac{x^2+2}{\cancel{3x+4}} = 5x (3x+4)$$

$$x^2+2 = 15x^2+20x$$

$$-x^2-2 \quad -x^2-2$$

$$\frac{1}{2} (0 = 14x^2+20x-2)$$

$$0 = 7x^2+10x-1$$

$$x = \frac{-b \pm \sqrt{b^2-4ac}}{2}$$

$$a=7$$

$$b=10$$

$$c=-1$$

$$x = \frac{-10 \pm \sqrt{100+28}}{14}$$

$$x = \frac{-10 \pm \sqrt{128}}{14}$$

$$128 = 64 \cdot 2$$

$$X = \frac{-10 \pm 8\sqrt{2}}{14} = \frac{-5 \pm 4\sqrt{2}}{7}$$

$$\boxed{X = \frac{-5 + 4\sqrt{2}}{2}} \text{ or } \boxed{X = \frac{-5 - 4\sqrt{2}}{7}}$$

$$(42) \quad (\sqrt{4-6x})^2 = (2x)^2$$

$$4-6x = 4x^2$$

$$\frac{1}{2} (0 = 4x^2 + 6x - 4)$$

$$0 = 2x^2 + 3x - 2$$

$$0 = (2x-1)(x+2)$$

$$2x-1=0 \text{ or } x+2=0$$

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

$$\boxed{x = -2}$$

check

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

$$\sqrt{4-3} = 2\frac{1}{2}$$

$$\sqrt{1} = 1$$

✓

$$\underline{x = -2}$$

$$\sqrt{4+12} = 2(-2)$$

$$\sqrt{16} = -4$$

$$\cancel{4 = 4}$$

$$\textcircled{43} \quad \sqrt{2x+1} + 1 = x$$

-1      -1

$$\sqrt{2x+1} = x-1 \quad \text{isolate } \sqrt{\quad} \text{ on one side.}$$

$$\left(\sqrt{2x+1}\right)^2 = (x-1)^2$$

$$2x+1 = x^2 - 2x + 1$$

-2x-1      -2x-1

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

$$0 = x(x-4)$$

$$\boxed{\cancel{x=0}} \text{ or } \boxed{x=4}$$

Check  $\sqrt{2x+1} + 1 = x$

x=0

$$\sqrt{0+1} + 1 = 0$$

$$\sqrt{1} + 1 = 0$$

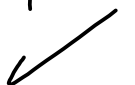
$$\cancel{2=0}$$

x=4

$$\sqrt{8+1} + 1 = 4$$

$$\sqrt{9} + 1 = 4$$

$$4 = 4$$



$$(49) \quad x^4 - 4x^2 + 3 = 0$$

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

$$(x^2 - 3)(x^2 - 1) = 0$$

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

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

This polynomial

is  $a^2 - 4a + 3 = 0$

where  $a = x^2$

$$(a - 3)(a - 1) = 0$$

(57)

$$\left(\frac{1}{x+1}\right)^2 - 2\left(\frac{1}{x+1}\right) - 8 = 0$$

$$a^2 - 2a - 8 = 0$$

$$(a - 4)(a + 2) = 0$$

$$\left(\frac{1}{x+1} - 4\right)\left(\frac{1}{x+1} + 2\right) = 0$$

$$\frac{1}{x+1} - 4 = 0 \quad \text{OR} \quad \frac{1}{x+1} + 2 = 0$$

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

$$1 = 4(x+1)$$

$$1 = 4x + 4$$

$$-3 = 4x$$

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

$$\frac{1}{x+1} = -2$$

$$1 = -2(x+1)$$

$$1 = -2x - 2$$

$$3 = -2x$$

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