

## 2.7 HOMEWORK HANDOUT: MULTI-STEP EQUATIONS

### PART A

1) State the operations, in order, that could be applied to both sides of the equation to solve for the unknown.

a)  $2x+1=7$    b)  $9t-5=22$    c)  $-2x+10=30$    d)  $-5=-3y-11$    e)  $13+8x=37$

2) Solve each equation in question 1 (find the value of the variable) and check each answer.

3) Solve and check in a)

a)  $2(x-4)=10$

b)  $8=2(3+y)$

c)  $2(4-3m)=32$

### PART B

4) Solve.

a)  $5x+8=23$

b)  $-6x-4=8$

c)  $26=3y+5$

d)  $-52=-2t+12$

e)  $31+7m=143$

f)  $50=8-6x$

g)  $18p-(-22)=22$

h)  $57=-x-22$

5) If  $6a-4=14$  and  $22=-14-3b$ , determine the value of  $5a-2b$ .

6) Solve. Do a formal check for b) and e).

a)  $3x+5+8=46$

b)  $3x-4-9x+18=44$

c)  $-4x+7x-4+12=-13-27$

d)  $3(1-2y)+y=2$

e)  $4=6-2(x+1)$

f)  $2(3x+4)+4(x-3)=6$

g)  $-2(3n-1)+2n=4$

h)  $-3(2-a)-a=1$

7) Solve.

a)  $(3x-4)+(5x+6)=42$

b)  $(9x+3)-(7x+7)=-84$

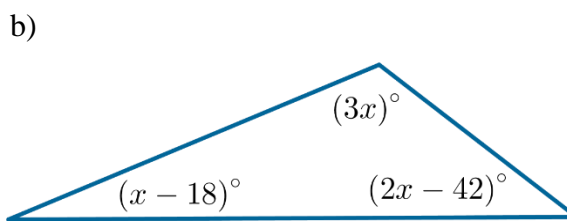
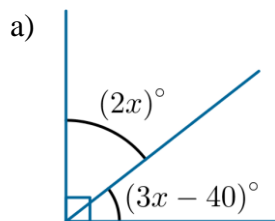
c)  $26=(4-3n)-(9n+14)$

d)  $2(p+1)-3(p-1)=0$

e)  $3(x-1)-2(x+1)=5$

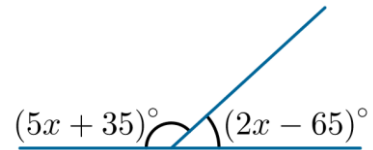
f)  $-2(1-x)+3(2-x)=0$

8) For each diagram, write an equation that can be used to determine the value of  $x$  and then use your equation to find the value of  $x$ .



**PART C**

9) Explain why there is no value of  $x$  that will satisfy the diagram on the right.



10) Solve.

a)  $x^2 - 3 = 6$    b)  $8x^2 = 32$    c)  $y^2 + 4 = -12$    d)  $-3n^2 = -75$    e)  $x^3 + 5 = -22$

11) Solve.

a)  $8x + 6 - 3x - 5x = 17$    b)  $-9y + 11y - 15 - 2y = -13 - 2$    c)  $x - 4x + 5x = 9 - 3^2$

**ANSWERS**

- 1) a) subtract 1, divide by 2   b) add 5, divide by 9   c) subtract 10, divide by -2  
d) add 11, divide by -3   e) subtract 13, divide by 8
- 2) a)  $x = 3$    b)  $t = 3$    c)  $x = -10$    d)  $y = -2$    e)  $x = 3$
- 3) a)  $x = 9$    b)  $y = 1$    c)  $m = -2$
- 4) a)  $x = 3$    b)  $x = -2$    c)  $y = 7$    d)  $t = 32$    e)  $m = 16$    f)  $x = -7$    g)  $p = 0$   
h)  $x = -79$
- 5) 39
- 6) a)  $x = 11$    b)  $x = -5$    c)  $x = -16$    d)  $y = \frac{1}{5}$    e)  $x = 0$    f)  $x = 1$    g)  $n = \frac{-1}{2}$    h)  $a = \frac{7}{2}$
- 7) a)  $x = 5$    b)  $x = -40$    c)  $n = -3$    d)  $p = 5$    e)  $x = 10$    f)  $x = 4$
- 8) a) A possible equation is  $2x + (3x - 40) = 90$ ;  $x = 26$   
b) A possible equation is  $3x + (x - 18) + (2x - 42) = 180$ ;  $x = 40$
- 9) The two indicated angles must add to  $180^\circ$  since they form a straight line. Therefore,  $(5x + 35) + (2x - 65) = 180$ . Solving this equation gives  $x = 30$ . Substituting  $x = 30$  in the original expressions for the two angles gives  $185^\circ$  and  $-5^\circ$ . These values do not correspond to the given diagram, which indicates an obtuse angle (between  $90^\circ$  and  $180^\circ$ ) and an acute angle (between  $0^\circ$  and  $90^\circ$ ). Therefore, no value of  $x$  will satisfy the given diagram.
- 10) a)  $x = 3$  or  $x = -3$    b)  $x = 2$  or  $x = -2$    c) no real solution   d)  $x = 5$  or  $x = -5$   
e)  $x = -3$
- 11) a) no solution   b) infinitely many solutions   c)  $x = 0$