

## Fourth Set of Homework for Math 05

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**Please note:** You should fully justify your answers.

### 1 Translating to algebra

- Write an algebraic expression for each of the following English phrases. If you introduce variables, state clearly what the stand for.
  - The product of negative eight and an unknown number.
  - The quotient of  $x$  and 3.
  - Three fifths of an unknown number.
  - The difference of negative nine and the product of  $-4$  and  $a$ .
  - The sum of a number and its square.
  - Three times a number is subtracted from five.
  - Seven less than twice the sum of an unknown number and six.
  - The third power of a number is subtracted from the product of eight and the number.
  - Eleven more than the square of the sum of twice a number and three.
  - The difference of the quotient of the sum of twice a number and three and seven and seven times the sum of the number and six.
- Translate the following sentences into Mathematics. If you introduce variables, state clearly what the stand for.
  - The sum of two consecutive integers is nine.
  - The product of two consecutive integers is equal to twenty two more than ten times the smaller of the two numbers.
  - The width of a rectangle is three more than twice its length.
  - Three times the sum of a number and six equals the difference of the number and eight.
  - The sum of twice a number and twenty is smaller than three times the number plus seven.
  - The difference of two thirds of an unknown number and eleven is greater than the sum of five halves of the number and nine.
  - The absolute value of five less than six times a number is equal to twenty three.

### 2 Solving Linear equation in one unknown

- Is the given value a solution to the given equation?
  - $2x - 7 = 3x - 11$ ;  $x = -4$
  - $3x - 4 = 8x - 9$ ;  $x = 1$
  - $3x - 4 = 8x - 9$ ;  $x = -1$
  - $3x - 7 = 2 - 7x$ ;  $x = \frac{9}{10}$
  - $5x + 10 = \frac{1}{2}$ ;  $x = -\frac{1}{2}$
  - $3x - 4 = 7x + -94$ ;  $x = -9$

- (g)  $5(2x - 6) = 3x - 11; \quad x = 3$
- (h)  $x^2 - x = 6; \quad x = -3$
- (i)  $x^3 - 2x^2 = x - 2; \quad x = 1$
- (j)  $x^3 - 2x^2 = x - 2; \quad x = -1$
- (k)  $x^3 - 2x^2 = x - 2; \quad x = 2$

2. Solve each of the following linear equations. After solving you should verify your solution by substituting into the equation.

- (a)  $2x = -8$
- (b)  $3x = 5$
- (c)  $-7x = 0$
- (d)  $-11x = 66$
- (e)  $-x = 3$
- (f)  $-5x = -75$
- (g)  $\frac{3}{2}x = 5$
- (h)  $\frac{5}{7}x = -\frac{3}{4}$
- (i)  $x + 3 = -5$
- (j)  $x - 7 = 11$
- (k)  $x - \frac{2}{3} = -\frac{5}{6}$
- (l)  $-5x + 7 = 0$
- (m)  $11x - 8 = -8$
- (n)  $7x - 8 = 13$
- (o)  $\frac{1}{2}x - 2 = -3$
- (p)  $-8x - 3 = 7$
- (q)  $-x + 3 = -\frac{5}{2}$
- (r)  $\frac{3}{4}x - \frac{2}{3} = -\frac{7}{12}$

3. What is the value of the real number  $a$  if  $x = -2$  is a solution to the following equation:

$$ax = 3x - 4$$

4. Find the real number  $b$  if  $x = 3$  is a solution to the following equation:

$$x^2 - 7 = bx$$