b) If the area of the cross-section is 260 cm^2, determine the value of x.

Complete Assignment Questions #5 - #10

Assignment

1. Solve the equation.

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

   $x = 2, -7$

   b) $(3x - 2)(2x + 5) = 0$

   $x = \frac{2}{3}, -\frac{5}{2}$

   c) $5x(10 - x) = 0$

   $x = 0, 10$

   d) $x^2 + 2x = 0$

   $x(x + 2) = 0$

   $x = 0, -2$

   e) $x^2 - 121 = 0$

   $(x - 11)(x + 11) = 0$

   $x = \pm 11$

   f) $9x^2 - 100 = 0$

   $(3x - 10)(3x + 10) = 0$

   $x = \pm 10/3$

   g) $36x^2 = 25$

   $36x^2 - 25 = 0$

   $(6x - 5)(6x + 5)$

   $x = \pm 5/6$

   h) $9x - 4x^2 = 0$

   $x(9 - 4x) = 0$

   $x = 0, 9/4$

   i) $4(49 - x^2) = 0$

   $4(7 - x)(7 + x) = 0$

   $x = \pm 7$

2. Solve the equation.

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

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

   $x = 2, 1$

   b) $x^2 + 13x + 30 = 0$

   $(x + 10)(x + 3) = 0$

   $x = -10, -3$

   c) $x^2 + 2x - 15 = 0$

   $(x + 5)(x - 3) = 0$

   $x = -5, 3$

d) $3x^2 - 10x + 3 = 0$

$3x^2 - 9x - 1x + 3$

$3x(x-3) - 1(x-3)$

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

$x = \frac{1}{3}, 3$

e) $2x^2 + 3x - 35 = 0$

$2x^2 + 10x - 7x - 35$

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

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

$x = \frac{7}{2}, -5$

f) $15 - 2x - x^2 = 0$

$-x^2 - 2x + 15 = 0$

$x^2 + 2x - 15 = 0$

$(x+5)(x-3) = 0$

$x = -5, 3$

3. Solve the equation.

a) $2x^2 + 5x = 7$

$2x^2 + 5x - 7 = 0$

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

$x(2x+7) - 1(2x+7)$

$(x-1)(2x+7) = 0$

$x = 1, -\frac{7}{2}$

b) $6x^2 = 7x + 3$

$6x^2 - 7x - 3 = 0$

$6x^2 - 9x + 2x - 3 = 0$

$3x(2x-3) + 1(2x-3)$

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

$x = -\frac{1}{3}, \frac{3}{2}$

c) $x(x+4) = 32$

$x^2 + 4x - 32 = 0$

$(x+8)(x-4) = 0$

$x = 8, 4$

d) $(x-3)(2x+3) = 5$

$2x^2 + 3x - 6x - 9 = 5$

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

$2x^2 - 7x + 4x - 14 = 0$

$x(2x-7) + 2(2x-7)$

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

$x = -2, \frac{7}{2}$

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

$4x^2 - 12x + 9 = 1$

$4x^2 - 12x + 8 = 0$

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

$4(x-2)(x-1) = 0$

$x = 2, 1$

f) $(x+1)(x-1) = 5(x+1)$

$x^2 - 1 = 5x + 5$

$x^2 - 5x - 6 = 0$

$(x-6)(x+1) = 0$

$x = 6, -1$

4. Solve the equation.

a) $6a^2 - 7 - 19a = 0$

$6a^2 - 19a - 7 = 0$

$6a^2 - 21a + 2a - 7 = 0$

$3a(2a-7) + 1(2a-7) = 0$

$(3a+1)(2a-7)$

$a = -\frac{1}{3}, \frac{7}{2}$

b) $21 - 8k - 2k^2 = 2k^2$

$0 = 4k^2 + 8k - 21$

$= 4k^2 - 6k + 14k - 21$

$2k(2k-3) + 7(2k-3)$

$(2k+7)(2k-3)$

$k = -\frac{7}{2}, \frac{3}{2}$

5. The diagram shows a piece of wood of uniform width x cm. $RS = 10$ cm and $ST = 7$ cm.

a) Find the area of the piece of wood in terms of x.
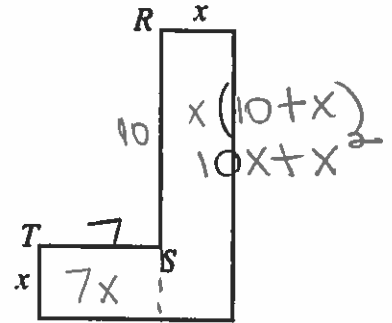
$$7x + 10x + x^2$$
$$A = 17x + x^2$$

b) Find the value of x if the area is 60 cm².

$$17x + x^2 = 60$$
$$x^2 + 17x - 60 = 0$$
$$(x + 20)(x - 3) = 0 \quad x = -20, 3 \quad x = 3$$

[Diagram: L-shaped wood piece labeled R, x at top, 10 on left side, $x(10+x)$, $10x + x^2$; T, 7, S with x and 7x at bottom]

6. Consider the arithmetic series $2 + 5 + 8 + ...$.
Determine the number of terms of the series required to give a sum of 222 by developing and solving a quadratic equation.

7. The height of a triangle is 8 mm more than the base. The area is 172.5 mm². $A = \dfrac{bh}{2}$

a) Write a polynomial equation to model this information.

$$h = x + 8 \quad 172.5 = \frac{x(x+8)}{2}$$
$$b = x$$

$$345 = x^2 + 8x$$
$$x^2 + 8x - 345 = 0$$
$$(x + 23)(x - 15) \quad x = -23, 15 \quad x = 15$$

b) Determine the height of the triangle.

$$\text{height} = 23$$

$$h = 23$$

Multiple Choice

8. The complete solution to the equation $x(x - 1) = 2$ is

A. $x = 0$ and $x = 1$

B. $x = 2$ and $x = 3$

C. $x = -1$ and $x = 2$

D. $x = -2$ and $x = 1$

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

Numerical Response 9. The equation $24x^2 + 2x = 15$ has solutions $x = a$ and $x = -b$, where a and b are positive rational numbers. The value of b, to the nearest hundredth, is _____.

(Record your answer in the numerical response box from left to right.)

$$\boxed{0}\ .\ \boxed{8}\ \boxed{3}$$

$$24x^2 + 2x - 15 = 0 \qquad \overset{\#}{+2}\,{}^{-360}$$

$$24x^2 + 20x - 18x - 15 = 0 \qquad 20, -18$$

$$4x(6x+5) - 3(6x+5) = 0$$

$$(4x-3)(6x+5)$$

$$x = 3/4,\ -5/6$$

10. The sum of the first n natural numbers is given by the formula $S = \frac{1}{2}n(n+1)$. If the first k natural numbers have a sum of 496, the value of k is _____.

(Record your answer in the numerical response box from left to right.)

$$\boxed{\ }\ \boxed{\ }\ \boxed{\ }\ \boxed{\ }$$

Answer Key

1. a) $2, -7$ b) $\frac{2}{3}, -\frac{5}{2}$ c) $0, 10$ d) $0, -2$
   e) ± 11 f) $\pm\frac{10}{3}$ g) $\pm\frac{5}{6}$ h) $0, \frac{9}{4}$ i) ± 7

2. a) $1, 2$ b) $-10, -3$ c) $-5, 3$ d) $\frac{1}{3}, 3$ e) $-5, \frac{7}{2}$ f) $-5, 3$

3. a) $-\frac{7}{2}, 1$ b) $-\frac{1}{3}, \frac{3}{2}$ c) $-8, 4$ d) $-2, \frac{7}{2}$ e) $1, 2$ f) $-1, 6$

4. a) $-\frac{1}{3}, \frac{7}{2}$ b) $-\frac{7}{2}, \frac{3}{2}$ 5. a) $x^2 + 17x$ cm^2 b) 3

6. 12 7. a) $x^2 + 8x - 345 = 0$ b) 23 mm

8. C 9. $\boxed{0}\ \boxed{.}\ \boxed{8}\ \boxed{3}$ 10. $\boxed{3}\ \boxed{1}\ \boxed{\ }\ \boxed{\ }$