WCP Math 10. Review Equation Solving Worksheet. Name: Corrections

Solving Quadratics:

a) $2x^2 + 1 = x^2 + 10$ $x = \pm 3$

b) $3x^2 + 1 = 26 - x^2$ $4x^2 = 25$ $x = \pm 5/2$

c) $m^2 + 2 = 9$ $m = \pm\sqrt{7}$

d) $9x^2 - 2 = 6$ $x = \pm \frac{2\sqrt{2}}{3}$

e) $x^2 + 4x = 0$ $x(x+4) = 0$ $x = 0, -4$

f) $2x^2 = 5x$ $2x^2 - 5x = 0$ $x(2x-5) = 0$ $x = 0, 5/2$

g) $x^2 - x = 6$ $x^2 - x - 6 = 0$ $(x-3)(x+2) = 0$ $x = 3, -2$

h) $x^2 + 25 = -10x$ $x^2 + 10x + 25 = 0$ $(x+5)(x+5) = 0$ $x = -5$

i) $5x^2 - 20x + 15 = 0$ $x^2 - 4x + 3 = 0$ $(x-3)(x-1) = 0$ $x = 3, 1$

j) $2x^2 + 7x + 3 = 0$ $(2x+1)(x+3) = 0$ $x = -1/2, -3$

2 11
1 | 3

Quadratic Word Problems

1. The sum of the squares of two consecutive integers is 145. Find the integers. $x, x+1$

$x^2 + (x+1)^2 = 145$
$x^2 + x^2 + 2x + 1 = 145$
$2x^2 + 2x - 144 = 0$
$x^2 + x - 72 = 0$
$(x-8)(x+9) = 0$
$x = 8, -9$

8, 9
-8, -9

2. A strip of paving is 5 m longer than it is wide. Its area is 50 m^2. What are the length and width?

$x(x+5) = 50$
$x^2 + 5x - 50 = 0$
$(x+10)(x-5) = 0$
$x = 5, -10$

width = 5 m
length = 10 m

3. How long does it take for a ball to hit the ground when it is dropped from a 20 m building? ($d = 4.9t^2$)

$20 = 4.9t^2$
$t = 2.02$ sec

4. How long after the kick is a football at a height of 15 m? ($h = 20t - 5t^2$)

$15 = 20t - 5t^2$
$5t^2 - 20t + 15 = 0$
$t^2 - 4t + 3 = 0$
$(t-3)(t-1) = 0$
$t = 3$ and 1

∴ The football reaches 15 m at 1 sec (on the way up) and at 3 sec (on the way down).

Solve the following:

1) $\frac{2x+1}{x-3} = \frac{6x+5}{3x-4}$ $x \neq 3, 4/3$

$(2x+1)(3x-4) = (x-3)(6x+5)$

$6x^2 - 5x - 4 = 6x^2 - 13x - 15$

$8x = -11$

$x = -11/8$

2) $\frac{9}{5} = \frac{3(x+2)}{x}$ $x \neq 0$

$9x = 15x + 30$

$-6x = 30$

$x = -5$

3) $\frac{1}{x} - \frac{4}{3x} = \frac{1}{5}$ $x \neq 0$ LCD $= 15x$

$15 - 20 = 3x$

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

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

4) $\frac{2}{x} = \frac{6}{x+6}$ $x \neq 0, -6$

$2x + 12 = 6x$

$\frac{12}{4} = \frac{4x}{4}$

$3 = x$

5) $\frac{-3}{x+4} = \frac{1}{x-2}$ $x \neq -4, 2$

$-3x + 6 = x + 4$

$-4x = -2$

$x = 1/2$

6) $\frac{-2}{2x-1} = \frac{4}{x-5}$ $x \neq 1/2, 5$

$-2x + 10 = 8x - 4$

$14 = 10x$

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

Part B: Word Problems.

1. Neptune has 2 more than one third of the number of moons that Saturn has. The sum of the number of moons for Neptune and Saturn is 26. How many moons does each planet have?

Single Variable Method

let x = Neptune's moons

then $26 - x$ = Saturn's moons

$\therefore$ Neptune has 8 moons and Saturn has 18 moons

Neptune $= \frac{1}{3}$ Saturn $+ 2$

$x = \frac{26-x}{3} + 2$ (3)

$3x = 26 - x + 6$

$4x = 32$

$x = 8$

2. A group of students plan to go on a ski trip which will cost the group $2430. They were going to split the cost equally, but three of them dropped out, raising the cost of each by $27. How many were in the original group?

$\frac{2430}{x}^{x(x-3)} + 27^{x(x-3)} = \frac{2430}{x-3}^{x(x-3)}$

$2430x - 7290 + 27x^2 - 81x = 2430x$

$27x^2 - 81x - 7290 = 0$

$x^2 - 3x - 270 = 0$

$(x-18)(x+15) = 0$

$x = 18$ people

3. Daniel left Winnipeg at 10:00 and drove toward Calgary at 80 km/h. Nathan left Winnipeg an hour later and drove along the same route at 100 km/h. If they both drove without stopping, at what time would Nathan overtake Daniel?

	D	V	T
Daniel	$80(x+1)$	80km/h	$x+1$
Nathan	$100x$	100km/h	x

$80x + 80 = 100x$

$80 = 20x$

$4 = x$

3:00

4. Maria drove 235 km from Quebec City to Montreal in the same length of time as Michel took to drive 205 km from Ottawa to Montreal. Maria drove 12 km/h faster than Michel. At what speed did Michel drive, in km/h?

	D	V	T
Maria	235	$x+12$	$\frac{235}{x+12}$
Michel	205	x	$\frac{205}{x}$

$\frac{235}{x+12} = \frac{205}{x}$

$235x = 205x + 2460$

$30x = 2460$

$x = 82$

82km/h

5. Mr. Sweet and Mr. Schaap drove their cars over a distance of 100 km. Mr. Sweet's car's average speed is 5 km/h less than that of Mr. Schaap's car. If Mr. Sweet's trip took an extra 1 hour, find the average speed of both Mr. Sweet's and Mr. Schaap's cars.

	D	V	T
Sweet	100	$x-5$	$\frac{100}{x-5}$
Schaap	100	x	$\frac{100}{x}$

slower − faster = difference

$\frac{100}{x-5}^{x(x-5)} - \frac{100}{x}^{x(x-5)} = 1^{x(x-5)}$

$100x - 100x + 500 = x^2 - 5x$

$0 = x^2 - 5x - 500$

$0 = (x-25)(x+20)$

$x = 25$ km/h

Schaap 25 km/h

Sweet 20 km/h