WARM UP

Solve the following quadratic equation by...
(a) factoring
(b) completing the square
(c) using the quadratic formula

$6x^2 - 13x = 5$

a) $6x^2 - 13x - 5 = 0$ (-30)

$6x^2 - 15x + 2x - 5 = 0$

$3x(2x-5) + 1(2x-5) = 0$

$(2x-5)(3x+1) = 0$

$2x-5=0$ or $3x+1=0$

$2x = 5$ $\quad 3x = -1$

$x = \frac{5}{2}$ $\quad x = -\frac{1}{3}$

$(-13)^2$

c) $6x^2 - 13x - 5 = 0$

$x = \frac{13 \pm \sqrt{(-13)^2 - 4(6)(-5)}}{2(6)}$

$x = \frac{13 \pm \sqrt{169 + 120}}{12}$

$x = \frac{13 \pm 17}{12}$

$x = \frac{30}{12}$ or $x = -\frac{4}{12}$

$x = \frac{5}{2}$ $\quad x = -\frac{1}{3}$

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

$ax^2 + bx + c = 0$

b) $6x^2 - 13x - 5 = 0$

$6\left(x^2 - \frac{13}{6}x + \frac{169}{144}\right) - 5 - \frac{169}{24} = 0$

$6\left(x - \frac{13}{12}\right)^2 = \frac{5}{1} + \frac{169}{24}$

$\left(\frac{1}{6}\right)6\left(x - \frac{13}{12}\right)^2 = \frac{289}{24}\left(\frac{1}{6}\right)$

$\sqrt{\left(x - \frac{13}{12}\right)^2} = \sqrt{\frac{289}{144}}$

$x - \frac{13}{12} = \pm\frac{17}{12}$

$x = \frac{13}{12} \pm \frac{17}{12}$

$x = \frac{30}{12}$ or $x = -\frac{4}{12}$

$x = \frac{5}{2}$ $\quad x = -\frac{1}{3}$

Warm Up

If a pistol bullet is fired vertically at an initial speed of 100 m/s, the height in metres after t seconds is given by the quadratic function...

$$h(t) = -5t^2 + 100t + 2$$

(a) Determine the height of the bullet after 2 seconds.
(b) When will the bullet reach a height of 457 m?
(c) What is the maximum height that the bullet will reach?

(a) $t = 2$ sec (vertex)

$h(2) = -5(2)^2 + 100(2) + 2$

$= -20 + 200 + 2$

$= 182$ m

b) $457 = -5t^2 + 100t + 2$

$-5t^2 + 100t - 455 = 0$

$t^2 - 20t + 91 = 0$

$t = \frac{20 \pm \sqrt{400 - 4(1)(91)}}{2(1)}$

$t = \frac{20 \pm \sqrt{36}}{2}$

$t = \frac{20 \pm 6}{2}$

$t = \frac{26}{2}$ or $t = \frac{14}{2}$

$t = 13$ $t = 7$

13 seconds & 7 seconds

c) $h(t) = -5t^2 + 100t + 2$

$h(t) = -5(t^2 - 20t + 100) + 2 + 500$

$h(t) = -5(t-10)^2 + 502$

$V(10, 502)$

(t, h)

$= 502$ m

Homework...

WORD PROBLEMS (equation given)...

Page 52... #37, #39a, #40, #41 and #45

"Perpendicular lines have slopes that are negative reciprocals to eachother."

NOTE

Page 57... #59 & #60

Page 52 SOLUTIONS...

#37. a) Discuss together

b) $\frac{-3 \pm \sqrt{849}}{2}$ where x = -16.609 & 13.069

#39. a) 24.85 seconds

b) 79.87 seconds

#40. a) 121.5 m

b) 5.54 seconds

#41. a) -40 °C & 10 °C

b) -15°C

#45. $\frac{-4 \pm \sqrt{2}}{2}$

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#59. a) Bangor to Moncton

354 km

Moncton to Bathurst

186 km

b) Two possible solns

Need a map!

#60. a) 4 m

b) 40 m

c) 0 & 12 seconds

d) 20 s