

Answer and simplify your answers completely. Show all work. Credit may not be given for an answer alone

Factor the following expressions:

1. $x^2 - 17x + 70$  $(x - 10)(x - 7)$	2. $x^2 - 25$  $(x + 5)(x - 5)$
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Solve by Factoring:

3. $x^2 + 5x - 14 = 0$  $(x + 7)(x - 2) = 0$ $x + 7 = 0$ or $x - 2 = 0$  $x = -7$ or $x = 2$	4. $6x^2 + 5x = 6$  $(3x - 2)(2x + 3) = 0$ $3x - 2 = 0$ or $2x + 3 = 0$ $3x = 2$ or $2x = -3$  $x = \frac{2}{3}$ or $x = -\frac{3}{2}$
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Solve by taking square roots:

5. $4x^2 + 3 = -33$  $4x^2 = -36$  $x^2 = -9$  $x = \pm 3i$	6. $\frac{1}{2}(x - 4)^2 = 10$  $(x - 4)^2 = 20$ $x - 4 = \pm\sqrt{20}$ $x = 4 \pm \sqrt{20}$  $x = 4 \pm 2\sqrt{5}$
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Solve by completing the square:

7. $x^2 - 14x = -37$  $x^2 - 14x + 49 = -37 + 49$ $(x - 7)^2 = 12$ $x - 7 = \pm\sqrt{12}$ $x = 7 \pm \sqrt{12}$  $x = 7 \pm 2\sqrt{3}$	8. $x^2 - 10x + 34 = 0$  $x^2 - 10x + 25 = -34 + 25$ $(x - 5)^2 = -9$ $x - 5 = \pm 3i$  $x = 5 \pm 3i$
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The Quadratic Formula:

9. State the quadratic formula:  $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$
10. Solve using the quadratic formula: $2x^2 - 6x + 8 = 0$  $x = \frac{+6 \pm \sqrt{36 - 4(2)(8)}}{4}$  $= \frac{6 \pm \sqrt{-28}}{4}$  $= \frac{6 \pm 2i\sqrt{7}}{4}$  $x = \frac{3}{2} + \frac{i\sqrt{7}}{2}$ or $x = \frac{3}{2} - \frac{i\sqrt{7}}{2}$

Solve using any method you choose:

11. $3x^2 - 6x - 2 = -x^2 + x$  $x = -\frac{1}{4} \text{ or } x = 2$	12. $2x^2 + 6x = 80$  $x = -8 \text{ or } x = 5$
13. $2(x + 4)^2 = 12$  $x = -4 \pm \sqrt{6}$	14. $x^2 - 8 = 0$  $x = \pm 2\sqrt{2}$
15. $7 + 36x^2 = 16$  $x = \pm \frac{1}{2}$	16. $5x^2 - 13x = -8$  $x = 1 \text{ or } x = \frac{8}{5}$

17. Jason jumped off of a cliff into the ocean in Acapulco while vacationing with some friends. His height as a function of time could be modeled by the function  $h(t) = -16t^2 + 16t + 480$ , where  $t$  is the time in seconds and  $h$  is the height in feet. Jason hit the water after how many seconds?

$$\text{Solve: } -16t^2 + 16t + 480 = 0$$

$$-16(t^2 - t - 30) = 0$$

$$-16(t - 6)(t + 5) = 0$$

$$t = 6$$

18. Spiderman is launching himself over a building so he can land on top. His progress can be modeled by the equation  $y = -t^2 + 12t - 25$ , where  $t$  is how long he has been in the air (in seconds), and  $y$  is his distance from the top of the building (in feet). After how many seconds will Spiderman clear the top of the building? After how many seconds will he land on the top of the building?

$$t = 6 - \sqrt{11} \text{ or } t = 6 + \sqrt{11}$$

$$t \approx 2.68 \text{ or } t \approx 9.3$$