

4. Which of the following results in a number with both a real and an imaginary part?

NO A. $(3+2i)(3-2i)$ $9 - 6i + 6i - 4i^2$
 $9 + 4 = 13$

B. $(5-2i)(3+4i)$ $15 + 20i - 6i - 8i^2$
 $23 + 14i$

NO C. $(-7+4i) - (-7+5i)$
 $-7 + 4i + 7 - 5i = -i$

NO D. $(9-8i) + (4+8i)$
 $9 - 8i + 4 + 8i = 13$

5. Determine if each quadratic equation has real solutions. Choose Yes or No.

A. $12x^2 - 5 = -3$ ☒ Yes ☐ No

$12x^2 - 2 = 0$ $0 - 4(12)(-2)$
 $+ 96 > 0$

B. $\frac{2}{3}x^2 + 7 = 11$ ☒ Yes ☐ No

$\frac{2}{3}x^2 - 4 = 0$ $0 - 4(\frac{2}{3})(-4) = \frac{32}{3} > 0$

C. $2(x^2 - 3) = 3(2x^2 + 1)$ ☐ Yes ☒ No

$2x^2 - 6 = 6x^2 + 3$ $0 = 4x^2 + 9$
 $-2x^2 - 9 = 0$ $0 - 4(4)(9)$
 $= -144 < 0$

D. $3x^2 - 1 = 8x^2 + 9$ ☐ Yes ☒ No

$-5x^2 - 10 = 0$ $0 - 4(5)(10)$
 $= -200 < 0$

E. $4(3x^2 - 7) = 3(x^2 - 5)$ ☐ Yes ☒ No

$12x^2 - 28 = 3x^2 - 15$ $0 - 4(9)(-13)$
 $9x^2 - 13 = 0$

6. A tennis ball is hit with an initial vertical velocity of 60 ft/s. The function $h(t) = -16t^2 + 60t + 2$ models the height h (in feet) of the tennis ball at time t (in seconds). Does the ball reach each of the following heights? Choose Yes or No.

$44 = -16t^2 + 60t + 2$ $0 = -16t^2 + 58t - 42$ ☒ Yes ☐ No

$60 = -16t^2 + 60t + 2$ $0 = -16t^2 + 58t - 58$ ☒ Yes ☐ No

$60 = -16t^2 + 60t + 2$ $0 = -16t^2 + 58t - 58$ ☐ Yes ☒ No

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7. Determine the number and types of solutions for each quadratic equation.

A. $9x^2 + 7x = 6$ Number: 2 Type: Real

$9x^2 + 7x - 6 = 0$
 $49 - 4(9)(-6) = 49 + 216 = 265$

B. $\frac{1}{5}x^2 + 8 = 9$ Number: 2 Type: Real

$\frac{1}{5}x^2 - 1 = 0$ $0 - 4(\frac{1}{5})(-1) = \frac{4}{5}$

C. $3(x^2 - 4) = 2x^2 + 3$ Number: 2 Type: Real

$3x^2 - 12 = 2x^2 + 3$ $0 - 4(1)(-15) = 60$
 $x^2 - 15 = 0$

D. $5 + 3x^2 = 7x^2 - 10$ Number: 2 Type: Real

$4x^2 - 15 = 0$ $0 - 4(4)(-15) = 240$

For 8–11, perform the indicated operation

8. $(-4 + 11i)(-5 - 8i)$

$20 + 32i - 55i - 88i^2$
 $20 + 88 - 23i$
 $108 - 23i$

9. $(6 + 3i)(2i - 4) - (4 + 5i)$

$12i - 24 + 6i^2 - 12i - 4 - 5i$
 $-34 - 5i$
 $-34 - 5i$

10. $(2 + 3i)(2 - 3i)$

$4 - 6i + 6i - 9i^2 = 4 + 9 = 13$
13

11. $(3i - 4) + (17i + 12)$

$3i - 4 + 17i + 12$
 $8 + 20i$

$52 = -16t^2 + 60t + 2 \rightarrow 0 = -16t^2 + 60t - 50$ $3600 - 4(-16)(-50) = 1552$