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12-6B Lesson Master

Questions on SPUR Objectives
See pages 773–775 for objectives.

PROPERTIES Objective E

1. If the discriminant of a quadratic expression is a perfect square, how do you know that the expression is factorable over the integers?

In 2–11, a quadratic expression is given. Calculate $b^2 - 4ac$ to determine whether the quadratic is factorable over the integers or prime. If possible, factor this expression.

2. $2x^2 + 3x - 2$

3. $4n^2 - 3n + 2$

4. $x^2 - 16$

5. $r^2 + 4$

6. $s^2 + 2s$

7. $x^2 - 7x + 2$

8. $2t^2 + 6t + 3$

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

10. $6x^2 - x - 15$

11. $4x^2 + 20x + 25$

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12. Which of the expressions below are factorable over the integers?

A $2x^2 + 3x - 2$

B $120x^2 - 262x + 143$

C $10z^2 + 20z + 10$

D $25x^2 + 2x - 1$

E $x^2 - 6x - 7$

F $4x^2 - 5x + 2$

G $7m^2 + 2m - 6$

H $10t^2 + 13t - 3$

I $y^2 + y + 1$

J $63r^2 + 15r - 2$

13. If the following numbers are values of discriminants, which would allow $ax^2 + bx + c$ to be factorable over the integers?

A 121

B 11

C –2

D 36

E 4

F 1

G –25

H 5

I 0

J –9

14. Find a value of k such that $4x^2 - kx - 2$ is factorable over the integers.

15. a. By multiplying, verify that $(x + 3 + \sqrt{3})(x + 3 - \sqrt{3}) = x^2 + 6x + 6$.

b. Verify that the discriminant of the expression $x^2 + 6x + 6$ is not a perfect square.

c. Part a indicates that $x^2 + 6x + 6$ is factorable. Does this violate the Discriminant Theorem? Explain.