Section 6.1: An Introduction to Factoring Polynomials

1. What is \( x \) if \((x - 14) = 0\)?
   (a) \( x = 14 \)
   (b) \( x = -14 \)
   (c) \( x = 0 \)
   (d) None of the above

2. What is \( x \) if \((2x + 5) = 0\)?
   (a) \( x = 5 \)
   (b) \( x = -5 \)
   (c) \( x = \frac{5}{2} \)
   (d) \( x = -\frac{5}{2} \)

3. If \( x = c \) is a zero, then the corresponding factor is:
   (a) \( (x - c) \)
   (b) \( (x + c) \)
   (c) \( x = c \)
   (d) \( xc = 0 \)

4. If \( x = -c \) is a zero, then the corresponding factor is:
   (a) \( (x - c) \)
   (b) \( (x + c) \)
   (c) \( x = c \)
   (d) \( xc = 0 \)

5. If \( x = 8 \) is a zero, then the corresponding factor is:
6. If \( x = 0 \) is a zero, then the corresponding factor is:

(a) \( (x - 0) \)
(b) \( x \)
(c) \( (x + 0) \)
(d) All of the above

7. If \( x = -\frac{5}{10} \) is a zero, then the corresponding factor is:

(a) \( (x - \frac{5}{10}) \)
(b) \( (x - 2) \)
(c) \( (2x + 1) \)
(d) \( (x - \frac{1}{2}) \)
(e) None of the above

8. If \( x = -\frac{3}{2} \) is a zero, then the corresponding factor is:

(a) \( (x - \frac{3}{2}) \)
(b) \( (2x + 3) \)
(c) \( (3x + 2) \)
(d) \( (2x - 3) \)
(e) None of the above

9. Determine the zeros of \( f(x) = (2x - 5)(x + 3) \).

(a) \( x = 5, 3 \)
(b) \( x = 5, -3 \)
(c) \( x = \frac{5}{2}, -3 \)
(d) \( x = -2, 5, -3 \)
(e) None of the above
10. Determine the zeros of \( f(x) = x(x + 8) \).
   
   (a) \( x = 0, -8 \)
   (b) \( x = -8 \)
   (c) \( x = 8 \)
   (d) \( x = \pm 8 \)
   (e) None of the above

11. \( f(x) \) has zeros \( x = 3, -5 \). What are the factors?
   
   (a) \( (3x)(-5x) \)
   (b) \( (x + 3)(x - 5) \)
   (c) \( (x - 3)(x + 5) \)
   (d) \( (-3x + 5) \)

12. \( f(x) \) has zeros \( x = \frac{5}{7}, -1 \). What are the factors?
   
   (a) \( (x + 1)(5x - 7) \)
   (b) \( (x - 1)(5x + 7) \)
   (c) \( (x + 1)(7x - 5) \)
   (d) \( (x - 1)(7x + 5) \)

13. True or False: If a value is an \( x \)-intercept then it is a root of the polynomial equation.
   
   (a) True, and I am very confident
   (b) True, but I am not very confident
   (c) False, but I am not very confident
   (d) False, and I am very confident

14. True or False: The expression \( 2ax - 7z - 3bx + 7b \) should be grouped as \( (2ax - 7a) - (2bx + 7b) \) in preparation for factoring by grouping.
   
   (a) True, and I am very confident
   (b) True, but I am not very confident
   (c) False, but I am not very confident
   (d) False, and I am very confident
15. When we talk about “the zeros of a function” we mean:

(a) The input value(s) for which the output value is zero.
(b) $x$-intercepts and $y$-intercepts
(c) The output value(s) for which the input value is zero.
(d) The pieces of a function that have a slope of zero.

16. The graph and table of values for $y = x^3 - 3x^2 - 10x + 24$ are given below. What are the coordinates of the intercepts of the function?

(a) $-3, 24, 2, 4$
(b) $(-3, 0), (0, 24), (2, 0), (4, 0)$
(c) $(-3, 0), (2, 0), (4, 0)$
(d) $(0, 24)$

17. The graph and table of values for $y = x^3 - 3x^2 - 10x + 24$ are given below. What are the zeros of the function?

(a) $-3, 24, 2, 4$
18. The graph and table of values for \( y = x^3 - 3x^2 - 10x + 24 \) are given below. What is a correct factorization of the function?

(a) \( y = x - 3, x - 24, x - 2, x - 4 \)
(b) \( x + 3, x - 2, x - 4 \)
(c) \( y = (x - (-3))(x - 2)(x - 4) \)
(d) \( (x + 3)(x - 24)(x - 2)(x - 4) \)

19. The graph and table of values for \( y = x^3 - 3x^2 - 10x + 24 \) are given below. What are the factors of the function?

(a) \( y = x - 3, x - 24, x - 2, x - 4 \)
(b) \( x + 3, x - 2, x - 4 \)
(c) \( y = (x - (-3))(x - 2)(x - 4) \)
(d) \( (x + 3)(x - 24)(x - 2)(x - 4) \)
20. What is the prime factorization of 140?

(a) (2)(70)
(b) (4)(5)(7)
(c) (2)(5)(7)
(d) (2)(2)(5)(7)

21. What is the greatest common factor of the terms of $20x^2 + 28x$?

(a) $2x$
(b) $4x^2$
(c) $4x$
(d) $7x$
(e) 1

22. What is the greatest common factor of the terms of $21a^3b − 15a^2b^2$?

(a) $3a^2b$
(b) $105a^3b^2$
(c) $3a^3b^2$
(d) 1

23. Factor out the greatest common factor: $16x^3y^2 − 24x^2y + 32x^2y$

(a) $4xy(4x^2y − 6x^3 + 8x)$
(b) $8x^2y(2xy − 3x^2 + 4)$
(c) $16x^3y^2(1 − 2x + 2y)$
(d) $8xy^2(2x − 3x^2 + 4y)$

24. Factor $−1$ out of $20 − x^2$

(a) $−1(20 − x^2)$
(b) $−1(x^2 − 20)$
(c) $−1(20 + x^2)$
(d) $−1(−x^2 + 20)$
25. What is the complete factorization of $21x^2 - 18x$?

(a) $(3x + 2x)(7x - 2)$
(b) $x(21x - 18)$
(c) $3x(21x^2 - 18x)$
(d) $3x(7x - 6)$
(e) This expression is already completely factored.

26. What is the complete factorization of $4x(2x - 1) - 3(2x - 1)$?

(a) $4x - 3(2x - 1)$
(b) $(4x - 3)(2x - 1)$
(c) $8x^2 - 10x + 3$
(d) This expression is already completely factored.