Math 25 – Study Guide – Chapter 6
Name_____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Find the greatest common factor of the numbers.

1) 54, 12 1) _____
A) 3 B) 9 C) 6 D) 66

Find the greatest common factor of the terms.

2) $-r^9s^5, -rs^4$ 2) _____
A) r^9s^5 B) s^4 C) rs^4 D) r^9s^4

3) 12t, 18 3) _____
A) 6 B) 36t C) 6t D) 12

Complete the factoring.

4) $5x^2 - 40x = 5x(\quad)$ 4) _____
A) $x - 8$ B) $8 - x$ C) $x^2 - 8$ D) $8 - x^2$

5) $7x^2y^5 + 56x^2y^4 = 7x^2y^4(\quad)$ 5) _____
A) $y + 8$ B) $7y + 8x$ C) $y + 8x^2$ D) $x^2y + 8$

Factor out the greatest common factor.

6) $16x^9y^9 - 24x^6y^7 - 16x^3y^2$ 6) _____
A) $8x^3(2x^6y^9 - 3x^3y^7 - 2y^2)$ B) $8x^3y^2(2x^6y^7 - 3x^3y^5 - 2)$
C) No common factor (except 1) D) $8(2x^9y^9 - 3x^6y^7 - 2x^3y^2)$

7) $3x^2y^5 + 6x^2y^4$ 7) _____
A) $3x^4y^2(y + 2)$ B) $3x^2y^4(y + 2)$ C) $x^2y^4(3y + 2)$ D) $y + 2$

Factor by grouping.

8) $20a^3 - 25a^2b + 8ab^2 - 10b^3$ 8) _____
A) $(5a^2 + 2b^2)(4a - 5b)$ B) $(5a^2 - 2b^2)(4a + 5b)$
C) $(5a^2 + 2b)(4a - 5b)$ D) $(20a^2 + 2b^2)(a - 5b)$

9) $2p^3 + 7q^3 + 7pq^2 + 2p^2q$ 9) _____
A) $(p + q^2)(7p^2 + 2q)$ B) $(p^2 + q^2)(7p + 2q)$
C) $(p^2 + q^2)(7p - 2q)$ D) $(p^2 + q^2)(2p + 7q)$

Provide an appropriate response.

10) Is it possible to factor the expression $19x^{10}(y + 4) + 7(y - 4)$? If so, factor it. 10) _____
A) Yes: $(19x^{10} + 7)(y + 4)$ B) Yes: $(19x^{10} + 7)(y - 4)$
C) Yes: $(19x^{10} + 7 + 4 + y)$ D) No

11) Is it possible to factor the expression $14x^9(y + 10) + 4(y + 10)$? If so, factor it. 11) _____

A) Yes: $(y + 10)(14x^9 + 4)$ B) No

C) Yes: $14x^9(y + 14)$ D) Yes: $14x^9(y + 10) + 4$

Find the pair of numbers whose product and sum are given.

12) Product: –8 Sum: –2 12) _____

A) –4 and 2 B) –8 and 1 C) 4 and –2 D) 8 and –1

Complete the factoring.

13) $x^2 - 12x + 32 = (x - 8)(\quad)$ 13) _____

A) $x - 4$ B) $x + 4$ C) $x^2 + 8$ D) $8 - x$

14) $x^2 - 2x - 63 = (x - 9)(\quad)$ 14) _____

A) $9 - x$ B) $x - 7$ C) $x + 7$ D) $x^2 + 9$

Factor completely. If the polynomial cannot be factored, write prime.

15) $s^2 + 5s + 6$ 15) _____

A) $(s - 3)(s - 2)$ B) $(s + 3)(s + 2)$ C) $(s + 6)(s - 1)$ D) $(s + 6)(s + 5)$

16) $x^2 - x - 54$ 16) _____

A) $(x - 54)(x + 1)$ B) $(x - 6)(x + 9)$ C) $(x + 6)(x - 9)$ D) Prime

17) $u^2 - 9u + 14$ 17) _____

A) $(u + 2)(u + 7)$ B) $(u + 2)(u - 7)$ C) $(u - 2)(u + 7)$ D) $(u - 2)(u - 7)$

Factor completely.

18) $12y^5 - 9y^4 + 15y^2$ 18) _____

A) $3y(4y^4 - 3y^3 + 5y)$ B) $3y^2(4y^3 + 3y^2 - 5)$

C) $3y^2(4y^3 - 3y^2 + 5)$ D) $3y^2(4y^3 - 3y^2 + 5y)$

19) $x^2 + 11xy + 30y^2$ 19) _____

A) $(x - 5y)(x - 6y)$ B) $x(x + 11y + 30y^2)$

C) $(x + 5y)(x - 6y)$ D) $(x + 5y)(x + 6y)$

20) $(3m + n)p^2 - 13(3m + n)p + 42(3m + n)$ 20) _____

A) $(3m + n)(p^2 - 13p + 42)$ B) $(3m + n)(p - 7)(p - 6)$

C) $(3m + n)(p + 7)(p + 6)$ D) $(3m + n)(p - 7)(p + 6)$

21) $(m + n)b^2 + (m + n)b + 8(m + n)$ 21) _____

A) $(m + n)(b + 8)(b - 8)$ B) $b(m + n)(b + 9)$

C) $(m + n)(b^2 + b + 8)$ D) $(m + n)(b^2 - b + 8)$

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Provide an appropriate response.

22) Explain the error in the following: 22) _____

$x^2 + 2x - 15 = (x - 5)(x + 3)$

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Factor by grouping.

23) $t^2 + 8t + 2t + 16$ 23) _____

A) $(t - 8)(t - 2)$ B) $t(t + 26)$ C) $(t + 8)(t - 2)$ D) $(t + 8)(t + 2)$

24) $30x^2 + 12xy - 25xy - 10y^2$ 24) _____

A) $(6x - 5)(5x + 2)$ B) $(6x + 5y)(5x + 2y)$

C) $(6x - 5y)(5x + 2y)$ D) $(30x - 5y)(x + 2y)$

25) $8x^2 - 6xt - 9t^2$ 25) _____

A) $(8x + 3t)(x - 3t)$ B) $(4x + 3t)(2x - 3t)$

C) $(4x - 3t)(2x + 3t)$ D) Prime

26) $15z^4 - 8z^2 - 16$ 26) _____

A) $(3z^2 + 4)(5z^2 - 4)$ B) $(3z^4 + 4)(5z - 4)$

C) $(5z^4 + 4)(3z - 4)$ D) $(5z^2 + 4)(3z^2 - 4)$

27) $9x^2 + 18xt + 8t^2$ 27) _____

A) $(3x - 4t)(3x - 2t)$ B) $(9x + 4t)(x + 2t)$

C) $(3x + 4t)(3x + 2t)$ D) Prime

Factor completely.

28) $18x^2 - 78x - 60$ 28) _____

A) $6(3x - 2)(x + 5)$ B) $(18x + 12)(x - 5)$ C) Prime D) $6(3x + 2)(x - 5)$

29) $-2r^2 + 17rt - 8t^2$ 29) _____

A) $-1(2r - t)(r - 8t)$ B) $-1(2r + t)(r - 8t)$ C) $-1(2r + t)(r + 8t)$ D) $(2r - t)(r - 8t)$

30) $-x^2 - 3x + 28$ 30) _____

A) $-1(x - 7)(x - 4)$ B) $-1(x - 7)(x + 4)$ C) $(x + 7)(x - 4)$ D) $-1(x + 7)(x - 4)$

31) $25p^2(r + 5)^3 + 70pq(r + 5)^3 + 49q^2(r + 5)^3$ 31) _____

A) $(r + 5)^3(5p + q)^2$ B) $(r + 5)^3(5p + 7q)(5p - 7q)$

C) $(r + 5)^3(5p - 7q)^2$ D) $(r + 5)^3(5p + 7q)^2$

32) $9r^2(y + 2)^5 - 9r(y + 2)^5 - 10(y + 2)^5$ 32) _____

A) $(y + 2)^5(3r - 5)(3r + 2)$ B) $(y + 2)^5(3r - 5)(3r - 2)$

C) $(y + 2)^5(9r - 5)(r + 2)$ D) $(y + 2)^5(3r + 5)(3r - 2)$

Simplify.

33) 10^2 33) _____

A) 200 B) 20 C) 100 D) 12

Factor the binomial completely. If it is prime, say so.

34) $75a^4b - 27b^3$ 34) _____

A) $3b(5a^2 + 3b)(5a^2 - 3b)$ B) $3b(5a + 3b)^2$

C) $3b(5a - 3b)^2$ D) Prime

35) $36m^2 - \frac{9}{25}$ 35) _____

A) $\left(6m + \frac{3}{5}\right)^2$ B) $\left(6m + \frac{3}{5}\right)\left(6m - \frac{3}{5}\right)$

C) $\left(6m - \frac{3}{5}\right)^2$ D) Prime

36) $x^4 - 1$ 36) _____

A) $(x + 1)^2(x - 1)^2$ B) $(x^2 - 1)(x + 1)(x - 1)$

C) $(x^2 + 1)(x + 1)(x - 1)$ D) Prime

Factor completely.

37) $x^2 + 32x + 256$ 37) _____

A) $(x + 16)(x - 16)$ B) $(x + 16)^2$ C) $(x - 16)^2$ D) Prime

38) $b^2 - 38b + 361$ 38) _____

A) $(b + 19)^2$ B) $(b + 19)(b - 19)$ C) $(b - 19)^2$ D) Prime

39) $288x^2 + 672x + 392$ 39) _____

A) $8(36x^2 + 84x + 49)$ B) $8(6x - 7)(6x + 7)$

C) $(48x + 56)(6x + 7)$ D) $8(6x + 7)^2$

40) $t^2 + \frac{1}{2}t + \frac{1}{16}$ 40) _____

A) $\left(t + \frac{1}{4}\right)\left(t - \frac{1}{4}\right)$ B) $\left(t + \frac{1}{4}\right)^2$ C) $\left(t - \frac{1}{4}\right)^2$ D) Prime

Factor the binomial completely. If it is prime, say so.

41) $25x^2 + 36$ 41) _____

A) $(5x - 6)^2$ B) $(5x + 6)(5x - 6)$ C) $(5x + 6)^2$ D) Prime

Factor the polynomial completely.

42) $t^3 + 64$ 42) _____

A) $(t + 4)(t^2 + 16)$ B) $(t - 4)(t^2 + 4t + 16)$

C) $(t + 4)(t^2 - 4t + 16)$ D) $(t - 64)(t^2 - 1)$

43) $27c^3 + 125$ 43) _____

A) $(3c + 5)(9c^2 + 25)$ B) $(3c - 5)(9c^2 + 15c + 25)$

C) $(27c + 5)(c^2 - 15c + 25)$ D) $(3c + 5)(9c^2 - 15c + 25)$

44) $8p^3 - 1$ 44) _____

A) $(2p - 1)(4p^2 + 2p + 1)$ B) $(2p - 1)(4p^2 + 1)$

C) $(2p + 1)(4p^2 - 2p + 1)$ D) $(8p - 1)(p^2 + 2p + 1)$

Factor completely.

45) $(x + y)^3 - (x - y)^3$ 45) _____

A) $2y(3x^2 + y^2)$ B) $y(3x^2 - y^2)$ C) $2y(3x^2 - y^2)$ D) $y(3x^2 + y^2)$

46) $5w - 5x + 5w^2 - 5x^2$ 46) _____

A) $5(w - x)(1 + w + x)$ B) $(w - x)(1 + w + x)$

C) $5(w - x)(w + x)$ D) $5(w - x)(1 + w - x)$

Solve the equation.

47) $(x - 2)(x + 3) = 0$ 47) _____

A) {2, –3} B) {2, 3} C) {2, –2, 3, –3} D) {–2, 3}

48) $\left(5x - \frac{1}{4}\right)\left(x + \frac{1}{5}\right)$ 48) _____

A) $\left\{-\frac{1}{20}, \frac{1}{5}\right\}$ B) $\left\{\frac{1}{20}, -\frac{1}{5}\right\}$ C) $\left\{\frac{1}{20}, \frac{1}{5}\right\}$ D) $\left\{-\frac{1}{20}, -\frac{1}{5}\right\}$

49) $49k^2 - 25 = 0$ 49) _____

A) $\left\{\frac{7}{5}, -\frac{5}{7}\right\}$ B) {5, 0} C) $\left\{\frac{5}{7}, -\frac{5}{7}\right\}$ D) $\left\{\frac{7}{5}, 0\right\}$

50) $36x^2 = 20 + 48x$ 50) _____

A) $\left\{\frac{1}{3}, \frac{5}{3}\right\}$ B) $\left\{-\frac{1}{5}, \frac{3}{5}\right\}$ C) $\left\{-\frac{1}{3}, \frac{5}{3}\right\}$ D) $\left\{\frac{1}{3}, -\frac{5}{3}\right\}$

51) $8r^2 = 2r$ 51) _____

A) {0, 4} B) $\left\{\frac{1}{4}\right\}$ C) $\left\{0, \frac{1}{4}\right\}$ D) {0}

52) $m(3m - 13) = -12$ 52) _____

A) $\left\{\frac{3}{4}, 3\right\}$ B) $\left\{-\frac{4}{3}, 3\right\}$ C) $\left\{\frac{4}{3}, 3\right\}$ D) $\left\{\frac{4}{3}, -3\right\}$

53) $10c^3 - 25c^2 + 15c = 0$ 53) _____

A) {0} B) $\left\{\frac{3}{5}, \frac{5}{2}\right\}$ C) $\left\{\frac{3}{2}, 1, 0\right\}$ D) $\left\{\frac{3}{2}, -\frac{3}{2}\right\}$

54) $5x(x + 2) = (4x - 5)(x + 2)$ 54) _____

A) {–5} B) {5} C) {–2, –5} D) {2, 5}

55) $(3x)^2 = (3x + 6)^2 - (x + 6)^2$ 55) _____

A) {–24, 0} B) {–24} C) {24} D) {0, 24}

56) $(x + 6)(x^2 - 7x - 18) = 0$ 56) _____

A) {6, –9, 2} B) {–6, 9, –2} C) {6} D) {–6}

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Provide an appropriate response.

57) A student was trying to solve the problem $6x(10x - 7) = 0$. The student knew that he or she should set $10x - 7 = 0$ but was confused about whether or not he or she should set $6x = 0$, or $6 = 0$ and $x = 0$. How would you advise this student? 57) _____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Solve the problem.

58) A rectangle has a length of $x + 2$ and a width of $x - 2$, and has an area of 60 square units. Find the length and width of the rectangle. ($A = LW$) 58) _____

A) width = 4 units; length = 15 units B) width = 3 units; length = 20 units

C) width = 6 units; length = 10 units D) width = 5 units; length = 12 units

59) A triangle has a base of length $2x + 3$ and a height of $x + 3$ and has an area of 27 square units. Find the length of base and height. ($A = \frac{1}{2}BH$) 59) _____

A) base = 18 units; height = 3 units B) base = 9 units; height = 3 units

C) base = 3 units; height = 9 unit D) base = 9 units; height = 6 units

60) The length of a rectangle is 8 inches more than its width. If 4 inches are taken from the length and added to the width, the figure becomes a square with an area of 324 square inches. What are the dimensions of the original figure? 60) _____

A) 14 in. by 22 in. B) 14 in. by 18 in. C) 10 in. by 18 in. D) 18 in. by 18 in.

61) A square piece of cardboard is to be formed into an open–topped box by cutting 3 inch squares from the corners and folding up the sides. The volume of the resulting box is given by the formula $V = 3(x - 6)^2$, where x is the original length of each side of the piece of cardboard. What is the volume of the box if the original length of each side of the piece of cardboard is 12 inches? 61) _____

A) 18 $in.^3$ B) 36 $in.^3$ C) 108 $in.^3$ D) 432 $in.^3$

62) The product of two consecutive integers is 19 more than their sum. Find the integers. 62) _____

A) 5, 6 B) –4, –3 C) 4, 5 or –4, –3 D) 5, 6 or –4, –3

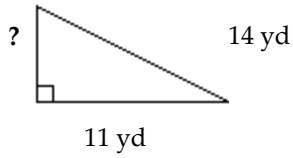
63) The product of two consecutive integers is 5 less than 5 times their sum. Find the integers. 63) _____

A) 0, 1 B) 9, 10 C) 0, 1 or 10, 11 D) 0, 1 or 9, 10

64) Two cars leave an intersection. One car travels north; the other east. When the car traveling north had gone 12 miles, the distance between the cars was 4 miles more than the distance traveled by the car heading east. How far had the eastbound car traveled? 64) _____

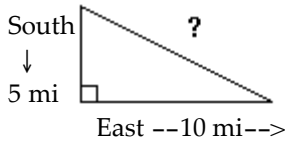
A) 16 mi B) 24 mi C) 12 mi D) 20 mi

65) The diagram below shows a rope connecting the top of a pole to the ground. The rope is 14 yd long and touches the ground 11 yd from the pole. How tall is the pole? Round approximations to the nearest tenth. 65) _____



A) 8.7 yd B) 37.5 yd C) 4.4 yd D) 12.5 yd

66) A long–distance runner runs 5 miles south and then 10 miles east. How far is the runner from the starting point? Round approximations to the nearest tenth. 66) _____



A) 5.6 mi B) 62.5 mi C) 7.5 mi D) 11.2 mi

Solve the problem. Round to the nearest tenth, if necessary.

67) If an object is propelled upward from ground level with an initial velocity of 42.1 feet per second, its height h in feet t seconds later is given by the equation $h = -16t^2 + 42.1t$. After how many seconds does the object hit the ground? 67) _____

A) 1.3 sec B) 0.4 sec C) 2.6 sec D) 5.3 sec

68) If an object is thrown upward with an initial velocity of 128 ft/sec, its height after t sec is given by $h = 128t - 16t^2$. Find the maximum height attained by the object. (The object will attain maximum height exactly at the halfway point in terms of the time t, where t = 0 is at the beginning of the object's flight, and the final time is when the object hits the ground.) 68) _____

A) 240 ft B) 112 ft C) 256 ft D) 128 ft

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Provide an appropriate response.

69) Tina was asked to solve the following problem: "The product of two consecutive numbers is 90. Find the numbers." Tina's solution is given below. Do you agree with her conclusion? If not, why not? 69) _____

$x(x + 1) = 90$
$x^2 + x = 90$
$x^2 + x - 90 = 0$
$(x + 10)(x - 9) = 0$
$x = -10$ or $x = 9$

The pair of numbers is 9 and 10

70) If an object is dropped, the distance it falls after t seconds is given by $d = \frac{1}{2}gt^2$. A student is determining how long it would take an object to fall 57 feet on planet x having gravity 12 ft/sec^2. The student determines the two solutions $t = \pm\frac{19}{2}$. Are both correct answers? Why or why not? 70) _____

1) C
2) C
3) A
4) A
5) A
6) B
7) B
8) A
9) B
10) D
11) A
12) A
13) A
14) C
15) B
16) D
17) D
18) C
19) D
20) B
21) C
22) The factorization yields a middle term of –2x rather than 2x:
$x^2 + 2x - 15 = (x + 5)(x - 3)$
23) D
24) C
25) B
26) D
27) C
28) D
29) A
30) D
31) D
32) A
33) C
34) A
35) B
36) C
37) B
38) C
39) D
40) B
41) D
42) C
43) D
44) A
45) A
46) A
47) A
48) B
49) C

50) C
51) C
52) C
53) C
54) C
55) D
56) B
57) Setting $6x = 0$ is not a problem because $x = \frac{0}{6} = 0$.
58) C
59) D
60) A
61) C
62) D
63) D
64) A
65) A
66) D
67) C
68) C
69) There is nothing in the problem to suggest that the two numbers must be positive thus there is no reason to discard the negative solution. There are two solutions: the pair of numbers is 9 and 10 or –10 and –9.
70) $t = -\frac{19}{2}$ gives negative time which is not correct.