115 Chapter 5 Practice
Disclaimer: The actual exam differs

Factor out the largest common factor and write the polynomial in factored format.

1) $t^8 - 8t^6$ GCF $= t^6$

$= t^6(t^2 - 8)$

1) $t^6(t^2-8)$

Factor out the largest common factor.

2) $x^7 - 23xb^3 + 5x^3b^4 - 37x^7b^3$ GCF $= x$

$= x(x^6 - 23b^3 + 5x^2b^4 - 37x^6b^3)$

2) $x(x^6 - 23b^3 + 5x^2b^4 - 37x^6b^3)$

3) $8x^{12} - 16x^9 + 24x^6 - 32x^3$ GCF $= 8x^3$

$= 8x^3(x^9 - 2x^6 + 3x^3 - 4)$

3) $8x^3(x^9 - 2x^6 + 3x^3 - 4)$

Factor completely.

4) $y^2(y+4) - 10(y+4)$ GCF $= (y+4)$

$= (y+4)(y^2 - 10)$

4) $(y+4)(y^2-10)$

5) $8x^2(x-9) + (x-9)$

$= (x-9)(8x^2+1)$

5) $(x-9)(8x^2+1)$

Factor by grouping, if possible.

6) $x^3 - 8x^2 + 5x - 40$

$= x^2(x-8) + 5(x-8)$

$= (x-8)(x^2+5)$

6) $(x-8)(x^2+5)$

7) $4x^3 - 24x^2 - 3x + 18$

$= 4x^2(x-6) - 3(x-6)$

$= (x-6)(4x^2-3)$

7) $(x-6)(4x^2-3)$

8) $12x^3 + 15x^2 - 20x - 25$

$3x^2(4x+5) - 5(4x+5)$

$= (4x+5)(3x^2-5)$

8) $(4x+5)(3x^2-5)$

Factor completely. If the polynomial is prime, state this.

9) $x^2 - 3x - 54$

$= (x+6)(x-9)$

9) $(x+6)(x-9)$

10) $x^2 + 12x + 36$

$= (x+6)^2$ or $(x+6)(x+6)$

10) $(x+6)^2$

11) $x^2 + 10x + 25$

$= (x+5)^2$ or $(x+5)(x+5)$

11) $(x+5)^2$

12) $-4b - 45 + b^2$ put in descending order 1st

$= b^2 - 4b - 45$

$= (b+5)(b-9)$

12) $(b+5)(b-9)$

13) $a^2 - 12a + 32 = (a-8)(a-4)$

13) $(a-8)(a-4)$

14) $x^3 + 2x^2 - 63x$ always factor out GCF 1st

$= x(x^2 + 2x - 63)$

$= x(x+9)(x-7)$

14) $x(x+9)(x-7)$

15) $x^2+\frac{6}{5}x+\frac{9}{25}$ = $(x+\frac{3}{5})^2$ or $(x+\frac{3}{5})(x+\frac{3}{5})$

15) $(x+\frac{3}{5})^2$

16) $x^2+\frac{1}{6}x-\frac{1}{6}$ -> [illegible]

$(x-\frac{1}{3})(x+\frac{1}{2})$

16) $(x-\frac{1}{3})(x+\frac{1}{2})$

17) $2x^2-6xy-8y^2$ Factor out GCF 1ST

$=2(x^2-3xy-4y^2)$

$=2(x+y)(x-4y)$

17) $2(x+y)(x-4y)$

18) $64x^2-144x+81$

$=(8x-9)^2$ or $(8x-9)(8x-9)$

18) $(8x-9)^2$

19) $10x^2+21x+9$

$=(2x+3)(5x+3)$

Using TRIAL & Error

OR IF using grouping method

REWRITE

$=10x^2+15x+6x+9$

$=5x(2x+3)+3(2x+3)$

$=(2x+3)(5x+3)$

19) $(2x+3)(5x+3)$

20) $9z^2-6z-8$

$=(3z-4)(3z+2)$

OR IF using Grouping

$-9z^2-12z+6z-8$

$=3z(3z-4)+2(3z-4)$

$=(3z-4)(3z+1)$

20) $(3z-4)(3z+2)$

21) $100x^3+145x^2+25x$ Factor out GCF 1ST

$=5x(20x^2+29x+5)$

$=5x(5x+1)(4x+5)$

OR IF using grouping

$5x[20x^2+25x+4x+5]$

$=5x[5x(4x+5)+(4x+5)]$

$=5x[4x+5][5x+1]$

21) $5x(5x+1)(4x+5)$

or IF using Grouping

22) $6x^2 + 7xt + 2t^2$

$= (2x+t)(3x+2t)$

$6x^2 + 3xt + 4xt + 2t^2$

$= 3x(2x+t) + 2t(2x+t)$

$= (2x+t)(3x+2t)$

22) $(2x+t)(3x+2t)$

23) $x^2 + 30x + 225 = (x+15)^2$ or $(x+15)(x+15)$

23) $(x+15)^2$

24) $-12x^3 + 48x^2 - 45x$ Factor out GCF 1ST

IF using grouping

$= -3x(4x^2 - 16x + 15)$

$= -3x(2x-5)(2x-3)$

$-3x[4x^2 - 6x - 10x + 15]$

$= -3x[(2x)(2x-3) - 5(2x-3)]$

$= -3x(2x-3)(2x-5)$

24) $-3x(2x-5)(2x-3)$

25) $16x^2 + 56xy + 49y^2$

$= (4x+7y)^2$ or $(4x+7y)(4x+7y)$

25) $(4x+7y)^2$

26) $y^2 - 25 = (y+5)(y-5)$

use: $a^2 - b^2 = (a+b)(a-b)$

26) $(y+5)(y-5)$

27) $49x^2 - 4 = (7x+2)(7x-2)$

use $a^2 - b^2 = (a+b)(a-b)$

27) $(7x+2)(7x-2)$

28) $64x^2 + 9$ prime

$a^2 + b^2$ is not factorable

28) prime

or if using grouping

29) $2x^2 + 3xy - 14y^2$

$= (2x+7y)(x-2y)$

$= 2x^2 - 4xy + 7xy - 14y^2$

$= 2x(x-2y) + 7y(x-2y)$

$= (x-2y)(2x+7y)$

29) $(2x+7y)(x-2y)$

Factor completely. * cubes formulas $a^3+b^3 = (a+b)(a^2-ab+b^2)$ $a^3-b^3 = (a-b)(a^2+ab+b^2)$

30) $x^3 - 216$

$= x^3 - 6^3 =$

$(x-6)(x^2+6x+36)$

30) $(x-6)(x^2+6x+36)$

31) $54k^3m - 250m^4$ use * above

$= 2m(27k^3 - 125m^3) =$

$2m[(3k)^3 - (5m)^3]$

$= 2m(3k-5m)(9k^2+15km+25m^2)$

31) $2m(3k-5m)(9k^2+15km+25m^2)$

32) $216s^3 + 1$ use * above

$= (6s)^3 + 1^3 =$

$(6s+1)(36s^2 - 6s + 1)$

32) $(6s+1)(36s^2-6s+1)$

33) $t^3 + 1000$ us * above

$t^3 + 10^3$

$= (t+10)(t^2-10t+100)$

33) $(t+10)(t^2-10t+100)$

Solve by factoring and using the principle of zero products.

34) $a^2 - 20a + 96 = 0$

$(a-8)(a-12) = 0$

$a-8=0$ or $a-12=0$

$a=8$ or $a=12$

34) $8, 12$

35) $b^2 + 12b = 0$

$b(b+12) = 0$

$b=0$ or $b+12=0$

$b=0$ $b=-12$

35) $-12, 0$

36) $m^2 - \frac{4}{9} = 0$

$(m + 2/3)(m - 2/3) = 0$

$m + 2/3 = 0$ or $m - 2/3 = 0$

$m = -2/3$ $\quad m = 2/3$

36) $-2/3, 2/3$

37) $(x-1)(x-5) = -4$ put in standard form 1ST $ax^2+bx+c=0$

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

$x^2 - 6x + 9 = 0$

$(x-3)^2 = 0$

$x - 3 = 0$

$x = 3$

37) 3

38) $x^2 - x = 56$ put in standard form 1ST

$x^2 - x - 56 = 0$

$(x+7)(x-8) = 0$

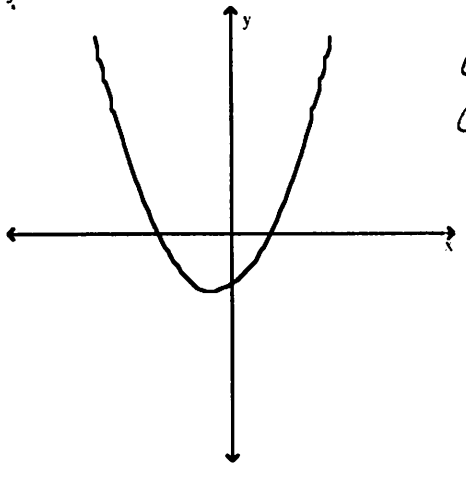
$x + 7 = 0$ or $x - 8 = 0$

$x = -7$ or $x = 8$

38) $-7, 8$

Find the x-intercepts for the graph of the equation.

39) $y = x^2 + 4x - 32$



Let $y = 0$

$0 = x^2 + 4x - 32$

$0 = (x+8)(x-4)$

$x + 8 = 0$ $\quad x - 4 = 0$

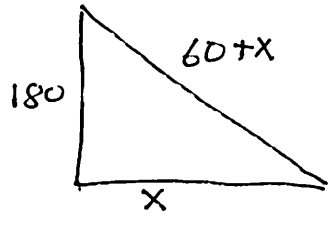
$x = -8$ $\quad x = 4$

so x-intercepts are $(-8, 0)$ and $(4, 0)$

39) $(-8, 0)$ $(4, 0)$

Solve the problem.

40) A lot is in the shape of a right triangle. The shorter leg measures 180 meters. The hypotenuse is 60 meters longer than the length of the longer leg. How long is the longer leg?



Let x = Length of Longer Leg

pythagorean theorem: $Leg^2 + Leg^2 = hypotenuse^2$

$180^2 + x^2 = (60+x)^2$

$32400 + x^2 = 3600 + 120x + x^2$ (subtract x^2 both sides)

$32400 = 3600 + 120x$

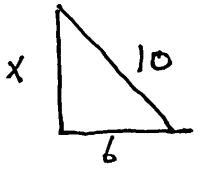
$28800 = 120x$

$\frac{28800}{120} = x$ $\quad x = 240$ meters

40) 240 meters

41) A 10-ft ladder is leaning against a building. If the bottom of the ladder is 6 ft from the base of the building, how high does the ladder reach? 41) 8 ft

Let x = height



$x^2+6^2=10^2$ By Pythagorean thm.

$x^2+36=100$

$x^2-64=0$

$(x+8)(x-8)=0$

$x+8=0$ $x-8=0$

$x=-8$ $x=8$

x cannot be negative

42) The product of two consecutive integers is 6 less than 6 times their sum. Find the integers. 42) 0, 1 or 11, 12

2 consecutive integers are x and $x+1$

$(x)(x+1)=6(x+x+1)-6$

$x^2+x=12x+6-6$

$x^2+x=12x$

$x^2-11x=0$

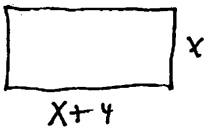
$x(x-11)=0$

$x=0$ or $x=11$

If $x=0 \rightarrow x+1=1$; If $x=11 \rightarrow x+1=12$

43) A room has a floor area of 140 square feet. One dimension is 4 feet more than the other. Find the dimensions of the room. 43) 10 ft, 14 ft

Let x = width, so $x+4$ = length



Area = Length × width

Area = $140 = x(x+4)$

$140 = x^2+4x$

$0 = x^2+4x-140$

$(x-10)(x+14)=0$

$x-10=0$ $x+14=0$

$x=10$ $x=-14$

$x=10$ is correct as x cannot be negative

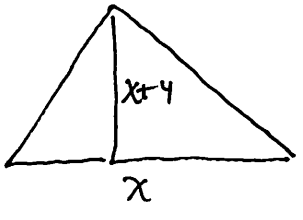
44) The height of a triangle is 4 cm more than the length of the base. If the area of the triangle is 96 cm^2, find the height and length of the base. 44)

height 16 cm

base 12 cm

Let x = Base length

$x+4$ = height



Area of a $\Delta = \frac{1}{2}$ Base × height

$96 = \frac{1}{2}x(x+4)$

$96 = \frac{1}{2}x^2+2x$

multiply both sides by 2 to clear fractions

$96(2) = 2(\frac{1}{2}x^2+2x)$

$192 = x^2+4x$

$0 = x^2+4x-192$

$0 = (x+16)(x-12)$

$x+16=0$ or $x-12=0$

$x=-16$ $x=12$

Since x cannot be negative we have only answer for x

$x = 12$ cm is the base

hence the height is $x+4$

$= 12+4 = 16$ cm

1) $t^6(t^2 - 8)$
2) $x(x^6 - 23b^3 + 5x^2b^4 - 37x^6b^3)$
3) $8x^3(x^9 - 2x^6 + 3x^3 - 4)$
4) $(y + 4)(y^2 - 10)$
5) $(x - 9)(8x^2 + 1)$
6) $(x - 8)(x^2 + 5)$
7) $(x - 6)(4x^2 - 3)$
8) $(4x + 5)(3x^2 - 5)$
9) $(x + 6)(x - 9)$
10) $(x + 6)^2$
11) $(x + 5)^2$
12) $(b + 5)(b - 9)$
13) $(a - 8)(a - 4)$
14) $x(x + 9)(x - 7)$
15) $\left(x + \frac{3}{5}\right)^2$
16) $\left(x - \frac{1}{3}\right)\left(x + \frac{1}{2}\right)$
17) $2(x + y)(x - 4y)$
18) $(8x - 9)^2$
19) $(2x + 3)(5x + 3)$
20) $(3z - 4)(3z + 2)$
21) $5x(5x + 1)(4x + 5)$
22) $(2x + t)(3x + 2t)$
23) $(x + 15)^2$
24) $-3x(2x - 5)(2x - 3)$
25) $(4x + 7y)^2$
26) $(y + 5)(y - 5)$
27) $(7x + 2)(7x - 2)$
28) Prime
29) $(2x + 7y)(x - 2y)$
30) $(x - 6)(x^2 + 6x + 36)$
31) $2m(3k - 5m)(9k^2 + 15km + 25m^2)$
32) $(6s + 1)(36s^2 - 6s + 1)$
33) $(t + 10)(t^2 - 10t + 100)$
34) 8, 12
35) -12, 0
36) $-\frac{2}{3}, \frac{2}{3}$
37) 3, 3
38) -7, 8
39) (-8, 0), (4, 0)
40) 240 meters
41) 8 ft

42) 0, 1 or 11, 12
43) 10 feet, 14 feet
44) height: 16 cm; base: 12 cm