

Math 10 Answers.

Chapters 1-9 Cumulative Review

1. To verify if the given point is a solution, use the values of x and y in both equations. If the values work in both equations, then the point is a solution.

a) Yes b) No

2. \$238.36

3. a) $\frac{4}{5}$ b) $\frac{3}{5}$

c) $\frac{3}{5}$ d) $\frac{4}{5}$

e) $\frac{4}{3}$ f) $\frac{3}{4}$

4. a) 64 b) -625

c) 49 d) $-\frac{27}{5}$

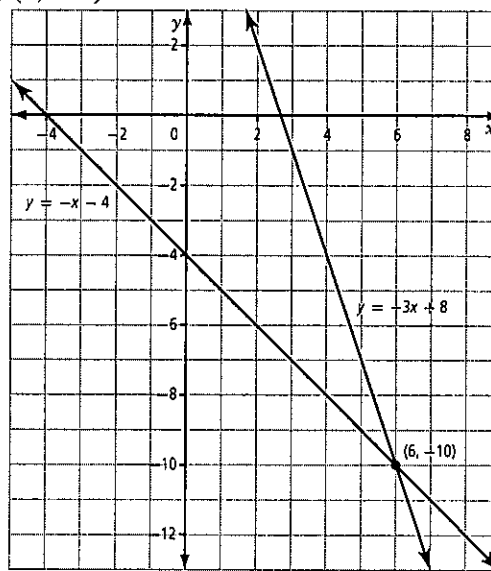
e) $\frac{3}{64}$ f) $-\frac{1}{125}$

5. a) $-56n^2 + 102n - 27$

b) $-4s^4 - 6s^3 + 21s^2 + 13s - 15$

6. Example: It takes Jon 5 s to reach the bottom of the first hill on his bike. For a few seconds, Jon pedals to maintain his speed on a flat section of road. He then begins to go down a second hill and continues to accelerate. At the bottom of the hill, the road rises up. Jon coasts up the third hill as his speed slows. At the top, Jon maintains his speed by pedalling until he reaches a slight decline, at which point he begins to accelerate again. He then maintains this speed by pedalling.

7. a) (6, -10)





18. a) $x^{\frac{23}{5}}$

c) z^4

e) $x^{200}y^{125}$

b) $\frac{1}{64}$

d) $\frac{1}{5p^{\frac{5}{2}}}$

f) $\frac{x^{\frac{9}{4}}(0.16)^{\frac{3}{4}}}{y^{\frac{9}{2}}}$

19. a) $(4x - 1)(x + 2)$

b) $(x - 3)(x - 6)$

c) $-3(2m - 3n)(4m - n)$

d) $(7x + 2y)(5x - 3y)$

e) $12t(s + 6)(s - 4)$

20. a) $(4, -2)$

b) $(-1, 8)$

21. 176 miles; 50 km; 66 ft; 213 m

22. a) 0.67 ft

b) 5.85 cm

c) 4.33 m

d) 9.40 cm

23. a) $\frac{4}{9}, 0.777\dots, \sqrt[3]{634}, \sqrt{82}$; The last two numbers are irrational.

b) $\sqrt[3]{67}, \sqrt[4]{1296}, 14\frac{1}{3}, \sqrt{289}; \sqrt[5]{67}$ is irrational.

24. $[-18.4, 69.8]$

25. a) slope-intercept form: $y = 3x + 5$;

general form: $3x - y + 5 = 0$

b) slope-intercept form: $y = \frac{3}{4}x - \frac{45}{4}$;

general form: $3x - 4y - 45 = 0$

26. a) $(c - 13)(c + 13)$

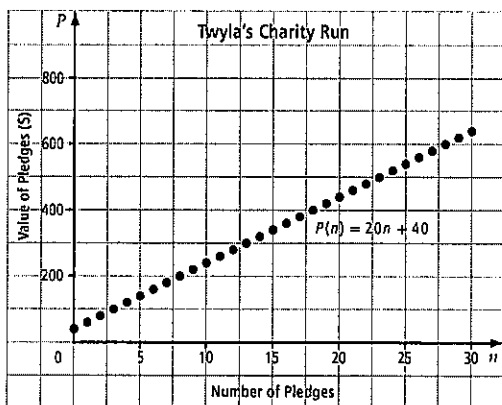
b) $(9 + 4y^2)(3 - 2y)(3 + 2y)$

c) $7(5h - 12f)(5h + 5f)$

d) $(x - 4)(x + 4)(x - 5)(x + 5)$

27. a) Example: domain: $\{x | 0 \leq x \leq 30, x \in \mathbb{N}\}$;

range: $\{y | y \geq 40, y \in \mathbb{N}\}$



b) If there were 9 pledges, there would be a total of \$220 in funds.

c) 24 pledges

d) This situation depicts a function because for every value in the domain there is a unique value in the range.

28. $y = \frac{5}{4}x + \frac{5}{2}$

29. a) $(3s - 9)^2$

b) $s(4s + 12)^2$

c) $(16 - 5y)^2$

30. a) 15.2 cm; 152 mm b) 5.98 in.

c) No, it is not necessary to measure the figure three times. It only needs to be measured once. That measurement can then be converted to the other required units.

31. 6.3 ft

32. a) $2\sqrt{10}$

b) $3\sqrt{2}$

c) $3\sqrt[3]{4}$

d) $3\sqrt[4]{2}$

33. A: undefined; B: $-\frac{3}{5}$; C: $\frac{1}{5}$; D: 5; E: 0



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Green buckles Answers.

Notes/Steps

Each question is written response. Show all of your work.

30. Marco has a gross income of \$47,000. He pays CPP and EI (both are tax deductible). His federal tax rate is 15% and his provincial tax rate is 5.05%. Calculate the total tax he pays and his yearly net income.

Find CPP/EI
Using formula on formula page.
Add together.

Deductions (CPP and EI):
 $CPP = (47,000 - 3500) \times 0.0495 = \$2,153.25$
 $EI = 47,000 \times 0.0163 = \766.10
 Total = $2,153.25 + 766.10 = 2,919.35$

Fed taxable income: $47,000 - 2,919.35 - 1,163.5 = \$32,917.15$

Taxable = Fed description
 Gross - CPP/EI - 1163.5 = 1533
 Fed tax: $32,917.15 \times 0.15 = 4,937.57$

Prov taxable income: $47,000 - 2,919.35 - 1,020.7 = \$33,059.95$

Prov tax = $33,059.95 \times 0.0506 = 1,672.81$

Total Tax: $4,937.57 + 1,672.81 = 6,610.38$

Net Income = Gross - tax - CPP/EI
 $47,000 - 6,610.38 - 2,919.35 = 37,470.27$

Yearly Net Income: $37,470.27$

Notes/Steps

Sequences
means t_n

$t_1 = 6$
 $d = 7$
 $n = 45$
 $t_n = ?$

For word problems,
it helps to write
out the pattern:

$t_1 = 6$
 $d = 7$
 $n = ?$
 $t_n = 20$

Each question is written response. Show all of your work.

24. Determine the 45th term for this arithmetic sequence. (2 marks)

$6, 13, 20, \dots$

$t_n = t_1 + d(n-1)$
 $t_x = 6 + 7(45-1)$
 $t_n = 6 + 7(44)$
 $t_n = 6 + 308$
 $t_n = 314$

25. Mary is training for a 20km race. In week 1, she runs 6 km. Each week she increases her run by 2km. In what week will she run 20km? (2 marks)

$t_n = 6 + 2(n-1)$
 $20 = 6 + 2(n-1)$
 $20 = 6 + 2n - 2$
 $20 = 4 + 2n$
 $16 = 2n$
 $8 = n$

She runs 20km in week 8.

26. Determine the number of terms for this arithmetic series (2 marks)

$t_1 = 4, t_n = 60, S_n = 384$

$S_n = \frac{n}{2}(t_1 + t_n)$
 $384 = \frac{n}{2}(4 + 60)$
 $384 = \frac{n(64)}{2}$
 $384 = 32n$
 $12 = n$

Series = S_n
- list what you know
- if you're missing too much, you may need a side trip using
 $t_n = t_1 + d(n-1)$
- find something to fill in what you know
- solve for what's missing

27. $S_n = 230, t_1 = 5$, find d (2 marks)

$S_n = \frac{n}{2}(t_1 + t_n)$
 $230 = \frac{n}{2}(5 + t_n)$
 $230 = \frac{n}{2}(5 + 5 + 4d)$
 $46 = 5 + 4d$
 $41 = 4d$
 $10.25 = d$

Notes/Steps

Rounded:

- 52 weeks
- 26 bi-weekly
- 12 monthly
- 24 semi-monthly
- % \Rightarrow decimal (100)
- $4\% = 0.04$
- Annual: year

Gross: no deductions

Net: gross - deductions (CPP/Tax)

* If help to change to years when they are all in different time frames. Then answer in correct format at the end.
* Read carefully! Are you going net \geq gross or gross \geq net?

Each question is written response. Show all of your work.

Chapter 7

28. Pete earns an annual salary of \$67 300. This year he will receive a 4% bonus. Scott earns \$1040/week in wages and an average of \$170 in tips per week. Who earned more gross income this year, and by how much?

Pete	Scott
\$67 300	\$1040 x 52 weeks = \$54 080
+ 4% bonus: $0.04 \times 67300 = 2692$	\$170 x 52 = \$8840
Total = \$67 300 + 2692 = \$69 992	Total = \$54 080 + \$8840 = \$62 920

by how much? subtract: $69992 - 62920 = \$7072$
Pete earns \$7072 more this year.

29. Janet's net pay is \$1164 for a 35 hour week. Her personal annual taxes are \$14 763, CPP is \$2564 and EI is \$836. What is her gross bi-weekly pay? What is her gross pay per hour?

$1164 \text{ per week} \times 52 = \$60 528 \text{ annual net}$
 $\text{Gross} = \text{Net} + \text{tax} + \text{CPP} + \text{EI}$
 $= 60 528 + 14 763 + 2564 + 836$
 $= \$78 691 \text{ Net annual}$
 $\frac{\$78 691}{4} \div 26 = \3026.58
 $\frac{\$3026.58}{2} = \1513.29
 $\frac{\$1513.29}{35 \text{ hours}} = \$43.24 \text{ Gross Pay Per Hour}$

Notes/Steps

Each question is written response. Show all of your work.

Chapter 6

18. Solve the linear system by graphing: (2 marks)

1. $3x + 2y = 12$

2. $3x - y = 3$

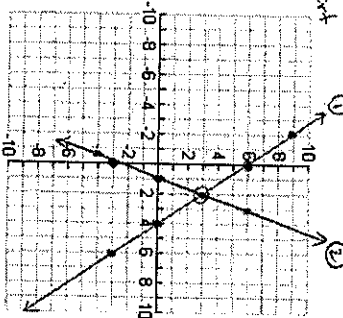
① $3x + 2y = 12$

$2y = -3x + 12$

$y = -\frac{3}{2}x + 6$

$m = -\frac{3}{2}$

$b = 6$



Solution: (2, 3)

19. Solve the following linear system: (2 marks) *Choose substitution or both. One of each shown here.

① $-6x + y = 21$ and ② $x + 9y = 24$

① $y = 6x + 21$

$x + 9(6x + 21) = 24$

$x + 54x + 189 = 24$

$55x = -165$

$x = -3$

$y = 6(-3) + 21 = -18 + 21 = 3$

Solution: (-3, 3)

- Substitution:
- 1) Solve one equation for X or Y
 - 2) Sub into other eq (use brackets)
 - 3) expand, solve for one variable
 - 4) Sub answer back in to original equation to get other variable
- Addition (Solve simultaneous):
- 1) Multiply one or both eqs by a constant
 - 2) Add eqs together (same columns). Solve min eqn that remains.
 - 3) Sub variable (x) back into any eqn to get other variable (y)

Notes/Steps

Each question is written response. Show all of your work.

Word Problems:

1) Make "let" statements. Choose variables for what you need to find.

2) Build 2 equations

3) Solve 5y system (either method)

4) Write solution in words.

Let n = cost of smoothie
Let s = cost of smoothie

① $3n + 4s = 33.75$

② $5n + 2s = 35.25$

14 cost \$4.50 for one smoothie.

23. Determine the number of terms in this arithmetic sequence: (2 marks)

$t_1 = -10, d = 6, t_n = 146$

$t_n = t_1 + d(n-1)$

$146 = -10 + 6(n-1)$

$146 = -10 + 6n - 6$

$146 = -16 + 6n$

$146 + 16 = -16 + 6n + 16$

$162 = 6n$

$27 = n$

22. Carly and Joel buy some Hot Dogs and some Smoothies for their friends at the Spanish Fair. Carly bought 3 Hot Dogs and 4 Smoothies for a total of \$33.75. Joel bought 5 Hot Dogs and 2 Smoothies for \$35.25. How much did it cost to buy one Smoothie? (3 marks)

Let n = cost of smoothie
Let s = cost of smoothie

① $3n + 4s = 33.75$

② $5n + 2s = 35.25$

$15n + 20s = 168.75$

$15n + 10s = 176.25$

$10s = -7.5$

$s = -0.75$

$3n + 4(-0.75) = 33.75$

$3n - 3 = 33.75$

$3n = 36.75$

$n = 12.25$

$s = 4.50$

There are 100 nickels and 300 dimes.

21. There is a collection of nickels and dimes. The number of dimes is three times the number of nickels. The total value of the collection is \$5.00. How many of each coin are there. Solve using system of equations. (3 marks)

Let n = # nickels
Let d = # dimes

① $d = 3n$

② $0.05n + 0.10d = 35$

$0.05n + 0.10(3n) = 35$

$0.05n + 0.30n = 35$

$0.35n = 35$

$n = 100$

$d = 300$

There are 100 nickels and 300 dimes.

Notes/Steps

Clear fractions if needed
 Expand into brackets

Collect x's on left, collect constants on right

Make sure x term is +

- Find m =
- Find b =
- Put into $y = mx + b$
- Reorganize standard (see above)

Some steps

15. What is the equation of the line below, in standard form? (2 marks)

$$y = mx + b$$

$$y = \frac{1}{3}x + 3$$

$$(1) y = \frac{1}{3}x + 3 \quad (2)$$

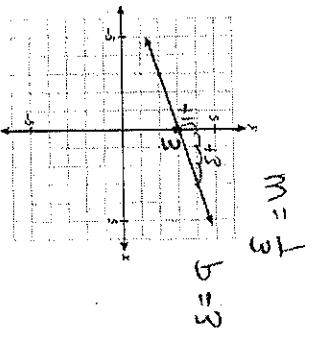
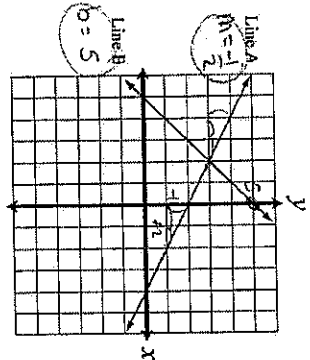
$$(3) y = \frac{1}{3}x + 3 \quad (3)$$

Remember to flip sign positive y's

$$3y = x + 9$$

$$-x + 3y = 9$$

$$x - 3y = -9$$



Notes/Steps

"Passing through" gives you the x and y to sub in

"parallel to" gives you slope (same)

- Write formula
- Fill in knowns
- Solve for what's missing
- Rewrite equation

Rate is slope! (m)
 Find 2 "points" and use formula

- Write formula
- Call in knowns (use points)
- Solve for b
- Rewrite equation

Plug in time to get cost or cost to get time.
 How many need to solve.

Each question is written response. Show all of your work.

16. Determine an equation of the line passing through the point (9, -3) and parallel to the line segment joining A(4, 7) and B(1, 5), in slope-intercept form. (3 marks)

Point: (9, -3)

Slope (same as...)

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{5 - 7}{1 - 4} = \frac{-2}{-3} = \frac{2}{3}$$

$$y - y_1 = m(x - x_1)$$

$$y - (-3) = \frac{2}{3}(x - 9)$$

$$y + 3 = \frac{2}{3}x - 6$$

$$y = \frac{2}{3}x - 9$$

17. A plumbing company charges a fixed amount, plus an hourly rate for a service call. A two hour service call is \$145, and a four hour service call is \$255. (4 marks)

a. Find the hourly rate.

$$\text{rate} = m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{255 - 145}{4 - 2} = \frac{110}{2} = \$55/\text{hr}$$

b. Find the fixed amount cost. (use point (2, 145))

$$y = mx + b$$

$$145 = 55(2) + b$$

$$145 = 110 + b$$

$$b = 35$$

The fixed cost is \$35.

Write the equation that now describes this relation.

$$y = 55x + 35$$

or $C = 55t + 35$

(can use other variables) etc.

Use the equation in (c) to find the total cost of 27 hours of work

$$y = 55(27) + 35$$

$$y = 1485 + 35$$

$$y = 1520$$

The total cost for 27h is \$1520.

Notes/Steps

Each question is written response. Show all of your work.

- Label points
- Use Slope Formula (brackets under)
- reduce if needed

Parallel Lines:
same slope

Perpendicular Lines:
Slope's are "negative reciprocal" (flip + change sign)
Reduce fractions!

- Sub into slope equation
- Simplify
- cross multiply
- solve for k

perpendicular:
- flip, change sign

9. Find the value of c so that the line through the points (2, 4) and (-3, 1) is perpendicular to the line through the points (1, 1) and (-2, 9). (2 marks)

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{4 - 1}{2 - (-3)} = \frac{3}{5}$$

$$m_{\perp} = \frac{c - 1}{1 - (-2)} = \frac{c - 1}{3}$$

$$\frac{3}{5} \cdot \frac{c - 1}{3} = -1$$

$$c - 1 = -5$$

$$c = -4$$

6. A line segment has endpoints A(-7, 3) and B(8, -2). Determine the slope of AB. (2 marks)

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{-2 - 3}{8 - (-7)} = \frac{-5}{15} = -\frac{1}{3}$$

Slope of AB:

$$m = -\frac{1}{3}$$

7. Line AB passes through (9, 3) and (-4, 7). Line CD passes through (4, -3) and (8, 10). Are these lines parallel, perpendicular, or neither? (2 marks)

AB $m = \frac{7 - 3}{8 - 9} = -4$

CD $m = \frac{10 - (-3)}{8 - 4} = \frac{13}{4}$

Perpendicular

8. The slope of a line segment joining M(-6, 3) and N(4, k) is $\frac{3}{5}$. Determine the value of k. (2 marks)

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{k - 3}{4 - (-6)} = \frac{k - 3}{10} = \frac{3}{5}$$

$$5(k - 3) = 30$$

$$5k - 15 = 30$$

$$5k = 45$$

$$k = 9$$

Notes/Steps

Each question is written response. Show all of your work.

Chapter 5

$$y = mx + b$$

- > get y term to left side
- > move other terms to right side (add or subtract)
- > divide by coefficient of y

- > make sure y is alone

- > m = slope b = y-intercept (0, b)
- > solve for b

10. Convert to slope-intercept form. What is the slope and the y-intercept of the following? (2 marks)

$$3x - 4y + 4 = 0$$

$$-4y = -3x - 4$$

$$y = \frac{3}{4}x + 1$$

Slope-intercept form: $y = \frac{3}{4}x + 1$

11. The graph of $y = 4x + b$ passes through the point (-20, 0). Determine the value of b. (2 marks)

$$y = 4x + b$$

$$0 = 4(-20) + b$$

$$0 = -80 + b$$

$$b = 80$$

12. Convert $y = \frac{2}{5}x + \frac{3}{4}$ to standard form. (2 marks)

clear fractions (multiply all terms by denominators)

$$(4)(5)y = \frac{(2)(5)}{5}x + \frac{(3)(5)}{4}$$

$$20y = 2x + \frac{15}{4}$$

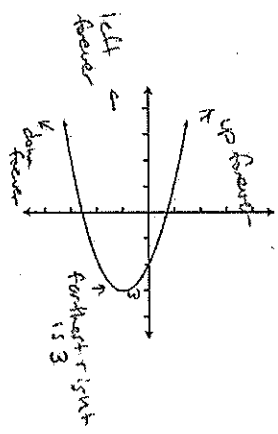
$$80y = 8x + 15$$

- make sure x term is positive (+1 if needed)
- make sure x term is positive
- no fractions
- x, y on left side
- x term is positive

Notes/Steps 2019-2020 #1-3
 skip Each question is written response. Show all of your work.

Chapter 4

1. What is the domain and range of the following: (2 marks)



Domain: $x \leq 3$ Range: $y \in \mathbb{R}$
 x is less than or equal to 3
 y is all real #s

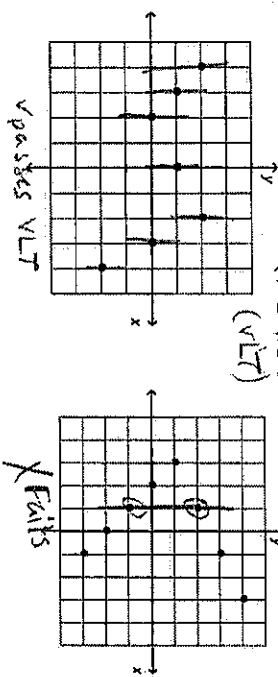
2. State whether the following are relations, functions or one-to-one functions: (3 marks)

- a. $(4, 2), (3, 0), (7, 1), (1, 0)$
 relation: \mathbb{N} function: \mathbb{N} 1-to-1 function: \mathbb{N}
 repeats in y
- b. $(1, 5), (2, 9), (4, 17), (5, 21)$
 relation: \mathbb{N} function: \mathbb{N} 1-to-1 function: \mathbb{N}

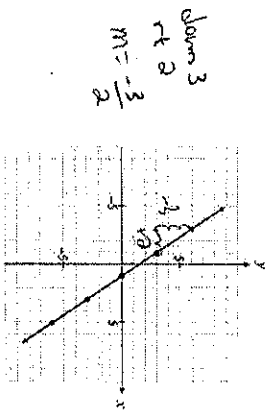
function -
 no x repeats
 repeats
 one-to-one
 no x repeats
 no y repeats
 relation: \mathbb{N} function: \mathbb{N} 1-to-1 function: \mathbb{N}
 repeats in x \therefore not 1-1 either

Notes/Steps Each question is written response. Show all of your work.

3. Are the following relations also functions? (2 marks)
 a) function \mathbb{N} Check reflected line $x=5$
 b) function \mathbb{N} (VLT)



4. Determine the slope of the following line: (1 mark)

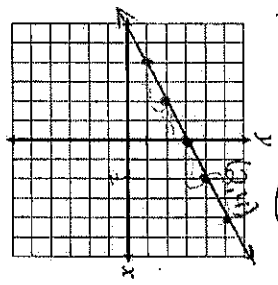


Slope = $\frac{\text{rise}}{\text{run}}$ (up/down) / (left to right)

down 3
 run 2
 $m = -\frac{3}{2}$

Slope = $-\frac{3}{2}$

5. Graph the line that passes through $(2, 4)$ and has the slope $m = \frac{3}{2}$ (2 marks)



- Plot the point (careful with x and y)
 - And travel using slope (up/down and right)
 $m = \frac{1}{2}$ rise up 1 run right 2
 (down 1 left 2)

Factoring Special Cases

Factor each completely.

1) $16n^2 - 9$

$(4n + 3)(4n - 3)$

2) $4m^2 - 25$

$(2m + 5)(2m - 5)$

3) $16b^2 - 40b + 25$

$(4b - 5)^2$

4) $4x^2 - 4x + 1$

$(2x - 1)^2$

5) $9x^2 - 1$

$(3x + 1)(3x - 1)$

6) $n^2 - 25$

$(n + 5)(n - 5)$

7) $n^4 - 100$

$(n^2 + 10)(n^2 - 10)$

8) $a^4 - 9$

$(a^2 + 3)(a^2 - 3)$

9) $k^4 - 36$

$(k^2 + 6)(k^2 - 6)$

10) $n^4 - 49$

$(n^2 + 7)(n^2 - 7)$

$$11) 98n^2 - 200 \\ 2(7n + 10)(7n - 10)$$

$$12) 3 + 6b + 3b^2 \\ 3(1 + b)^2$$

$$13) 400 - 36v^2 \\ 4(10 + 3v)(10 - 3v)$$

$$14) 100x^2 + 180x + 81 \\ (10x + 9)^2$$

$$15) 10n^2 + 100n + 250 \\ 10(n + 5)^2$$

$$16) 49n^2 - 56n + 16 \\ (7n - 4)^2$$

$$17) 49x^2 - 100 \\ (7x + 10)(7x - 10)$$

$$18) 1 - r^2 \\ (1 + r)(1 - r)$$

$$19) 10p^3 - 1960p \\ 10p(p + 14)(p - 14)$$

$$20) 343b^2 - 7b^4 \\ 7b^2(7 + b)(7 - b)$$

$$21) 81v^4 - 900v^2 \\ 9v^2(3v + 10)(3v - 10)$$

$$22) 200m^4 + 80m^3 + 8m^2 \\ 8m^2(5m + 1)^2$$

Factoring Trinomials (a = 1)

Date _____ Period _____

Factor each completely.

1) $b^2 + 8b + 7$

$(b + 7)(b + 1)$

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

$(x - 10)(x - 1)$

3) $m^2 + m - 90$

$(m - 9)(m + 10)$

4) $x^2 + 4x - 12$

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

5) $n^2 - 10n + 9$

$(n - 1)(n - 9)$

6) $b^2 + 16b + 64$

$(b + 8)^2$

7) $m^2 + 2m - 24$

$(m + 6)(m - 4)$

8) $x^2 - 4x + 24$

Not factorable

9) $k^2 - 13k + 40$

$(k - 5)(k - 8)$

10) $a^2 + 11a + 18$

$(a + 2)(a + 9)$

11) $n^2 - n - 56$

$(n + 7)(n - 8)$

12) $n^2 - 5n + 6$

$(n - 2)(n - 3)$

$$13) b^2 - 6b + 8$$
$$(b - 4)(b - 2)$$

$$14) n^2 + 6n + 8$$
$$(n + 2)(n + 4)$$

$$15) 2n^2 + 6n - 108$$
$$2(n + 9)(n - 6)$$

$$16) 5n^2 + 10n + 20$$
$$5(n^2 + 2n + 4)$$

$$17) 2k^2 + 22k + 60$$
$$2(k + 5)(k + 6)$$

$$18) a^2 - a - 90$$
$$(a - 10)(a + 9)$$

$$19) p^2 + 11p + 10$$
$$(p + 10)(p + 1)$$

$$20) 5v^2 - 30v + 40$$
$$5(v - 2)(v - 4)$$

$$21) 2p^2 + 2p - 4$$
$$2(p - 1)(p + 2)$$

$$22) 4v^2 - 4v - 8$$
$$4(v + 1)(v - 2)$$

$$23) x^2 - 15x + 50$$
$$(x - 10)(x - 5)$$

$$24) v^2 - 7v + 10$$
$$(v - 5)(v - 2)$$

$$25) p^2 + 3p - 18$$
$$(p - 3)(p + 6)$$

$$26) 6v^2 + 66v + 60$$
$$6(v + 10)(v + 1)$$