

Summer Math Preparing for Advanced Math

To assist students in retaining material from their previous math course, we require the completion of the Summer Math Packet before the first day of school in August. The work will be collected and graded, and there will be an assessment on these types of problems.

Be able to evaluate functions, simplify radicals, and factor without a calculator, so be sure to practice without a calculator.

Problems should be worked on loose-leaf with pages and problem numbers clearly labeled. All work must be in pencil. In order to receive credit, ALL work must be shown. An answer key is provided to check for accuracy.

Part A – Exponents

Simplify.

1) $2x^2 \cdot 3x^3$

2) $2a \cdot 2a^4$

3) $(4x)^2$

4) $(2k)^2$

Simplify. Your answer should contain only positive exponents.

5) $\frac{3x^2}{2x^2}$

6) $\frac{3v^3}{v^3}$

7) $\frac{n}{n \cdot 4n^2}$

8) $\frac{4n^3 \cdot 3n^3}{n^3 \cdot 3n}$

9) $\frac{4v^2}{4v^2 \cdot 2v^2}$

10) $\frac{n^3 \cdot n^2 n^3}{3n^4}$

11) $(2yx^3)^{-4}$

12) $(2x^3 y^{-1})^{-1}$

13) $\frac{4x^{-3} y^{-2}}{2y^2}$

14) $\frac{2vu^4}{2u^4 v^2}$

15) $\frac{4x^{-4} y^2}{3x^4}$

16) $\frac{3m^4 n^2}{4n^{-4}}$

Simplify.

17) $4n^{\frac{2}{3}} \cdot 2nn^{\frac{3}{2}}$

18) $x^{\frac{2}{3}} \cdot 3x^{\frac{7}{4}} \cdot 4x^{\frac{5}{4}}$

Simplify. Your answer should contain only positive exponents with no fractional exponents in the denominator.

19) $\frac{3r^{-1}}{3r^{-2}}$

20) $\frac{4v^{-\frac{3}{2}}}{v^{\frac{3}{2}}}$

Part B – Solving Linear Equations

Solve each equation.

1) $-12 + 5m - m = m - 3$

2) $3b + 3 = -1 + b + 4 + 6$

3) $-11 + 3n - 5 + 4 = 5n - 2$

4) $6p - 5 - 5p + 5 = 2p + 5$

5) $\frac{5}{3} = -\frac{4}{3}v + \frac{1}{2}v$

6) $\frac{11}{4}m + 1 - \frac{6}{5} = \frac{53}{10}$

7) $-\frac{7}{6}b + b = \frac{5}{24}$

8) $-\frac{223}{30} = -5x + \frac{7}{5} - 3$

9) $-19 = 5(1 + 2b) - 4(b + 3)$

10) $-13 = -(1 - 6p) - 3(p + 5)$

11) $-2(5r + 3) + 2(5 - 4r) = 58$

12) $6(2x - 2) - 2(x - 6) = 10$

13) $-5n + 4n = -(4 - n) + 3(3n + 5)$

14) $3(2x + 4) = 2(-2 + 4x)$

15) $6(r - 3) - 3r = 6(r - 3)$

16) $5(1 + x) = -2(-3x - 4)$

17) $\frac{1}{2}m + \frac{1}{3}m = -\frac{20}{9}$

18) $-\frac{4}{3}v + \frac{9}{5}v = \frac{14}{9}$

19) $3v + \frac{7}{5} - 2v = \frac{12}{5}$

20) $\frac{11}{4}k + 1 + \frac{1}{4} = \frac{43}{8}$

Part C – Multiplying Binomials

Find each product.

1) $(x + 1)(3x - 2)$

2) $(3x + 3)(8x + 7)$

3) $(6v - 5)(4v - 5)$

4) $(7n - 6)(6n - 8)$

5) $(7x + 5)^2$

6) $(7x - 4)(7x + 4)$

7) $(x - 7)^2$

8) $(8p + 8)^2$

9) $(b - 3)(b + 3)$

10) $(3x + 3)^2$

Part D – Evaluating Functions

Evaluate each function.

No calculator allowed.

1) $f(n) = -|n + 1| + 3$; Find $f(1)$

2) $k(x) = x^2 + 5x$; Find $k(-8)$

3) $w(x) = 3|x - 3| - 1$; Find $w(3)$

4) $k(a) = 2a^2 - 1 - 2a$; Find $k(-6)$

5) $p(n) = n^2$; Find $p(-5)$

6) $f(x) = -x^2 - 3$; Find $f(-1)$

7) $k(a) = -2a^2 + 5a$; Find $k(10)$

8) $h(n) = n^2 - 5$; Find $h(2)$

9) $p(n) = n^2 - 2$; Find $p(-3)$

10) $f(t) = t^2 + 3t$; Find $f(10)$

Part E – Simplifying Radicals

Date _____ Period _____

Simplify.

No calculator allowed. (Give exact answers.)

1) $\sqrt{50}$

2) $\sqrt{72}$

3) $\sqrt{180}$

4) $\sqrt{144}$

5) $\sqrt{343}$

6) $\sqrt{48}$

7) $\sqrt{108}$

8) $\sqrt{80}$

9) $\sqrt{128}$

10) $\sqrt{54}$

11) $\sqrt{45}$

12) $\sqrt{96}$

13) $\sqrt{32x^2}$

14) $\sqrt{45x}$

15) $\sqrt{27x}$

16) $\sqrt{20k}$

17) $\sqrt{12k}$

18) $\sqrt{125b^2}$

19) $\sqrt{36v^2}$

20) $\sqrt{50x^2}$

Summer Math Preparing for Advanced Math

Part F – Factoring

NO calculator allowed.

Factor each expression completely. Show the work that leads to your answer on loose leaf. Do **NOT** use a calculator.

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

2. $m^2 + m - 90$

3. $n^2 - 10n + 9$

4. $m^2 + 2m - 24$

5. $k^2 - 13k + 40$

6. $n^2 - n - 56$

7. $b^2 - 6b + 8$

8. $2n^2 + 6n - 108$

9. $2k^2 + 22k + 60$

10. $p^2 + 11p + 10$

11. $2p^2 + 2p - 4$

12. $x^2 - 15x + 50$

13. $p^2 + 3p - 18$

14. $3p^2 - 2p - 5$

15. $3n^2 - 8n + 4$

16. $2v^2 + 11v + 5$

17. $7a^2 + 53a + 28$

18. $15n^2 - 27n - 6$

19. $4n^2 - 15n - 25$

20. $4n^2 - 17n + 4$

21. $6x^2 + 37x + 6$

22. $6n^2 + 5n - 6$

23. $16n^2 - 9$

24. $16b^2 - 40b + 25$

25. $9x^2 - 1$

26. $n^4 - 100$

27. $k^4 - 36$

28. $98n^2 - 200$

29. $400 - 36v^2$

30. $10n^2 + 100n + 250$

Solve each equation by factoring.

1) $8(k - 8)(k + 1) = 0$

2) $p(p - 5) = 0$

3) $3(b - 6)(b - 5) = 0$

4) $(m - 5)(5m + 2) = 0$

5) $4x^2 - 192 = -8x$

6) $4k^2 - 24k = 0$

7) $8r^2 = -104r - 320$

8) $3m^2 - 15m = 0$

9) $5n^2 + 24n = 36$

10) $5a^2 - 13a = 6$

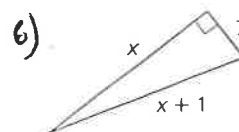
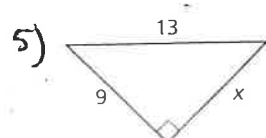
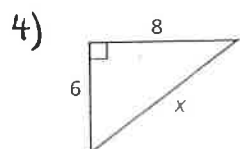
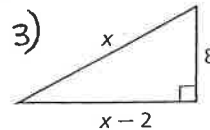
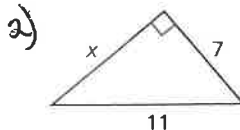
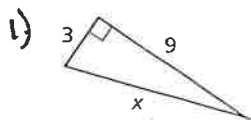
11) $0 = -b^2 - b$

12) $0 = -n^2 - 4n$

13) $n^2 - 4n = 5$

14) $-1 = -n^2$

Find the value of x . Give your answer in simplest radical form. (Use the Pythagorean Theorem.)

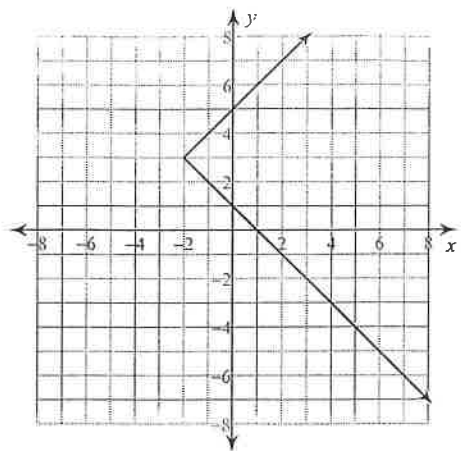


Part I – Domain, Range

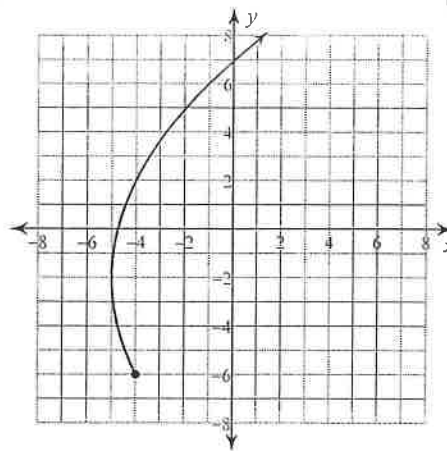
Date _____ Period _____

Each graph represents a relation. Determine the domain and range. Write answers using interval notation.

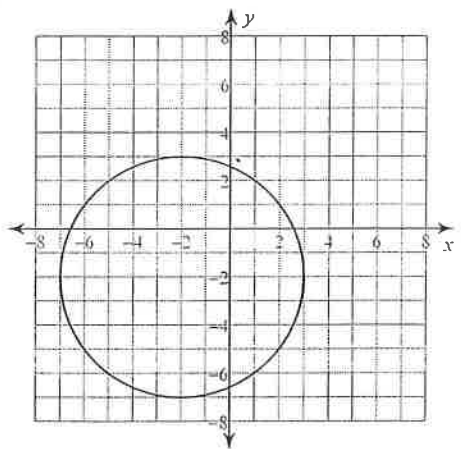
1)



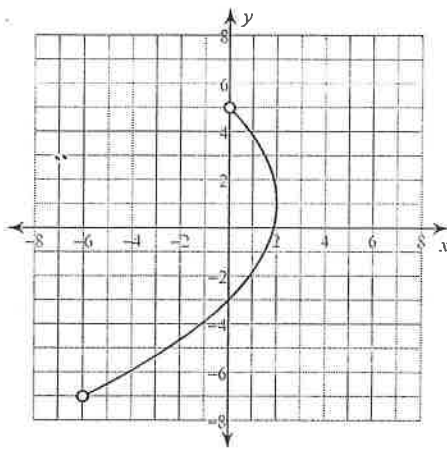
2)



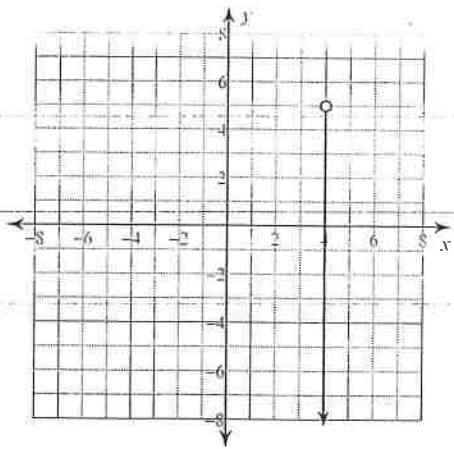
3)



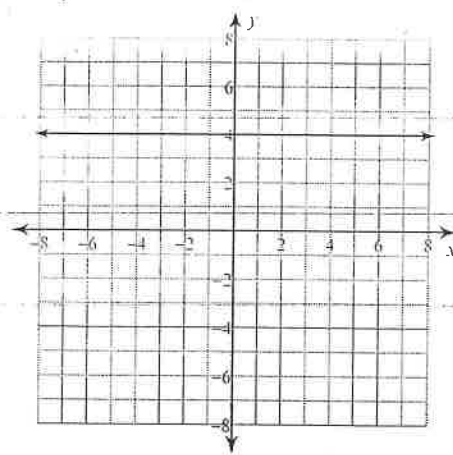
4)



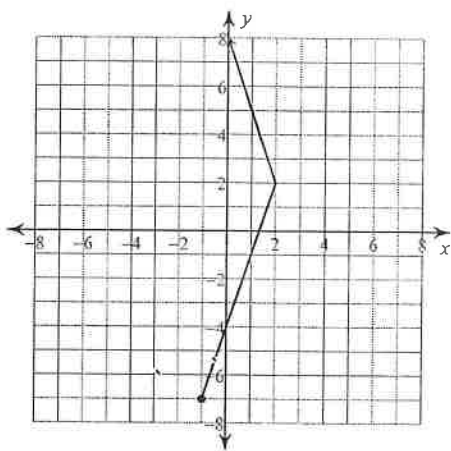
5)



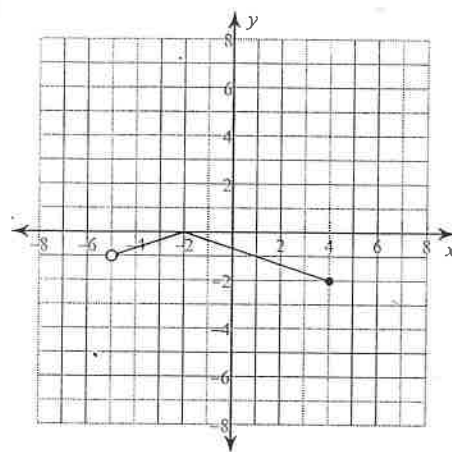
6)



7)



8)



Summer Math, Preparing for Advanced Math

Part A – Exponents - SOLUTIONS

1) $6x^5$

2) $4a^5$

3) $16x^2$

4) $4k^2$

5) $\frac{3}{2}$

6) 3

7) $\frac{1}{4n^2}$

8) $4n^2$

9) $\frac{1}{2v^2}$

10) $\frac{n^4}{3}$

11) $\frac{1}{16y^4x^{12}}$

12) $\frac{y}{2x^3}$

13) $\frac{2}{x^3y^4}$

14) $\frac{1}{v}$

15) $\frac{4y^2}{3x^8}$

16) $\frac{3n^6m^4}{4}$

17) $8n^{\frac{19}{6}}$

18) $12x^{\frac{11}{3}}$

19) r

20) $\frac{4}{v^3}$

Summer Math Preparing for Advanced Math

Part B – Solving Linear Equations - SOLUTIONS

1) $\{3\}$

2) $\{3\}$

3) $\{-5\}$

4) $\{-5\}$

5) $\{-2\}$

6) $\{2\}$

7) $\left\{-\frac{5}{4}\right\}$

8) $\left\{\frac{7}{6}\right\}$

9) $\{-2\}$

10) $\{1\}$

11) $\{-3\}$

12) $\{1\}$

13) $\{-1\}$

14) $\{8\}$

15) $\{0\}$

16) $\{-3\}$

17) $\left\{-\frac{8}{3}\right\}$

18) $\left\{\frac{10}{3}\right\}$

19) $\{1\}$

20) $\left\{\frac{3}{2}\right\}$

Summer Math Preparing for Advanced Math

Part C – Multiplying Binomials - SOLUTIONS

1) $3x^2 + x - 2$

2) $24x^2 + 45x + 21$

3) $24v^2 - 50v + 25$

4) $42n^2 - 92n + 48$

5) $49x^2 + 70x + 25$

6) $49x^2 - 16$

7) $x^2 - 14x + 49$

8) $64p^2 + 128p + 64$

9) $b^2 - 9$

10) $9x^2 + 18x + 9$

Summer Math Preparing for Advanced Math

Part D – Evaluating Functions - SOLUTIONS

1) 1

2) 24

3) -1

4) 83

5) 25

6) -4

7) -150

8) -1

9) 7

10) 130

Summer Math Preparing for Advanced Math

Part E – Simplifying Radicals - SOLUTIONS

1) $5\sqrt{2}$

2) $6\sqrt{2}$

3) $6\sqrt{5}$

4) 12

5) $7\sqrt{7}$

6) $4\sqrt{3}$

7) $6\sqrt{3}$

8) $4\sqrt{5}$

9) $8\sqrt{2}$

10) $3\sqrt{6}$

11) $3\sqrt{5}$

12) $4\sqrt{6}$

13) $4x\sqrt{2}$

14) $3\sqrt{5x}$

15) $3\sqrt{3x}$

16) $2\sqrt{5k}$

17) $2\sqrt{3k}$

18) $5b\sqrt{5}$

19) $6v$

20) $5x\sqrt{2}$

Summer Math Preparing for Advanced Math

Part F – Factoring - SOLUTIONS

- | | |
|---------------------------|----------------------------|
| 1. $(b + 7)(b + 1)$ | 2. $(m - 9)(m + 10)$ |
| 3. $(n - 1)(n - 9)$ | 4. $(m + 6)(m - 4)$ |
| 5. $(k - 5)(k - 8)$ | 6. $(n + 7)(n - 8)$ |
| 7. $(b - 4)(b - 2)$ | 8. $2(n + 9)(n - 6)$ |
| 9. $2(k + 5)(k + 6)$ | 10. $(p + 10)(p + 1)$ |
| 11. $2(p - 1)(p + 2)$ | 12. $(x - 10)(x - 5)$ |
| 13. $(p - 3)(p + 6)$ | 14. $(3p - 5)(p + 1)$ |
| 15. $(3n - 2)(n - 2)$ | 16. $(2v + 1)(v + 5)$ |
| 17. $(7a + 4)(a + 7)$ | 18. $3(5n + 1)(n - 2)$ |
| 19. $(n - 5)(4n + 5)$ | 20. $(n - 4)(4n - 1)$ |
| 21. $(x + 6)(6x + 1)$ | 22. $(2n + 3)(3n - 2)$ |
| 23. $(4n + 3)(4n - 3)$ | 24. $(4b - 5)^2$ |
| 25. $(3x + 1)(3x - 1)$ | 26. $(n^2 + 10)(n^2 - 10)$ |
| 27. $(k^2 + 6)(k^2 - 6)$ | 28. $2(7n + 10)(7n - 10)$ |
| 29. $4(10 + 3v)(10 - 3v)$ | 30. $10(n + 5)^2$ |

Part G – Solve by Factoring - SOLUTIONS

1) $\{8, -1\}$

2) $\{5, 0\}$

3) $\{6, 5\}$

4) $\left\{5, -\frac{2}{5}\right\}$

5) $\{6, -8\}$

6) $\{6, 0\}$

7) $\{-5, -8\}$

8) $\{5, 0\}$

9) $\left\{\frac{6}{5}, -6\right\}$

10) $\left\{-\frac{2}{5}, 3\right\}$

11) $\{-1, 0\}$

12) $\{-4, 0\}$

13) $\{-1, 5\}$

14) $\{-1, 1\}$

Summer Math Preparing for Advanced Math

Part H – Pythagorean Theorem - SOLUTIONS

1) $3^2 + 9^2 = x^2$

$9 + 81 = x^2$

$\sqrt{90} = x$

$\sqrt{90} = x$

$x = \sqrt{9 \cdot 10} = \boxed{3\sqrt{10}}$

2) $x^2 + 7^2 = 11^2$

$x^2 + 49 = 121$
 $-49 \quad -49$

$\sqrt{x^2} = \sqrt{72}$

$x = \sqrt{72}$

$x = \sqrt{36 \cdot 2} = \boxed{6\sqrt{2}}$

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

$x^2 - 4x + 4 + 64 = x^2$

$-4x + 68 = 0$

$\frac{-4x}{-4} = \frac{-68}{-4}$

$\boxed{x = 17}$

4) $6^2 + 8^2 = x^2$

$36 + 64 = x^2$

$\sqrt{100} = x$

$\boxed{10 = x}$

5) $x^2 + 9^2 = 13^2$

$x^2 + 81 = 169$
 $-81 \quad -81$

$x^2 = 88$

$x = \sqrt{88}$

$x = \sqrt{4 \cdot 22} = \boxed{2\sqrt{22}}$

6) $x^2 + 7^2 = (x+1)^2$

$x^2 + 49 = (x+1)(x+1)$

$x^2 + 49 = x^2 + 2x + 1$

$48 = 2x$

$\boxed{24 = x}$

Summer Math Preparing for Advanced Math

Part I – Domain, Range - SOLUTIONS

1) Domain: $x \geq -2$

Range: All real numbers

2) Domain: $x \geq -5$

Range: $y \geq -6$

3) Domain: $[-7, 3]$

Range: $[-7, 3]$

4) Domain: $(-6, 2]$

Range: $(-7, 5)$

5) Domain: $\{4\}$

Range: $(-\infty, 5)$

6) Domain: $(-\infty, \infty)$

Range: $\{4\}$

7) Domain: $(-\infty, 2]$

Range: $[-7, \infty)$

8) Domain: $(-5, 4]$

Range: $[-2, 0]$