BRONX COMMUNITY COLLEGE
of the City University of New York

DEPARTMENT OF MATHEMATICS & COMPUTER SCIENCE

MTH 28.5 Review Sheet I

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1. Perform the indicated operations and simplify:

(a) $(-7)-(-4)$ (b) $(-7)+14$ (c) $8\div 0$ (d) $0\div 2$ (e) $24\div(-3)$

(f) $5(-7)$ (g) -2^4 (h) $(-2)^4$ (i) $\dfrac{-12}{-4}$ (j) $\left(\dfrac{2}{5}\right)\left(-\dfrac{1}{4}\right)$

(k) $2-\dfrac{1}{5}$ (l) $\dfrac{1}{3}\div(-2)$ (m) $\left(-3\dfrac{5}{6}\right)\left(1\dfrac{3}{4}\right)$ (n) $-2\dfrac{3}{4}+1\dfrac{2}{3}$

2. Perform the indicated operations and simplify:

(a) $(-7)(-6)(-3)$ (b) $2^3-3^2+(3)(4)$ (c) $5-3-[2-(-3+5)]$ (d) $16-7-9+11$

(e) $5\cdot 2^3-3$ (f) $3-2[1-(2-9)]$ (g) $\dfrac{-3+5}{-5+4}-3+6$ (h) $\dfrac{3}{4}(17-3\cdot 3)$

3. Evaluate:

(a) $C=\dfrac{5}{9}(F-32)$, if $F=50$.

(b) $3a+bx-cy$, if $a=-2$, $b=3$, $c=-4$, $x=1$, $y=0$.

(c) $5a+x^2-by$, if $a=-2$, $b=4$, $x=16$, $y=-6$.

(d) $-x^2-2x-5$, if $x=\dfrac{1}{2}$.

4. Solve:

(a) $11+3x=26$ (b) $5x-3=3x+3$ (c) $x-4+2x=5x-1-2x$

(d) $\dfrac{x+2}{5}-\dfrac{x+3}{4}=\dfrac{5}{2}$ (e) $3(2x-1)-(7x+1)=3(3x-4)$

5. Solve for the indicated variable:

(a) $C = \frac{5}{9}(F - 32)$, for F (b) $z = 5x - 7y$, for x (c) $3x - 2y = 7$, for y

6. Solve the inequality and graph the solution set :

(a) $2x + 1 \leq 4x - 3$ (b) $3x - 2 > x$ (c) $2x - (3x + 5) > 4x - 2(3x - 2)$

7. Sketch the graph of the linear equation:

(a) $3x + 2y = 6$ (b) $y = 2x - 3$ (c) $x = 3$

8. Function f is given by $f(x) = 7x - 8$. Find

(a) $f(3)$ (b) $f(a + 5)$ (c) $f(3t)$

9. Function f is given by $f(x) = 3x^2 - 5x + 3$. Find

(a) $f(1)$ (b) $f(3)$ (c) $f(-2)$

10. Perform the indicated operations :

(a) $(3x^2 - 2x + 3) + (-2x^2 + 3x - 7)$ (b) $2x^2 - 4x + 5 - (3x^2 - 11x + 6)$ (c) $\left(4a^2b^3\right)^2$

(d) $\left(3x^2y^5\right)\left(5xy^3 - 3x^2y^2 + 2x^3y^2\right)$ (e) $(x^2 - 3x + 2)(2x^2 - 3x + 7)$ (f) $\frac{20x^5y^7}{4x^2y^7}$

(g) $(3x^3 - 2x^2 + 4x - 6) \div (x - 5)$ (h) $\frac{24a^5b^4 + 16a^7b^3 - 8a^3b^2}{8a^3b^2}$ (i) $\frac{3ab^{-1} \cdot 5a^3b^2}{(3a^3b)^2}$

11. Simplify and write the answer in decimal form.

(a) 3.5×10^{-3} (b) $(2 \times 10^3)(6 \times 10^{-1})$ (c) $\frac{2 \times 10^3}{5 \times 10^6}$

The answers

1(a) -3 **1(b)** 7 **1(c)** *undefined* **1(d)** 0 **1(e)** -8

1(f) -35 **1(g)** -16 **1(h)** 16 **1(i)** 3 **1(j)** $\frac{-1}{10}$

1(k) $\frac{9}{5}$ **1(l)** $\frac{-1}{6}$ **1(m)** $\frac{-161}{24}$ **1(n)** $\frac{-13}{2}$

2(a) -126 **2(b)** 11 **2(c)** 2 **2(d)** 11

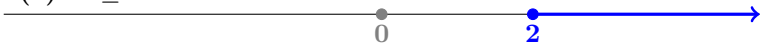
2(e) 37 **2(f)** -13 **2(g)** 1 **2(h)** 6

3(a) $C = 10$ **3(b)** -3 **3(c)** 270 **3(d)** $\frac{-25}{4}$

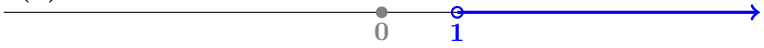
4(a) $x = 5$ **4(b)** $x = 3$ **4(c)** *No solutions* **4(d)** $x = -57$ **4(e)** $x = \frac{4}{5}$

5(a) $F = \frac{9}{5}C + 32$ **5(b)** $x = \frac{z + 7y}{5}$ **5(c)** $y = \frac{3x - 7}{2}$

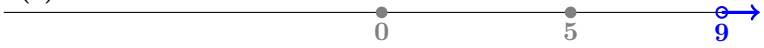
6(a) $x \geq 2$



6(b) $x > 1$



6(c) $x > 9$



7(a), 7(b), 7(c) next page

8(a) 13 **8(b)** $7a + 27$ **8(c)** $21t - 8$

9(a) 1 **9(b)** 15 **9(c)** 25

10(a) $x^2 + x - 4$ **10(b)** $-x^2 + 7x - 1$ **10(c)** $16a^4b^6$

10(d) $15x^3y^8 - 9x^4y^7 + 6x^5y^7$ **10(e)** $2x^4 - 9x^3 + 20x^2 - 27x + 14$ **10(f)** $5x^3$

10(g) $3x^2 + 13x + 69 + \frac{339}{x - 5}$ **10(h)** $3a^2b^2 + 2a^4b - 1$ **10(i)** $\frac{5}{3a^2b}$

11(a) 0.0035 **11(b)** 1200 **11(c)** 0.0004

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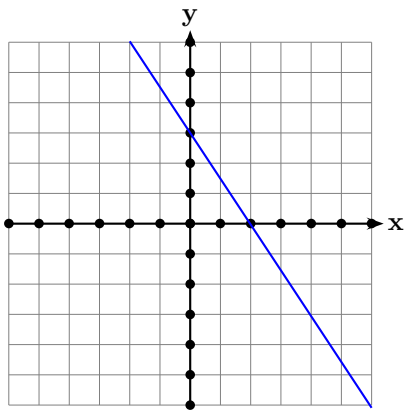
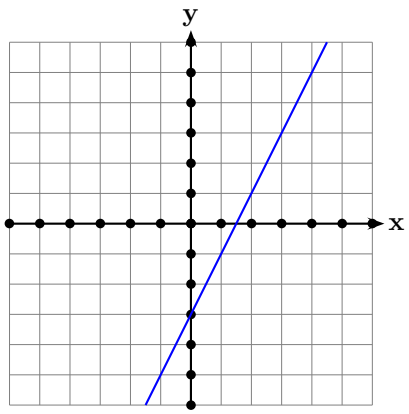
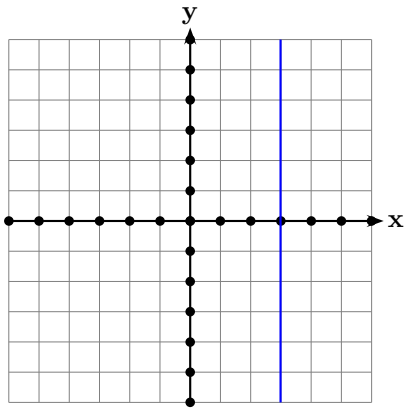


7(a) 3x+2y=6



7(b) y=2x-3



7(c) x=3

Figure 1: The graphs of Question 7

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MTH 28.5 Review Sheet II

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1. Factor completely:

(a) $3b^2 + 12b$

(b) $12x^3y - 3y^3$

(c) $9x^2y^3 - 3x^2y^5$

(d) $25x^4 - 16y^2$

(e) $15ax + 9xy - 10ay - 6y^2$

(f) $x^2 - 3x - 10$

(g) $2x^2 - x - 6$

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

(i) $4x^2 - 12xy + 9y^2$

(j) $-3x^2 - xy + 10y^2$

(k) $2x^4 - 2x^3 - 12x^2$

2. Solve:

(a) $3x^2 = 27$

(b) $6x^2 = 3x$

(c) $x^2 - 8x + 16 = 0$

(d) $x^2 - 8x - 20 = 0$

(e) $2x^2 + x - 6 = 0$

(f) $x^2 + 2x = 15$

3. Determine the values for which the rational expression is undefined.

(a) $\dfrac{3x-2}{4-x}$

(b) $\dfrac{x^2-4}{6}$

(c) $\dfrac{x^2-3x+2}{2x^2-7x+6}$

4. Perform the indicated operations and simplify:

(a) $\dfrac{6x^3-6x}{3x^3+3x^2}$

(b) $\dfrac{4yz}{5a^2}\cdot\dfrac{10a^5}{12xy}\div\dfrac{6}{3a}$

(c) $\dfrac{4x^2+x-5}{x^3-x^2}\cdot\dfrac{x^2+2x}{4x^2+13x+10}$

(d) $\dfrac{x^2-7x+12}{x^2-4x+4}\div(x-3)$

(e) $\dfrac{2x^2-8y^2}{2xy-4y^2}\div\dfrac{4x^2-16y^2}{2x^2-4xy}$

(f) $\dfrac{x^2+x-12}{x^2-9}\div\dfrac{x^2+4x}{x^2+5x+6}$

(g) $\dfrac{2}{5x^2y}+\dfrac{1}{x}+2$

(h) $\dfrac{2}{2x+3}+\dfrac{1}{x+5}$

(i) $\dfrac{2x^2-10}{2x^2+17x+21}-\dfrac{x+4}{x+7}$

(j) $\dfrac{\dfrac{7}{ab}-\dfrac{3}{b^2}}{\dfrac{2}{a^2}+\dfrac{7}{b^2}}$

(k) $\dfrac{\dfrac{2}{x^2-4}}{\dfrac{5}{x+2}-\dfrac{3}{x-2}}$

5. Solve:

(a) $\dfrac{2}{x}+7=\dfrac{7x}{x+5}$

(b) $\dfrac{3}{2x-1}+\dfrac{1}{x}=4$

(c) $\dfrac{x}{x-4}+\dfrac{1}{x+1}=\dfrac{2x}{x^2-3x-4}$

(d) $\dfrac{2}{x+2}+\dfrac{15}{x^2-4x-12}=\dfrac{3}{x-6}$

The answers

1(a) $3b(b+4)$ **1(b)** $3y(4x^3-y^2)$ **1(c)** $3x^2y^3(3-y^2)$
1(d) $(5x^2+4y)(5x^2-4y)$ **1(e)** $(3x-2y)(5a+3y)$ **1(f)** $(x-5)(x+2)$
1(g) $(2x+3)(x-2)$ **1(h)** *Not factorable* **1(i)** $(2x-3y)^2$
1(j) $(-3x+5y)(x+2y)$ **1(k)** $2x^2(x-3)(x+2)$
2(a) $x=3, x=-3$ **2(b)** $x=0, x=1/2$ **2(c)** $x=4$
2(d) $x=10, x=-2$ **2(e)** $x=-2, x=3/2$ **2(f)** $x=3, x=-5$
3(a) $x=4$ **3(b)** *No values* **3(c)** $x=2, x=3/2$
4(a) $\dfrac{2x-2}{x}$ **4(b)** $\dfrac{za^4}{3x}$ **4(c)** $\dfrac{1}{x}$
4(d) $\dfrac{x-4}{x^2-4x+4}$ **4(e)** $\dfrac{x}{2y}$ **4(f)** $\dfrac{x+2}{x}$
4(g) $\dfrac{2+5xy+10x^2y}{5x^2y}$ **4(h)** $\dfrac{4x+13}{2x^2+13x+15}$ **4(i)** $\dfrac{-11x-22}{2x^2+17x+21}$
4(j) $\dfrac{7ab-3a^2}{2b^2+7a^2}$ **4(k)** $\dfrac{1}{x-8}$
5(a) $x=-10/37$ **5(b)** $x=1, x=1/8$ **5(c)** $x=2, x=-2$ **5(d)** $x=-3$

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MTH 28.5 Review Sheet III

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1. Simplify:

(a) $\sqrt{108}$ (b) $\sqrt{180}$ (c) $\sqrt[3]{40}$ (d) $\sqrt[3]{-64}$

2. Perform the indicated operations and simplify (all variables represent positive real numbers):

(a) $5\sqrt{12} - 4\sqrt{3} + \sqrt{75}$ (b) $\left(2\sqrt{3}\right)\left(3\sqrt{5}\right)$ (c) $(4 + \sqrt{2})(5 - 3\sqrt{2})$

(d) $(8 + 2\sqrt{3})^2$ (e) $(1 - 2\sqrt{11})(1 + 2\sqrt{11})$ (f) $\sqrt{\dfrac{7}{18}}$

(g) $\dfrac{\sqrt{2}}{\sqrt{5}}$ (h) $\dfrac{\sqrt{3}}{\sqrt{x}}$ (i) $\dfrac{\sqrt[3]{2x}}{\sqrt[3]{9x^2}}$

(j) $\dfrac{1}{2 + \sqrt{3}}$ (k) $\dfrac{\sqrt{x} - \sqrt{y}}{\sqrt{x} + \sqrt{y}}$

3. Perform the indicated operations and simplify (all variables represent positive real numbers):

(a) $64^{-2/3}$ (b) $\left(\dfrac{9}{16}\right)^{-1/2}$ (c) $\left(64x^3y \cdot xy^5\right)^{4/3}$

(d) $\left(\dfrac{27x^5y}{8y^3}\right)^{1/3}$ (e) $\left(\dfrac{8x^{\frac{1}{4}}y^{-\frac{3}{4}}}{x^{-\frac{1}{2}}y^3}\right)^{2/3}$

4. Solve the equation.

(a) $\sqrt{2x + 3} - 3 = 0$ (b) $\sqrt{2x + 5} = 3\sqrt{x - 1}$ (c) $\sqrt{3x + 4} - x = 2$

5. Perform the indicated operations of complex numbers and simplify:

(a) i^{173} (b) $(2 - 3i)(5 - 7i) - (3 - 2i)$ (c) $\dfrac{4 - 7i}{5 + 3i}$

6.Solve the equation **by completing the square**.

(a) $x^2 + 6x - 12 = 0$ (b) $x^2 + 4x + 6 = 0$ (c) $2x^2 - 8x = 0$

7. Solve the equation **by quadratic formula**.

(a) $x^2 - 2x - 6 = 0$ (b) $x^2 - 3x = 0$ (c) $x^2 = 8$

8. Solve the equation **by any method**.

(a) $2x^2 + 18 = 0$ (b) $x^2 + 4x + 20 = 0$ (c) $4x^2 + 5x - 6 = 0$

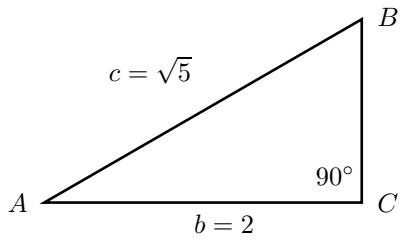
(d) $(2x - 3)(x + 4) = 4$ (e) $x^4 - 7x^2 + 12 = 0$

9. Determine the exact value of:

(a) $\cos 60^\circ$ (b) $\csc 45^\circ$ (c) $\sin 30^\circ - \cos 45^\circ$

10. Use the triangle to find:

(a) $\cos A$ (b) $\csc A$ (c) $\tan B$



11. Given that $\triangle ABC$ is a right triangle with $C = 90^\circ$, find the missing sides.

(a) $\cos A = \frac{1}{3},\ b = 2$ (b) $\tan A = \frac{2}{3},\ b = 6$ (c) $\cos B = \frac{1}{4},\ c = 12$

12. The angle of elevation of the top of a tree is 60° from an observation point 80 feet from the base of the tree. Find the height of the tree.

13. Bill is standing on top of a 175 foot cliff overlooking a lake. The measure of the angle of depression to a boat is 30°.

(a) How far, exactly, is the boat from the foot of the cliff?

(b) How far is the boat from Bill?

The answers

1(a) $6\sqrt{3}$ **1(b)** $6\sqrt{5}$ **1(c)** $2\sqrt[3]{5}$ **1(d)** -4

2(a) $11\sqrt{3}$ **2(b)** $6\sqrt{15}$ **2(c)** $14-7\sqrt{2}$

2(d) $76+32\sqrt{3}$ **2(e)** -43 **2(f)** $\dfrac{\sqrt{14}}{6}$

2(g) $\dfrac{\sqrt{10}}{5}$ **2(h)** $\dfrac{\sqrt{3x}}{x}$ **2(i)** $\dfrac{\sqrt[3]{6x^2}}{3x}$

2(j) $2-\sqrt{3}$ **2(k)** $\dfrac{x+y-2\sqrt{xy}}{x-y}$

3(a) $\dfrac{1}{16}$ **3(b)** $\dfrac{4}{3}$ **3(c)** $256(x)^{16/3}y^8$

3(d) $3/2x^{5/3}y^{-2/3}$ **3(e)** $4x^{1/2}y^{-5/2}$

4(a) $x=3$ **4(b)** $x=2$ **4(c)** $x=0, x=-1$

5(a) i **5(b)** $-14-27i$ **5(c)** $\dfrac{-1}{34}-\dfrac{47i}{34}$

6(a) $x=-3+\sqrt{21}, x=-3-\sqrt{21}$ **6(b)** $x=-2+\sqrt{2}i, x=-2-\sqrt{2}i$ **6(c)** $x=0, x=4$

7(a) $x=1+\sqrt{7}, x=1-\sqrt{7}$ **7(b)** $x=0, x=3$ **7(c)** $x=2\sqrt{2}, x=-2\sqrt{2}$

8(a) $x=3i, x=-3i$ **8(b)** $x=-2+4i, x=-2-4i$ **8(c)** $x=-2, x=3/4$

8(d) $x=\dfrac{-5+\sqrt{153}}{4}, x=\dfrac{-5-\sqrt{153}}{4}$ **8(e)** $x=2, x=-2, x=\sqrt{3}, x=-\sqrt{3}$

9(a) $1/2$ **9(b)** $\sqrt{2}$ **9(c)** $\dfrac{1-\sqrt{2}}{2}$

10(a) $2\sqrt{5}/5$ **10(b)** $\sqrt{5}$ **10(c)** 2

11(a) $a=4\sqrt{2}, c=6$ **11(b)** $a=4, c=2\sqrt{13}$ **11(c)** $a=3, b=3\sqrt{15}$

12 $80\sqrt{3}$

13(a) $175\sqrt{3}$ **13(b)** 350

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