

# MPM1DO/9: REVIEW #2 FOR FINAL EXAM—MORE BASIC CONCEPTS PLUS PROBLEM SOLVING

1. **Simplify** each of the following algebraic expressions.

(a)  $-3x + x$

(b)  $-3x(x)$

(c)  $-3x(7x-5)$

(d)  $-3x(7x)-5$

(e)  $-3x-(7x-5)$

(f)  $-3x-4(7x-5)$

(g)  $-5a+7b-3a-9b$

(h)  $-5a+7b-(3a-9b)$

(i)  $-5a(7b)(3a)(-9b)$

(j)  $-(3a-1)+4(a-3)$

(k)  $(3a-1)-4(a-3)$

(l)  $(-3zw^5)^2$

(m)  $\frac{256q^{14}r^{11}}{-128q^7r}$

(n)  $\frac{14q^{14}r^{12}-(7q^7r^6)^2}{-7qr^{11}}$

(o)  $-3x^2-21y-4(7x^2-5y)$

2. **Solve** each of the following equations. **Check each solution.**

(a)  $5(-x-1)=-6x-6(-2x+1)$

(b)  $\frac{-3}{4}-\frac{2s+5}{6}=\frac{s-7}{4}$

3. Compare the monthly cost of the following long distance plans:

**AcrossTheWorld** charges \$7 for 100 minutes and \$17 for 300 minutes.

**InternationalTalker** has a monthly base fee of \$8 and charges \$16 for 400 minutes.

(a) Carefully plot the graph of each equation.

(b) Write an equation for the monthly cost of using each long distance phone company.  
The equation should relate  $C$ , the cost per month, to  $n$ , the number of minutes used.

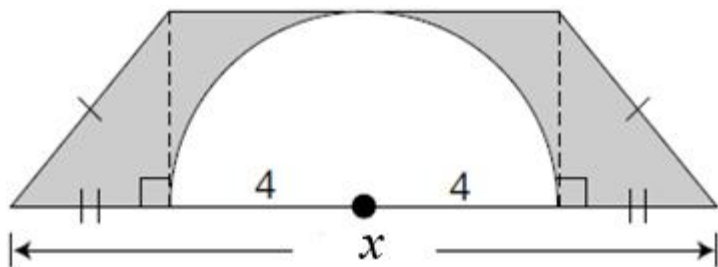
(c) Find the point of intersection of the two graphs. What is the meaning of the point of intersection in the context of this problem?

(d) What is the cost per minute for each company?

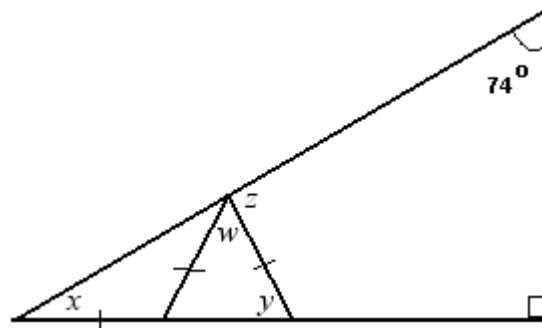
(e) Which company is a better deal? Explain.

4. A line is perpendicular to  $3x+7y+21=0$  and has the same  $x$ -intercept as  $y=\frac{2}{3}x+\frac{34}{9}$ . Find the equation of the line in both slope- $y$ -intercept form and standard form.

5. Write an algebraic expression for the area of the shaded part of the figure shown below.



6. Find the values of  $x$ ,  $y$ ,  $z$  and  $w$ . Justify your answers.



7. Diophantus of Alexandria was born around the year 200 AD. The following is a famous riddle about his life:

His boyhood lasted one-sixth of his life. He married after one-seventh more. His beard grew after one-twelfth more and his son was born five years later. The son lived to half his father's final age and the father died four years after the son.

How old was Diophantus when he died?

## Answers

1. (a)  $-2x$ , (b)  $-3x^2$ , (c)  $-21x^2 + 15x$ , (d)  $-21x^2 - 5$ , (e)  $-10x + 5$ , (f)  $-31x + 20$ , (g),  $-8a - 2b$ ,  
 (h)  $-8a + 16b$ , (i)  $945a^2b^2$ , (j)  $a - 11$ , (k)  $-a + 11$ , (l)  $9z^2w^{12}$ , (m)  $-2q^7r^{10}$ , (n)  $5q^{13}r$ , (o)  $-31x^2 - y$

2. (a)  $x = \frac{1}{11}$ ,  
 (b)  $s = \frac{2}{7}$

3. **AcrossTheWorld:**  $C = 0.05n + 2$ ,

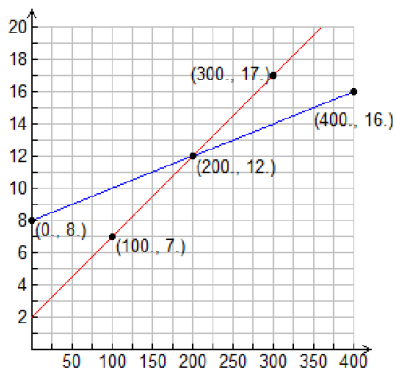
cost per minute is \$0.05

**InternationalTalker:**  $C = 0.02n + 8$ ,

cost per minute is \$0.02

The point of intersection is (200, 12). It means that both companies charge \$12 for \$200 of usage.

For fewer than 200 minutes, AcrossTheWorld is cheaper because its graph is lower. For more than 200 minutes, InternationalTalker is cheaper because its graph is lower.



4.  $y = \frac{7}{3}x + \frac{119}{9}$ ,  $21x - 9y + 119 = 0$

5.  $\frac{4(x+8)}{2} - \frac{\pi(4)^2}{2} = 2x + 16 - 8\pi$

6.  $x = 16^\circ$ ,  $y = 32^\circ$ ,  $z = 48^\circ$ ,  $w = 116^\circ$

7. Let  $x$  represent the age at which Diophantus died. Then solve the equation

$$\frac{1}{6}x + \frac{1}{7}x + \frac{1}{12}x + 5 + \frac{1}{2}x + 4 = x \text{ to}$$

obtain  $x = 84$ . Therefore, according to the riddle, Diophantus died at the age of 84.