

## Math 9 Final Review: Short Answer Answer Section

### SHORT ANSWER

1. ANS:

$$\frac{5}{6}$$

REF: 1.1 Square Roots of Perfect Squares

2. ANS:

$$\sqrt{\frac{19}{14}} \approx 1.2$$

REF: 1.2 Square Roots of Non-Perfect Squares

3. ANS:

Any decimal between 6.76 and 7.29

For example: 7.03 and 7.08

REF: 1.2 Square Roots of Non-Perfect Squares

4. ANS:

The length of side  $s$  is about 7.1 cm.

REF: 1.2 Square Roots of Non-Perfect Squares

5. ANS:

The surface area of the object is  $30 \text{ cm}^2$ .

REF: 1.3 Surface Areas of Objects Made from Right Rectangular Prisms

6. ANS:

The surface area of the object is about  $560 \text{ cm}^2$ .

REF: 1.4 Surface Areas of Other Composite Objects

7. ANS:

The answers for i and ii are positive.

REF: 2.1 What Is a Power?

8. ANS:

$$7^0 = 1$$

REF: 2.2 Powers of Ten and the Zero Exponent

9. ANS:

$$(2 \times 10^4) + (5 \times 10^2) = 20\,500$$

REF: 2.2 Powers of Ten and the Zero Exponent

10. ANS:

$$(-2)^4 = 16$$

REF: 2.4 Exponent Laws I

11. ANS:

$$(4^6 \div 4^3)^2 - (2^8 \div 2^6)^2 = (4^3)^2 - (2^2)^2 = 4^6 - 2^4 = 4080$$

REF: 2.5 Exponent Laws II

12. ANS:

$$Q: -0.16, R: -0.19$$

REF: 3.1 What Is a Rational Number?

13. ANS:

$$-6\frac{7}{20}$$

REF: 3.2 Adding Rational Numbers

14. ANS:

$$\frac{28}{3}$$

REF: 3.4 Multiplying Rational Numbers

15. ANS:

$$\frac{4}{5}$$

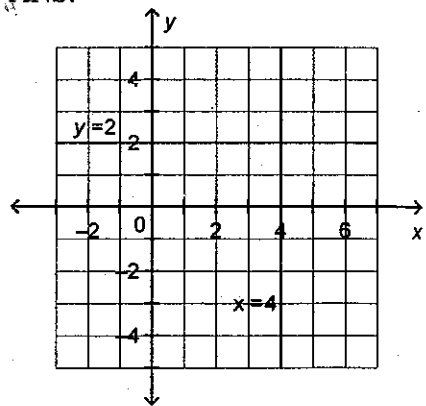
REF: 3.5 Dividing Rational Numbers

16. ANS:

$$w = 3t + 2$$

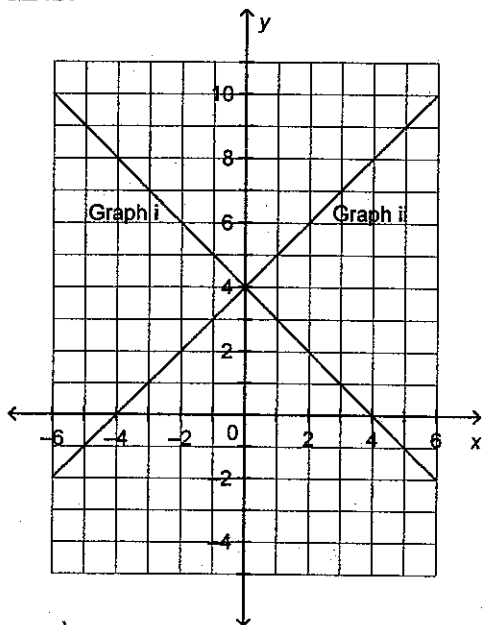
REF: 4.1 Writing Equations to Describe Patterns

17. ANS:



REF: 4.3 Another Form of the Equation for a Linear Relation

18. ANS:



REF: 4.3 Another Form of the Equation for a Linear Relation

19. ANS:

Graph C

REF: 4.4 Matching Equations and Graphs

20. ANS:

- a) 70 L
- b) 540 km

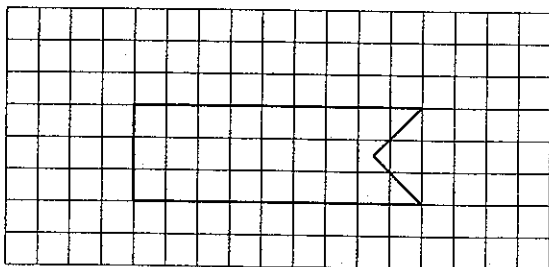
REF: 4.5 Using Graphs to Estimate Values

21. ANS:

Yes,  $\Delta PQR$  is a scale diagram of  $\Delta ABC$ .  
The scale factor is 2.

REF: 7.1 Scale Diagrams and Enlargements

22. ANS:



REF: 7.2 Scale Diagrams and Reductions

23. ANS:  
 $x = 20.4$   
 $y^\circ = 31^\circ$

REF: 7.3 Similar Polygons

24. ANS:  
 $RS = 117.6 \text{ m}$

REF: 7.4 Similar Triangles

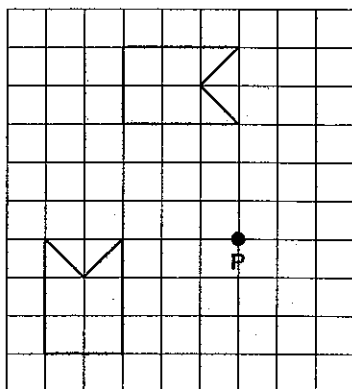
25. ANS:  
 $77 \text{ m}$

REF: 7.4 Similar Triangles

26. ANS:  
 Pentagon P is the reflection image of the black pentagon in the vertical line through 3 on the  $x$ -axis.  
 Pentagon Q is the reflection image of the black pentagon in the horizontal line through 3 on the  $y$ -axis.  
 Pentagon R is the reflection image of the black pentagon in the oblique line through  $(4, 10)$  and  $(12, 2)$ .  
 Pentagon S is the reflection image of the black pentagon in the vertical line through 7.5 on the  $x$ -axis.

REF: 7.5 Reflections and Line Symmetry

27. ANS:

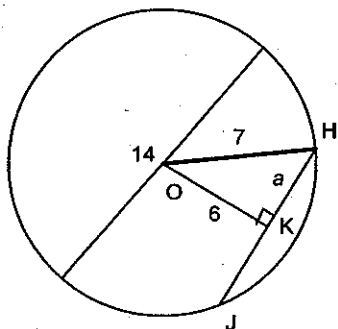


REF: 7.6 Rotations and Rotational Symmetry

28. ANS:  
 $d = 24.1, e^\circ = 28^\circ$

REF: 8.1 Properties of Tangents to a Circle

29. ANS:  
Answers may vary. For example:



REF: 8.2 Properties of Chords in a Circle

30. ANS:  
Inscribed angle:  $\angle PRQ$   
Central angle:  $\angle POQ$

REF: 8.3 Properties of Angles in a Circle

31. ANS:  
-8

REF: 6.1 Solving Equations by Using Inverse Operations

32. ANS:  
-20

REF: 6.1 Solving Equations by Using Inverse Operations

33. ANS:  
 $-10x^2 - 25$

REF: 5.5 Multiplying and Dividing a Polynomial by a Constant

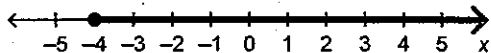
34. ANS:  
Errors:  
The student forgot to multiply  $-5$  by  $3$  when using the distributive property.  
 $7 - 3x$  is not equal to  $4x$ .

REF: 6.2 Solving Equations by Using Balance Strategies

35. ANS:  
 $w \geq 2$

REF: 6.4 Solving Linear Inequalities by Using Addition and Subtraction

36. ANS:  
 $x \geq -4$



REF: 6.4 Solving Linear Inequalities by Using Addition and Subtraction

37. ANS:  
 a) Yes  
 b) No  
 c) Yes  
 d) Yes

REF: 6.5 Solving Linear Inequalities by Using Multiplication and Division

38. ANS:  
 Coefficients: 4, -6  
 Variable:  $x$   
 Degree: 2  
 Constant term: 8

REF: 5.1 Modelling Polynomials

39. ANS:  
 a) 1  
 b) 0  
 c) 2  
 d) 2  
 e) 1

REF: 5.1 Modelling Polynomials

40. ANS:  
 $8x^2 - 5x - 3$

REF: 5.3 Adding Polynomials

41. ANS:  
 $2x^2 - 8x + 8$

REF: 5.4 Subtracting Polynomials

42. ANS:  
 Error:  
 -5 should be multiplied by  $4x$  to give  $-20x$ .

REF: 5.6 Multiplying and Dividing a Polynomial by a Monomial

43. ANS:  
 $5x - 2y + 3z$

REF: 5.6 Multiplying and Dividing a Polynomial by a Monomial

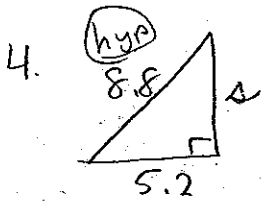
# Math 9 Final Review: Short Answer

KEY

1.  $\sqrt{\frac{25}{36}} = \frac{\sqrt{25}}{\sqrt{36}} = \frac{5}{6}$

2.  $\sqrt{\frac{19}{14}} \approx 1.2$  (Nearest tenth - use calculator:  
 $\frac{19}{14} = 1.357 \rightarrow \sqrt{1.357} = \boxed{1.16496} \approx 1.2$

3. Square 6.76  $\swarrow$  7.29 Anything between 6.76 and 7.29  
 square root 2.6 2.7



$a^2 + b^2 = c^2$  hypotenuse  
 $s^2 + 5.2^2 = 8.8^2$   
 $s^2 + 27.04 = 77.44$   
 $-27.04 \quad -27.04$   
 $\sqrt{\quad} \sqrt{s^2} = \sqrt{50.4}$   
 $s = 7.099$   
 nearest tenth is good

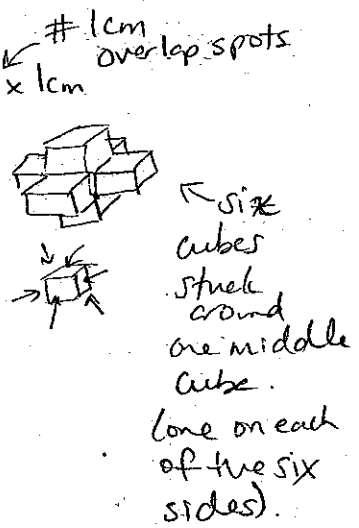
The length of side s is about 7.1 cm  
 ↑  
 remember units.

5. Add up all the centimetre cubes - overlap (x2)

- Built up of 7 cm cubes.  
 - each one 6 cm<sup>2</sup> surface area.  
 $7 \times 6 = \underline{42 \text{ cm}^2}$

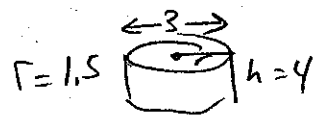
- overlap:  $2 \times 6 \times 1 \text{ cm}$   
 $= \underline{12 \text{ cm}^2}$

$42 - 12 = \underline{30 \text{ cm}^2}$



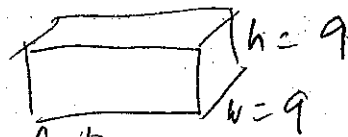
6. SA composite: add up the 2 shapes, subtract overlap.

$$\begin{aligned}
 SA_{\text{cylinder}} &= 2\pi r h + 2\pi r^2 \\
 &= 2(\pi)(1.5)(4) + 2(\pi)(1.5)^2 \\
 &= 51.836 \text{ cm}^2
 \end{aligned}$$



SA<sub>rect. prism</sub>

$$\begin{aligned}
 &= 2lw + 2lh + 2wh \\
 &= 2(10)(9) + 2(10)(9) + 2(9)(9) \quad l=10 \quad h=9 \quad w=9 \\
 &= 180 + 180 + 162 \\
 &= 522 \text{ cm}^2
 \end{aligned}$$



$$\begin{aligned}
 \text{overlap} &= \text{circle} \times 2 \\
 &= \pi r^2 \times 2 \\
 &= \pi (1.5)^2 \times 2 \\
 &= 14.137 \text{ cm}^2
 \end{aligned}$$

$$\begin{aligned}
 SA_{\text{composite}} &= 51.836 + 522 - 14.137 = 559.699 \\
 &= \underline{\underline{560 \text{ cm}^2}} \quad (\text{nearest cm}^2)
 \end{aligned}$$

h.2

7. i)  $5^3 = \dots$  positive (positive base) =  $5 \times 5 \times 5 = 125$

ii)  $(-7)^6 = \dots$  even =  $-7 \times -7 \times -7 \times -7 \times -7 \times -7 = 117649$  (i) (ii) have positive answers.

iii)  $(-3)^7 = \dots$  odd = negative =  $(-3)(-3)(-3)(-3)(-3)(-3)(-3)$

iv)  $-(6)^3$  positive = negative =  $-216$   
 $\uparrow$  neg =  $-(6 \times 6 \times 6) = -216$

8.  $7^0 = 1$

9.  $(2 \times 10^4) + (5 \times 10^2) = 20000 + 500 = 20500$

10.  $(-2)^4 \times (-2)^6 \div (-2)^6$   
 $= (-2)^{10} \div (-2)^6$

$\times$  same base  $\rightarrow +$  exponents

$\div$  same base  $\rightarrow -$  exponents.

$$\begin{aligned}
 &= (-2)^4 \\
 &= \textcircled{16}
 \end{aligned}$$



$$11. (4^6 \div 4^3)^2 - (2^8 \div 2^6)^2$$

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

Power of a power:  
multiply!

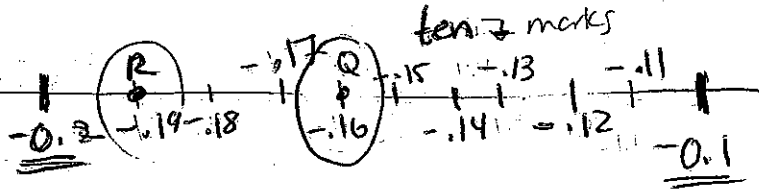
$$= 4^6 - 2^4$$

$$= 4096 - 16$$

$$= \underline{4080}$$

Ch 3

12.



O = -0.16  
R = -0.19

$$13. -4\frac{3}{4} + \left(-1\frac{3}{5}\right)$$

$$-\frac{19 \times 5}{4 \times 5} + \left(-\frac{8 \times 4}{5 \times 4}\right)$$

$$-\frac{95}{20} + \frac{-32}{20}$$

$$\frac{-127}{20}$$

$$-6\frac{7}{20}$$

127 ÷ 20 = 6.35  
6 × 20 = 120  
127 - 120 = 7

$$14. \frac{4}{1} \times \left(-\frac{7}{3}\right)$$

$$\frac{4 \times -7}{1 \times 3}$$

$$\frac{-28}{3}$$

$$-9\frac{1}{3}$$

15.  $\left(-\frac{4}{3}\right) \div \left(-\frac{5}{3}\right) \uparrow$   
 $\frac{-4}{3} \times \frac{-3}{5}$   
 $= \frac{12}{15} \div 3$   
 $= \frac{4}{5}$

14

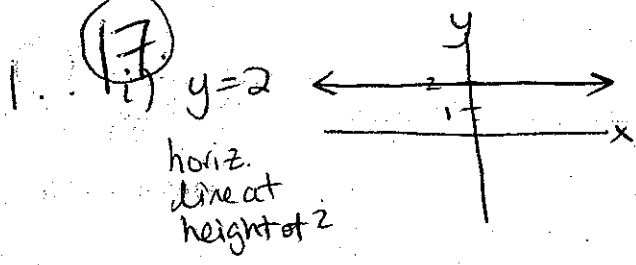
t	w
0	2
1	5
2	8
3	11
4	14
5	17

as t goes up by 1  
w goes up by 3

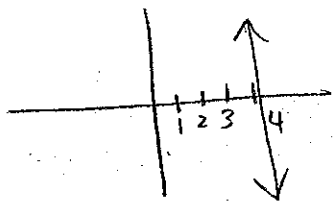
$w = 3t + 2$

need to add two to make it work.  
(or go "up" one in table to 0 | 2)

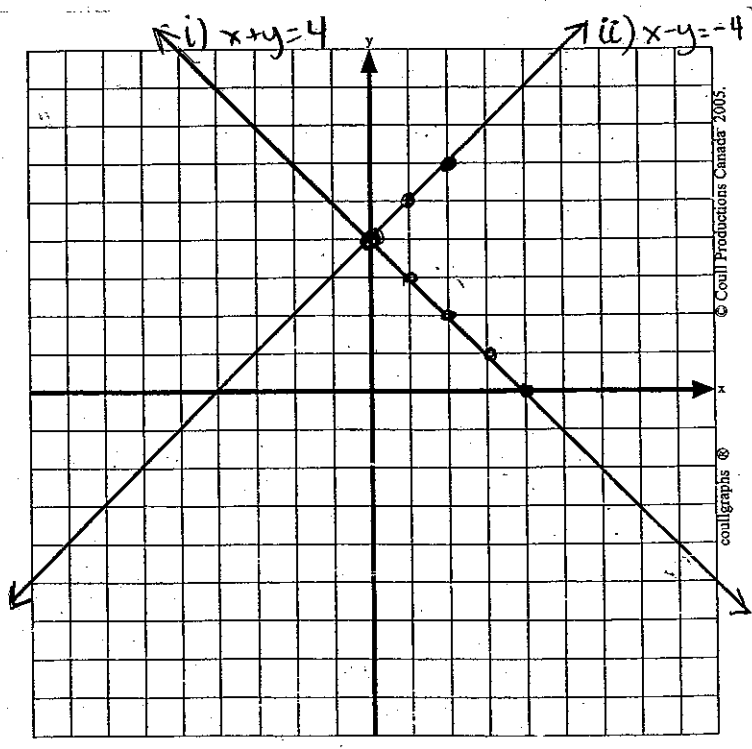
$w = 3t + 2$



(ii)  $x = 4$   
vert. line at  $x = 4$



18.



(i)  $x + y = 4$

x	y	$x+y=4$
0	4	$0+4=4 \checkmark$
1	3	
2	2	
3	1	
4	0	

(ii)  $x - y = -4$

x	y	$x-y=-4$
0	4	$0-(4)=-4 \checkmark$
1	5	$1-5=-4 \checkmark$
2	6	$2-6=-4 \checkmark$

or test some pts:  
if  $x = 1$   
 $1 - y = -4$   
 $-y = -5$   
 $y = 5$

19.  $x + 2y = 3$

if  $x = 0$

$0 + 2y = 3$

$2y = 3$

$y = \frac{3}{2}$

$(0, \frac{3}{2})$

if  $x = 1$

$1 + 2y = 3$

$2y = 2$

$y = 1$

$(1, 1)$

Only graph C

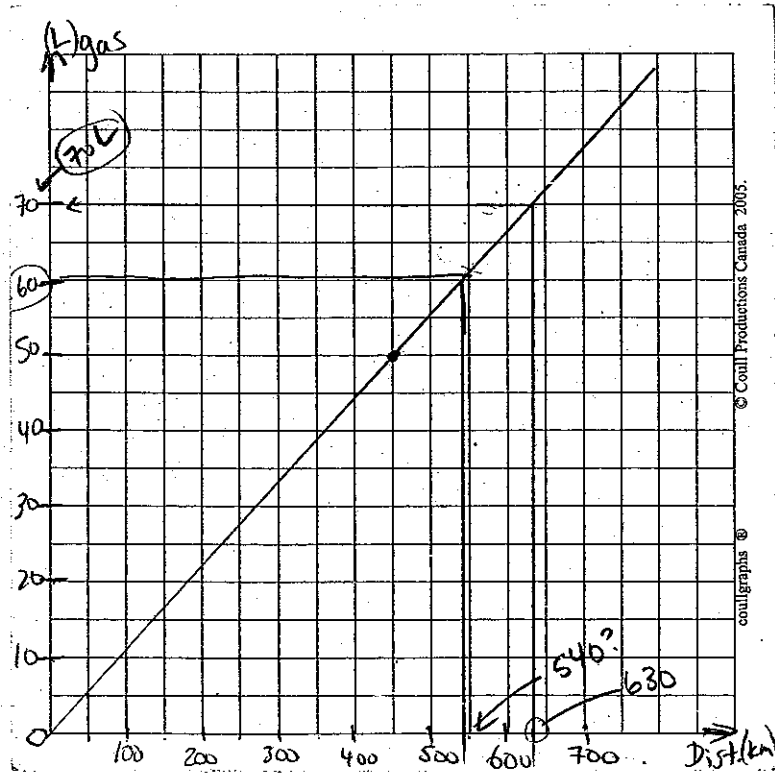
goes through these points.

(graph B is definitely not it, as horizontal lines are always  $y = \text{number}$ )

20. Extend line: (extrapolate)

a) 630 km  
 $\Rightarrow$  70L

b) 60L  
 $\Rightarrow$  540 km



Ch 7

21.

AB = 2 diagonals.

PQ = 4 diagonals.

$$\frac{PQ}{AB} = \frac{4}{2} = 2$$

BC = 3 diagonals

QR = 6 diagonals

$$\frac{QR}{BC} = \frac{6}{3} = 2$$

AC = 5 boxes right to go down 1

PR = 10 " " " " " 2

$$\frac{PR}{AC} = \frac{10}{5} = \frac{2}{1} = 2$$

All same  
Scale  
so  
Scale  
diagram

scale factor = 2. or  $\frac{2}{1}$

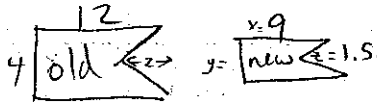
22.  $\frac{\text{New}}{\text{old}} = \frac{3}{4}$

$$\frac{x}{12} = \frac{3}{4}$$

$$4x = 36$$

$$\frac{4x}{4} = \frac{36}{4}$$

$$x = 9$$



$$\frac{\text{new}}{\text{old}} = \frac{3}{4}$$

$$\frac{y}{4} = \frac{3}{4}$$

$$y = 3$$

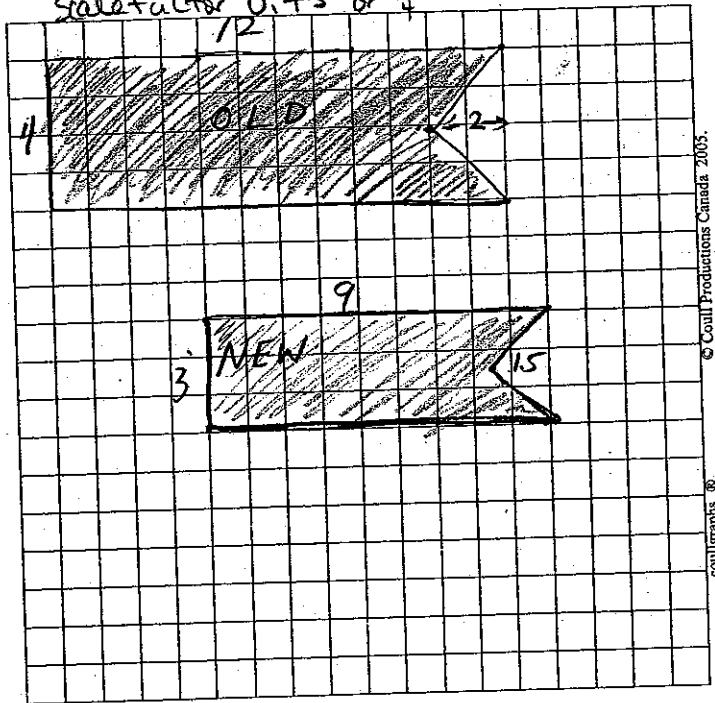
$$\frac{\text{new}}{\text{old}} = \frac{3}{4}$$

$$\frac{z}{2} = \frac{3}{4}$$

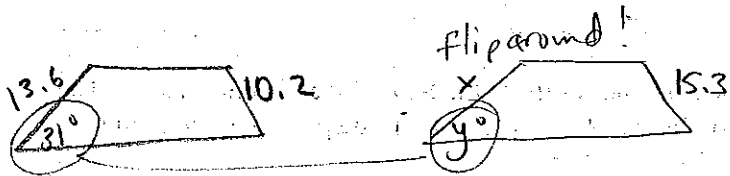
$$4z = 6$$

$$z = 1.5$$

Scale factor 0.75 or  $\frac{3}{4}$



23.



$y^\circ = 31^\circ$  (same angles)

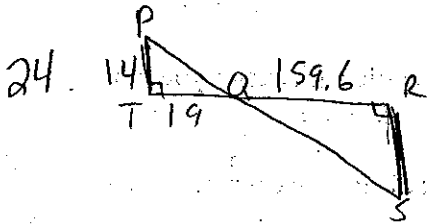
Same ratios

$$\frac{x}{13.6} = \frac{15.3}{10.2}$$

$$10.2x = 208.08$$

$$\frac{10.2x}{10.2} = \frac{208.08}{10.2}$$

$$x = 20.4$$



$$\frac{RS}{14} = \frac{159.6}{19}$$

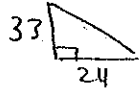
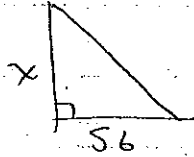
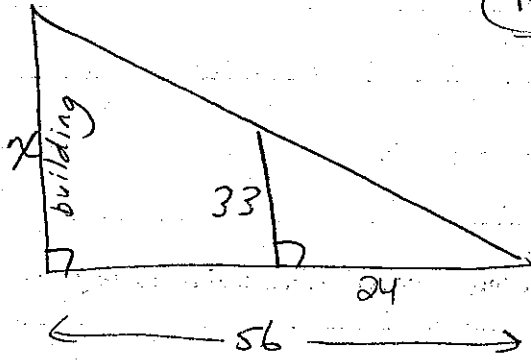
$$19RS = 159.6 \times 14$$

$$19RS = 2234.4$$

$$\frac{19RS}{19} = \frac{2234.4}{19}$$

$$RS = 117.6 \text{ m}$$

25.



$$\frac{x}{33} = \frac{56}{24}$$

$$24x = 1848$$

$$\frac{24x}{24} = \frac{1848}{24}$$

$$x = 77 \text{ m}$$

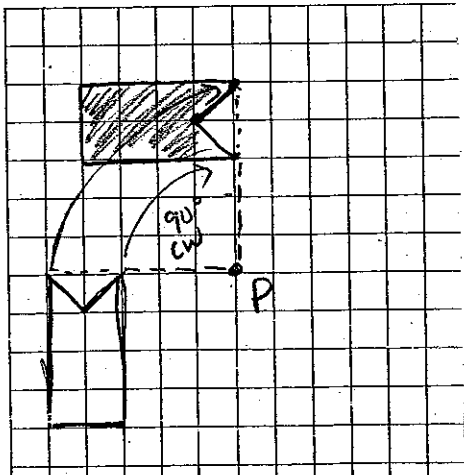
26. Q is reflected across the line  $y=3$

P is reflected across the line  $x=3$

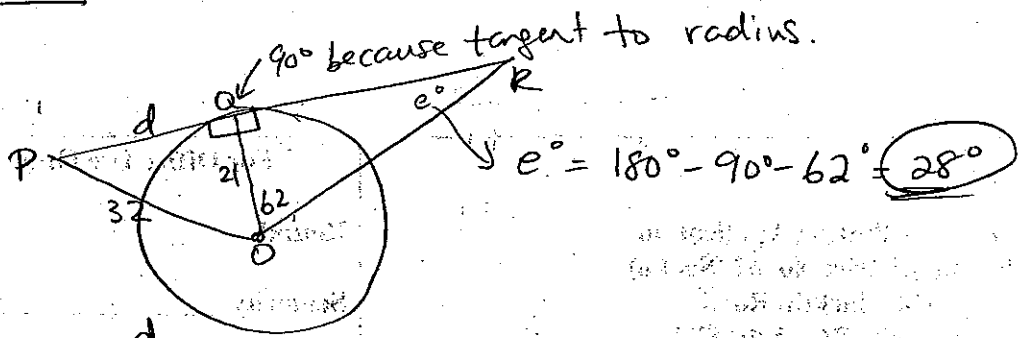
S is reflected across the line  $x=7.5$

R is reflected across the line (oblique) that goes through (8,6) and (6,8)

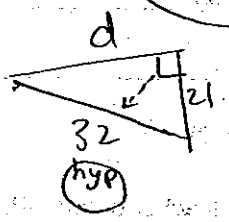
27.



h8  
28.



$e^\circ = 180^\circ - 90^\circ - 62^\circ = 28^\circ$



Can use Pythag because  $90^\circ$

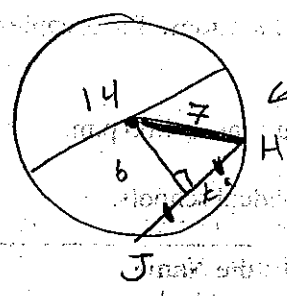
$d^2 + 21^2 = 32^2$

$d^2 + 441 = 1024$   
 $-441 \quad -441$

$\sqrt{d^2} = \sqrt{583}$

$d = 24.145$   
 $d = 24.1$  (Nearest tenth)

29.

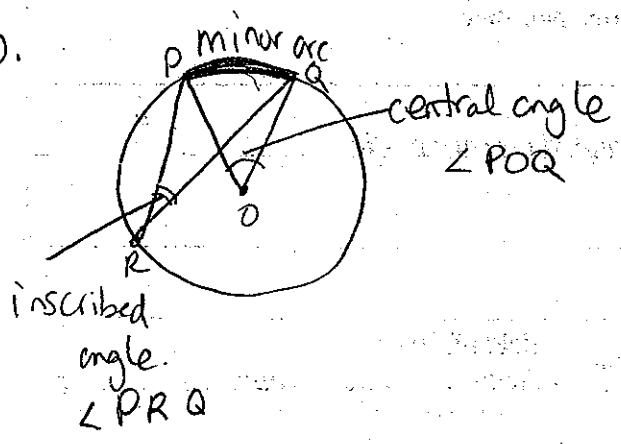


need radius (=7) here to make right  $\Delta$  (could use Pythag)

$a^2 + 6^2 = 7^2$

(no need to solve, but  $a = 3.6$ )

30.



green ch2

31. (4)  $6x = -12(4)$

$\frac{6x}{6} = \frac{-48}{6}$   
 $x = -8$

$$32. \quad 20 = \frac{-3x}{4} + 5$$

$$\begin{array}{r} -5 \\ \hline \end{array} \quad \begin{array}{r} -5 \\ \hline \end{array}$$

$$(4) 15 = \frac{-3x(4)}{4}$$

$$\frac{60}{-3} = \frac{-3x}{-3}$$

$$\underline{-20 = x}$$

$$33. \quad 5(-2x^2 - 5)$$

$$\underline{\underline{-10x^2 - 25}}$$

$$34. \quad 3(2x - 5) = 7 - 3x \quad \text{Correct solution: } 3(2x - 5) = 7 - 3x$$

student:

$$6x - 5 = 4x$$

$\uparrow$  did not multiply in the 3 to 2nd term  
 $\uparrow$   $7 - 3x \neq 4x$  (not like terms)

$$\begin{array}{r} 6x - 15 = 7 - 3x \\ +3x \qquad \qquad +3x \end{array}$$

$$\begin{array}{r} 9x - 15 = 7 \\ +15 \end{array}$$

$$\frac{9x}{9} = \frac{22}{9}$$

$$x = 2.4 \text{ or } \frac{22}{9}$$

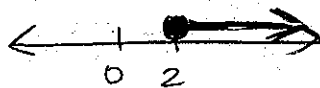
$$\text{or } 2\frac{4}{9}$$

h6

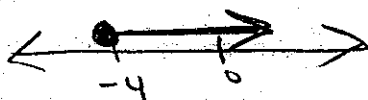
$$35. \quad \begin{array}{r} 8w - 4 \geq 7w - 2 \\ -7w \qquad -7w \end{array}$$

$$\begin{array}{r} w - 4 \geq -2 \\ +4 \qquad +4 \end{array}$$

$$\underline{\underline{w \geq 2}}$$



$$36. \quad \begin{array}{r} x + 6 \geq 2 \\ -6 \qquad -6 \\ \hline x \geq -4 \end{array}$$



37. a)  $6 < -x$  Yes ( $\div -1$ )

b)  $2x \geq -4$  No.

c)  $\frac{x}{-4} < -5$  Yes ( $\times -4$ )

d)  $\frac{-x}{3} > 9$  Yes ( $\div -1$ )

reverse sign  
if multiply  
or divide  
by a negative #.

mean  
n 4

38.

$$4x^2 - 6x + 8$$

Annotations:  
 -  $4x^2$ : degree 2, coeff ↑  
 -  $-6x$ : variable, coeff ↑  
 -  $+8$ : constant

Coefficients: 4, -6  
 Variable: x  
 degree: 2  
 constant: 8

39. a)  $7t + 4$  (1 ← degree 1)

b)  $4x^0$  (degree 0)

c)  $4p^2 - 7p + 7$  (2 ← degree 2)

d)  $11q^2$  (degree 2)

e)  $13v$  (degree 1)

40.  $(10x^2 - 7x + 6) + (-2x^2 + 2x - 9)$   
 $= \boxed{10x^2} \boxed{-7x} \boxed{+6} \boxed{-2x^2} \boxed{+2x} \boxed{-9}$   
 $= \underline{\underline{8x^2 - 5x - 3}}$

41.  $(2x^2 + 4) - (8x - 4)$   
 $2x^2 \boxed{+4} - 8x \boxed{+4}$   
 $\underline{\underline{2x^2 - 8x + 8}}$



$$42. \quad 4x(-3x-5)$$

student:  $-12x^2 - 20$  ← missing an  $x$ !

correct:  $4x(-3x-5)$

$$\underline{\underline{-12x^2 - 20x}}$$

$$43. \quad (-10x^2 + 4xy - 6xz) \div (-2x)$$

$$\begin{array}{r} -10x^2 + 4xy - 6xz \\ \hline \phantom{-} -2x \end{array}$$

$$\underline{\underline{5x - 2y + 3z}}$$

or  $\frac{-10x^2}{-2x} + \frac{4xy}{-2x} + \frac{6xz}{-2x}$

$$\underline{\underline{5x - 2y + 3z}}$$

The End!



