

GRADE 10 MATH  
FINAL EXAM PRACTICE #2



Instructions:

- Show work for best mark and to organize your thoughts  
 Keep answers exact whenever possible, otherwise Round answers to nearest two decimal places. Regardless, select the closest answer.  
 You may use your two - page course reference notes  
 Basic calculators are permitted.  
 A unit conversion sheet and formulae sheet will be provided.

**Multiple Choice** (Choose one best answer, Circle the letter of the correct response)

1. A simpler and exact way to say  $5\sqrt{3} + \sqrt{27}$  is:  $5\sqrt{3} + \sqrt{27} = 5\sqrt{3} + \sqrt{9}\sqrt{3} = 5\sqrt{3} + 3\sqrt{3} = 8\sqrt{3}$
- a.  $8\sqrt{3}$       b. 13.8      c.  $5\sqrt{81}$       d. 45
2. The line parallel to the line  $y = 2x + 5$  is: **MUST HAVE SAME SLOPE! "2"**
- a.  $y = 5$       b.  $y = 2x - \pi$       c.  $y = 5x + 2$       d.  $y = 5x$
3. The point (0, 6) is on the line: **When x is 0, y is 6. So plug in!**
- a.  $y = 3x - 6$       b.  $y = 5x$       c.  $y = 5x + 6$       d.  $x = 6$   
 $-6 = 3(0) - 6$        $0 = 5(0)$        $6 = 5(0) + 6$        $\hookrightarrow x$  is always 6
4. The slope of the line that goes through the Points  $P_1(2, -5)$  and  $P_2(-4, 0)$  is:
- a.  $-\frac{5}{6}$       b.  $-\frac{2}{5}$       c. 1      d.  $\frac{6}{5}$        $\frac{\Delta y}{\Delta x} = \frac{-5}{-6} = -\frac{5}{6}$
5. Simplify and evaluate the expression  $\left(\frac{2 \cdot 3 \cdot \sqrt{8}}{1.5^2 - \pi}\right)^0$  **l.o.l.**
- a. 0.22      b.  $\frac{1}{4}$       c. 1      d. none of these  
**(anything)<sup>0</sup> = 1**

6. A simpler exact expression for  $\frac{3\sqrt{8}}{6\sqrt{2}}$  is:

~~$\frac{3\sqrt{2}\sqrt{4}}{6\sqrt{2}} = \frac{3 \cdot 2}{6} = 1$~~  2  
 MPT

- a. 1      b. 0.5      c.  $\sqrt{4}$       d.  $3\sqrt{6}$

7. The volume of a sphere that has a diameter of 12 ft is:

$V_{\text{sphere}} = \frac{4}{3}\pi r^3 = \frac{4}{3}\pi 6^3$

- a. 904.8 ft<sup>3</sup>      b. 90.4 ft<sup>2</sup>      c. dumb impossible      d.  $12\pi^2$  exactly

8. 12 feet is the same as how many meters? *area*  
 → Dumb. This is

*too small*  
 $12 \text{ ft} \cdot \frac{1 \text{ m}}{3.28 \text{ ft}} = 3.66 \text{ m}$

- a. 39.4 m      b. 12 cm      c. 50 ml      d. 3.66 m

*Dumb! WAY TO BIG*

*Dumb*

*Dumb, Volume?*

→ ONLY NOW-DUMB ANSWER

9. The distance between the two points (4, 4) and (9, 4) is:

- a. 5 units      b. 0 units      c. (6.5, 4)      d. None of these

10. The corner, A, of a triangle has a tangent that is equal to 1.89 (ie:  $\tan(A) = 1.89$ ). What is the measure of the angle A?

$\theta = \tan^{-1}(1.89) = 62^\circ$

- a. 62°      b. impossible      c. 0.033°      d. 28°

11. If two boxes of smarties plus four loose smarties make a total of 64 smarties altogether; how many smarties are there in each box?

$2x + 4 = 64$        $2x = 60$   
 $x = 30$

- a. 30      b. 62      c. Unknown      d. 15

12. There is a scalene triangle with sides of length 5, 8, 10. Which triangle is 'similar'?

- a. 3, 4, 5      b. 8, 12, 13      c. 15, 24, 30      d. impossible

*3 times bigger*

13. If  $3x + 5 = 22$  what does 'x' equal?

- a. 0      b. 22/5      c. 17/3      d. none of these answers

$3x + 5 = 22$   
 $3x = 17$

$x = \frac{17}{3} = 5\frac{2}{3} = 5.6666666666666666$

14. A cone fits perfectly inside a cylinder of the same height. The volume of the cone is  $21 \text{ cm}^3$ . What is the volume of the cylinder?

a.  $7 \text{ cm}^3$

b.  $63 \text{ ml}$

c.  $0.63 \text{ m}^3$

d.  $\frac{4\pi^2}{3}$

Don't forget  $1 \text{ ml} \equiv 1 \text{ cm}^3$  by definition

15. The volume of this square pyramid is:

a.  $60 \text{ in}^3$

b.  $180 \text{ ft}^3$

c.  $77760 \text{ in}^3$

d.  $15 \text{ cubic feet}$

Careful! Different Units!

$$V = \frac{1}{2} \cdot b^2 \cdot h$$

$$V = \frac{1}{2} \cdot 3^2 \cdot 5$$

$$= \frac{1}{2} \cdot 9 \cdot 5$$

$$= 3 \cdot 5 = 15 \text{ ft}^3$$



Hint: eliminate stupid answers!

16. The volume of this cone is:

a.  $600 \text{ in}^3$

b.  $3.14 \text{ litres}$

c.  $9424 \text{ cm}^3$

d. none of these

$$V = \frac{1}{3} \pi r^2 \cdot h$$

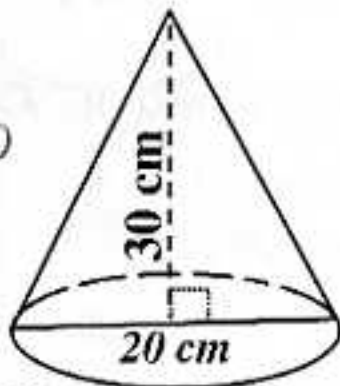
$$= \frac{1}{3} \cdot \pi \cdot 10^2 \cdot 30$$

$$= \pi \cdot 10^2 \cdot 10$$

$$= 3140 \text{ cm}^3$$

$$= 3140 \text{ ml}$$

$$= 3.14 \text{ litres}$$



17. Solve for  $x$ :  $\frac{3}{4}x + 5 = \frac{1}{2}x - 1.5$  LEO = 4

a.  $-26$

b.  $\frac{4}{3}$

c. blue

d. my brain hurts

$$4 \left( \frac{3}{4}x + 5 \right) = \left( \frac{1}{2}x - 1.5 \right) 4$$

$$3x + 20 = 2x - 6$$

$$x = -26$$

Hint: if you don't know how to solve it, just test each answer to see which one works

Checks!

18. Solve for  $x$ :  $2x + 3 = 14$

a. 0

b. 11

c. 5

d.  $5.5$

$$2x + 3 = 14$$

$$2x = 11$$

$$x = 5.5$$

19. Simplify:  $\left(\frac{8x^2y}{2xy}\right)^2 = (4x)^2 = 4^2 x^2 = 16x^2$  **MP**

- a.  $16x^2$     b.  $4x$     c.  $32x^3y$     d. none of these

20. Simplify, keep exponents positive:  $\left(\frac{9xy^6}{6x^2y^3}\right)^3 = \left(\frac{3y^3}{2x}\right)^3 = \frac{27y^9}{8x^3}$

- a.  $\frac{27y^9}{8x^3}$     b.  $\frac{9y^4}{6}$     c.  $\frac{729x^3}{8y}$     d. none of these

21. Simplify:  $\sqrt{8} \cdot \sqrt{2}$  **l.o.l**  $\sqrt{8} \cdot \sqrt{2} = \sqrt{16} = 4$

- a. 16    b. 64    c. 4    d. none of these

22. Multiply:  $(x+1)(x+2)$  **FOIL**  $x^2 + 2x + 1x + 2 = x^2 + 3x + 2$

- a.  $x+3$     b.  $x^2+2$     c.  $3x$     d.  $x^2+3x+2$

23. Multiply:  $(x-1)(x+5)$  **FOIL**  $x^2 + 5x - 1x - 5 = x^2 + 4x - 5$

- a.  $x^2+4x-5$     b.  $x+4$     c.  $-5x$     d. none of these

24. Factor:  $x^2 - x - 6$

- a.  $(x-3)(x+2)$     b.  $(x+3)(x-2)$     c.  $(x+3)^2$     d. 7

*Test Hint: Test each answer by multiplying to see which one works, 'back-solve'.*

25. Factor:  $3x^2 + 12x + 12 = 3(x^2 + 4x + 4) = 3(x+2)(x+2)$

- a.  $3(x+2)^2$     b.  $x+6$     c.  $(3x+2)(x+6)$     d. none of these  $= 3(x+2)^2$

**FREE RESPONSE** questions. Show work for best marks.

1. Numbers sense:

a. list the first 10 prime numbers

 $2, 3, 5, 7, 11, 13, 17, 23, 29, 31$ 

b. give three examples of rational numbers

 $2.16, \frac{2}{3}, -\frac{1}{5}, 3.45,$ 

c. give three examples of irrational numbers

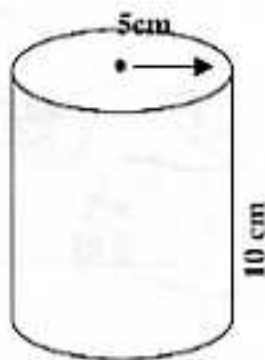
 $\sqrt[3]{5}, \sqrt{2}, 1+\sqrt{5}, \pi$ 

d. list three perfect cube numbers

 $8, 27, 64, 125, 343, 512, \dots$   
 $2^3, 3^3, 4^3, 5^3, 7^3, 8^3$ 

2. What is the volume of the cylinder:

$$\begin{aligned}
 V_{\text{cyl}} &= \pi r^2 h \\
 &= \pi \cdot 5^2 \cdot 10 \\
 &= \pi \cdot 25 \cdot 10 \\
 &= \pi \cdot 250 \\
 &= 785.40 \text{ cm}^3
 \end{aligned}$$



3. Simplify the radical expressions:

a.  $\frac{1}{\sqrt{7}}$

$$\frac{1}{\sqrt{7}} \cdot \frac{\sqrt{7}}{\sqrt{7}} = \frac{\sqrt{7}}{7}$$

b.  $5\sqrt{12} - (\sqrt{5} + \sqrt{3})$

$$\begin{aligned} & 5 \cdot \sqrt{4} \cdot \sqrt{3} - (\sqrt{5} + \sqrt{3}) \\ & = 10\sqrt{3} - \sqrt{5} - \sqrt{3} \\ & = 9\sqrt{3} - \sqrt{5} \end{aligned}$$

c.  $\frac{3\sqrt{72}}{18\sqrt{12}}$

$$\begin{aligned} & = \frac{3 \cdot \sqrt{36} \sqrt{2}}{18 \cdot \sqrt{4} \sqrt{3}} \\ & = \frac{3 \cdot 6 \sqrt{2}}{18 \cdot 2 \sqrt{3}} \\ & = \frac{\sqrt{2}}{2\sqrt{3}} \cdot \frac{\sqrt{6}}{\sqrt{6}} \end{aligned}$$

4. Factor completely:

a.  $x^2 + x - 20$

$$\begin{aligned} & \rightarrow +5, -4 \\ & (x+5)(x-4) \end{aligned}$$

b.  $64x^2y^2 - 9$

Special.

$$(8xy+9)(8xy-9)$$

c.  $3x^2 - 3x - 20$

→ Tough one.

$$(3x+4)(x-5)$$

SORRY, can't be done  
 $9 + 240$   
 $9 - 4(5)(-20)$

5. Simplify:

a.  $\left(\frac{1}{2}\right)^{-2}$

$$\begin{aligned} \left(\frac{1}{2}\right)^{-2} &= \frac{1}{\left(\frac{1}{2}\right)^2} \\ &= \frac{1}{\frac{1}{4}} \end{aligned}$$

b.  $\left(\frac{37x^2z^3}{(4z)^{-2}}\right)^0$  where  $x=2$  and  $z=-5$

l.o.l  
 doesn't matter  
 Answer = 1

c.  $4^{-1} \cdot \left(\frac{1}{4}\right)^{1/2}$

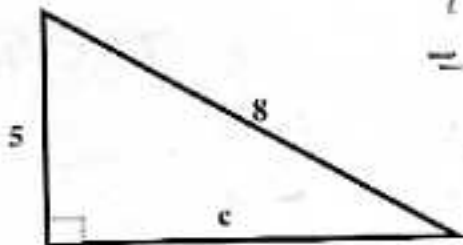
$$\begin{aligned} & 4^{-1} \cdot \left(\frac{1}{4}\right)^{-1/2} \\ & = \frac{1}{4} \cdot \frac{1}{\left(\frac{1}{4}\right)^{1/2}} \\ & = \frac{1}{4} \cdot \frac{1}{\sqrt{1/4}} \\ & = \frac{1}{4} \cdot \frac{1}{1/2} \\ & = \frac{1}{4} \cdot 2 \\ & = \frac{1}{2} \end{aligned}$$

6. Find the length of side c:

$$\begin{aligned} 8^2 &= 5^2 + c^2 \\ 64 &= 25 + c^2 \\ 39 &= c^2 \end{aligned}$$

$$\sqrt{39} = c \quad \text{Exact!}$$

or if you prefer  
 decimals  $c \approx 6.24$



7. Find the following:

a.  $\sin(\angle A)$ :

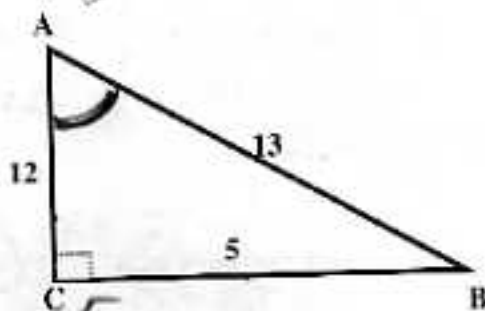
$$\sin A = \frac{5}{13}$$

b.  $\cos(\angle A)$ :

$$\cos \angle A = \frac{12}{13}$$

c.  $\tan(\angle A)$ :

$$\tan \angle A = \frac{\text{opp}}{\text{adj}} = \frac{5}{12}$$



d. measure of  $\angle A$  ( $m\angle A$ ) in degrees:

$$\tan \angle A = \frac{5}{12} \circ \circ \quad \angle A = \tan^{-1}\left(\frac{5}{12}\right) = 22.6^\circ$$

$$\text{or } \sin \angle A = \frac{5}{13} \circ \circ \quad \angle A = \sin^{-1}\left(\frac{5}{13}\right) = 22.6^\circ$$

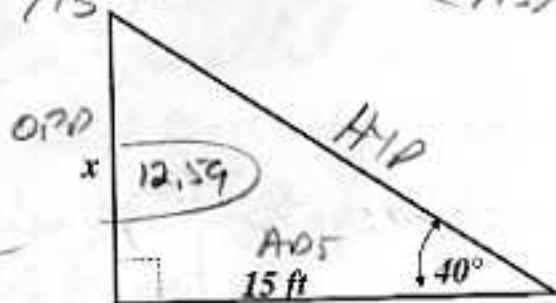
$$\text{or } \cos \angle A = \frac{12}{13} \circ \circ \quad \angle A = \cos^{-1}\left(\frac{12}{13}\right) = 22.6^\circ$$

8. Find the length of side  $x$ :

$$\tan 40^\circ = \frac{x}{15}$$

$$15 \cdot \tan 40 = \frac{x}{15} \cdot 15$$

$$12.59 \approx 15 \tan 40 = x$$

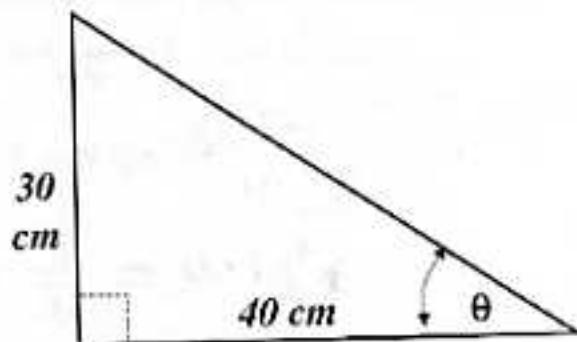


9. Find the measure of angle  $\theta$  (degrees):

$$\tan \theta = \frac{30}{40}$$

$$\theta = \tan^{-1}\left(\frac{30}{40}\right)$$

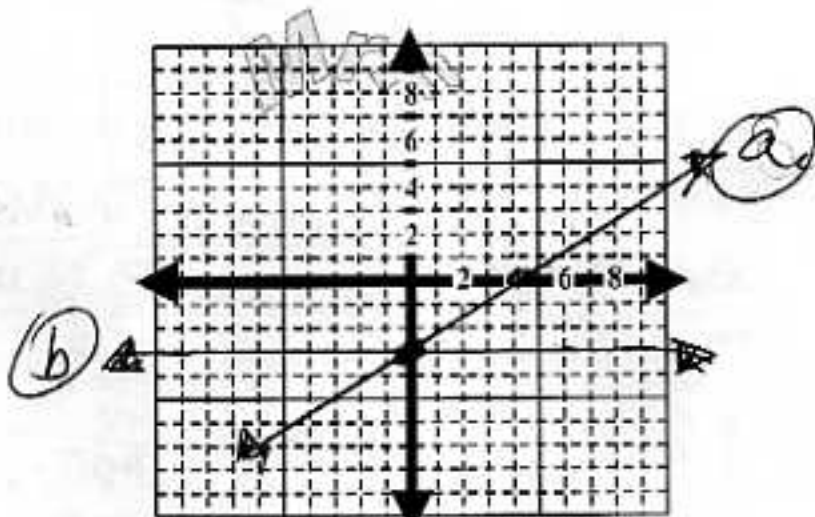
$$\theta = 36.87^\circ$$



10. Please graph and label:

a. Graph the line  $y = \frac{3}{4}x - 3$

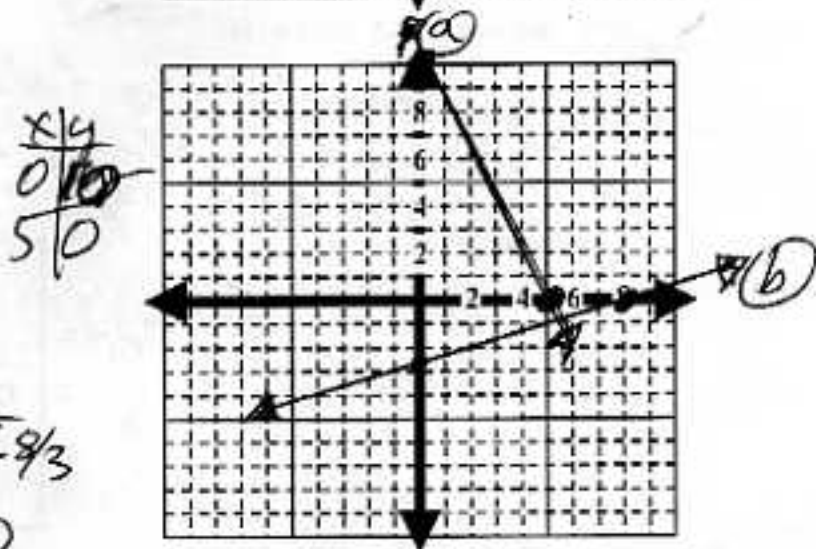
b. Graph the line  $y = -3$



10a. Please graph and label:

a. Graph the line  $2x + y = 10$

b. Graph the line  $x - 3y = 8$



11. Find the equation of the line that runs through the two points  $P_1(6, 6)$  and  $P_2(0, 4)$ .

*You may not have learned this!*

$$\text{Slope} = \frac{\Delta y}{\Delta x} = \frac{-2}{-6} = \frac{1}{3}$$

$$\therefore y = \frac{1}{3}x + b \rightarrow \text{so calculate this 'b'}$$

when  $x=6$ ,  $y$  has to equal 6

$$\text{so } 6 = \frac{1}{3}(6) + "b"$$

$$6 = 2 + "b"$$

$$4 = "b"$$

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

*This may be new to you.*



12. Find the equation of the line that has a slope,  $m$ , of 2 and runs through the point  $(-2, 4)$ .

You may Not  
know AT  
THIS

$$y = mx + b$$

$$y = 2x + b \quad \text{but when } x = -2 \text{ then } y = 4$$

so  $4 = 2(-2) + b$

$$\therefore b = 8$$

Note: you may not have learned this if class time was challenged

13. Find the equation of the line that is parallel to the line  $2x + 3y = 12$  but runs through the origin  $(0, 0)$ .

You may  
not  
have learned  
this

$$2x + 3y = 12$$

Convert  $3y = 12 - 2x$

$$y = 4 - \frac{2}{3}x = -\frac{2}{3}x + 4$$

So want a parallel line  
Same slope.  $y = -\frac{2}{3}x + b$   
So when  $x$  is 0,  $y$  is 0  
 $\therefore b$  is 0. Ans of  $y = -\frac{2}{3}x$

Note: you may not have learned this if class time was challenged

14. Convert the following measures to the indicated units:

a.  $4.6 \text{ cm} = \underline{\hspace{2cm}}$  in

b.  $35 \text{ ft} = \underline{\hspace{2cm}}$  m

c.  $4.5 \text{ kg} = \underline{\hspace{2cm}}$  lbs

$$4.6 \text{ cm} \cdot \frac{1 \text{ in}}{2.54 \text{ cm}}$$

$$= 1.81 \text{ in}$$

OK

but Better:

$$1 + \frac{81}{100} = 1 \frac{81}{100}$$

$$= 1 \frac{3}{4}$$

" is  
better

$$35 \text{ ft} \cdot \frac{1 \text{ m}}{3.28 \text{ ft}}$$

$$= 10.67 \text{ m}$$

$$4.5 \text{ kg} \cdot \frac{2.205 \text{ lbs}}{1 \text{ kg}}$$

$$= 9.92 \text{ lbs}$$

is OK

but no  
Such thing  
as 0.92  
lbs

$$\text{So } 9 \text{ lbs}$$

$$15 \text{ oz}$$

15. Convert 4 km/hr into meters per second [m/sec].

M/F

$$\frac{4 \cancel{\text{km}}}{\cancel{\text{hr}}} \cdot \frac{1000 \text{ m}}{1 \cancel{\text{km}}} \cdot \frac{1 \cancel{\text{hr}}}{3600 \text{ sec}} = 1.11 \text{ m/sec}$$

16. Convert \$5.00 per litre for a can of paint into pennies per ml.

$$\frac{5}{\cancel{\text{L}}} \cdot \frac{100 \text{¢}}{\$1} \cdot \frac{1 \text{ L}}{1000 \text{ ml}} = \frac{500}{1000} = 0.5 \frac{\text{¢}}{\text{ml}}$$

17. Convert 5 lbs 6 oz into kg

$$\begin{aligned} 5 \text{ lbs } 6 \text{ oz} &= 5 \text{ lbs} + \frac{6}{16} \text{ lbs} \\ &= 5.375 \text{ lbs} \cdot \frac{1 \text{ kg}}{2.2 \text{ lbs}} \\ &= 2.44 \text{ kg} \end{aligned}$$

18. Find the sine, cosine, and tangent of angle  $\theta$  in the given right triangle. Find the measure of angle  $\theta$  also.

(exact answers if you plan on Precalc, decimal if you plan on Applied)



$$\sin \theta = \frac{20}{44.7}$$

$$\cos \theta = \frac{40}{44.7}$$

$$\tan \theta = \frac{20}{40} = \frac{1}{2}$$

$$\theta = \tan^{-1}\left(\frac{1}{2}\right)$$

$$\theta = 26.57^\circ$$

$$c^2 = 20^2 + 40^2$$

$$c^2 = 400 + 1600$$

$$c^2 = 2000$$

$$c = \sqrt{2000}$$

$$c = \sqrt{400} \cdot \sqrt{5}$$

$$c = 20\sqrt{5} \text{ EXACT}$$

$$c \approx 44.7$$