

Name: _____ Date: _____

**ACCELERATED PRE-CALCULUS ENTRANCE EXAM - NON CALCULATOR
ANSWER SHEET**

1) c)

Strategy: Factor numerator and denominator into prime numbers. Cancel like factors.

$$\frac{46}{115} = \frac{(2)(23)}{(5)(23)} = \frac{2}{5}$$

2) b)

Strategy: When you divide by a fraction you multiply by the reciprocal.

$$4 \div \frac{8}{7} \rightarrow 4 \times \frac{7}{8} \rightarrow \frac{4}{1} \times \frac{7}{8} \rightarrow \frac{28}{8} = \frac{7}{2}$$

3) c)

Strategy: Change 25% to decimal number or fraction then multiply by 1630.

$$25\% \rightarrow .25 \text{ or } \frac{1}{4}$$
$$\frac{1}{4}(1630) = \frac{1630}{4}$$

$$\begin{array}{r} 407 \\ 4 \overline{) 1630} \\ \underline{16} \\ 30 \\ \underline{28} \\ 2 \end{array} \quad 407 \frac{2}{4} \text{ or } 407.5$$

4) d)

Strategy: Subtraction transforms to addition. Number to the right of the subtraction transforms to its opposite number.

$$(-3) - (-6) \rightarrow -3 + 6 \rightarrow 3$$

5) a)

Strategy

$$(-4)^4 = (-4)(-4)(-4)(-4) = 16(-4)(-4) = -64(-4) = 256$$

6) c)

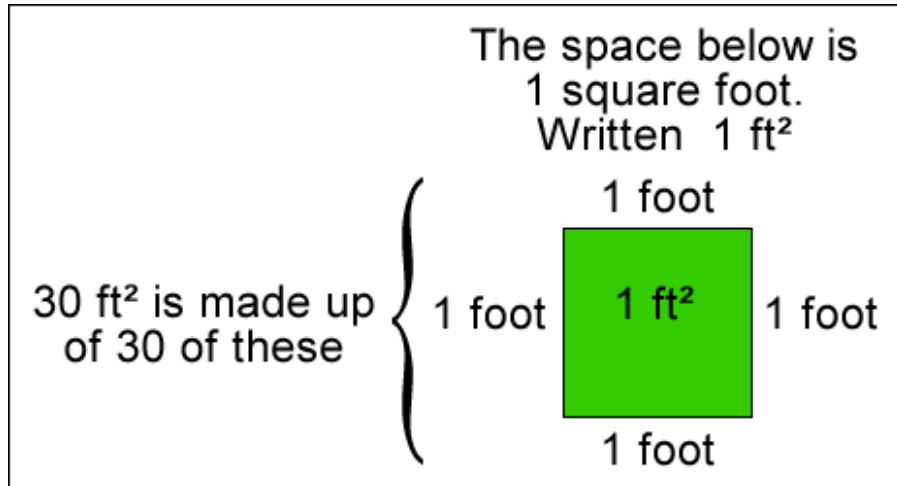
Strategy: You need to know how to multiply fractions and divide fractions.

$$-\frac{1}{6}\left(\frac{1}{2}\right) + \frac{3}{4} \div \frac{1}{12} \rightarrow -\frac{1}{12} + \frac{3}{4} \times \frac{12}{1} \rightarrow -\frac{1}{12} + \frac{36}{4}$$

$$\rightarrow -\frac{1}{12} + 9 \rightarrow -\frac{1}{12} + \frac{9}{1} \rightarrow -\frac{1}{12} + \frac{9 \cdot 12}{1 \cdot 12} \rightarrow -\frac{1}{12} + \frac{108}{12} \rightarrow \frac{107}{12}$$

7) **ANSWER:**

This is the amount of space on a flat surface(a plane) that is made up of 30 squares; and each square has sides of length 1 foot. See image below:



8) a)

$$3x - 8 = 7x + 6 \rightarrow 3x - 7x = 6 + 8 \rightarrow -4x = 14 \rightarrow x = \frac{14}{-4} = -\frac{7}{2}$$

9) b)

$$\frac{2}{5}x + \frac{1}{4} = \frac{1}{2}x \rightarrow \frac{2}{5}x - \frac{1}{2}x = -\frac{1}{4} \rightarrow \frac{4-5}{10}x = -\frac{1}{4}$$

$$\rightarrow -\frac{1}{10}x = -\frac{1}{4} \rightarrow x = \frac{-\frac{1}{4}}{-\frac{1}{10}} = -\frac{1}{4} \times -\frac{10}{1} = \frac{10}{4} = \frac{5}{2}$$

10) d)

$$I = Prt \rightarrow \frac{I}{Pt} = \frac{Prt}{Pt} \rightarrow \frac{I}{Pt} = r$$

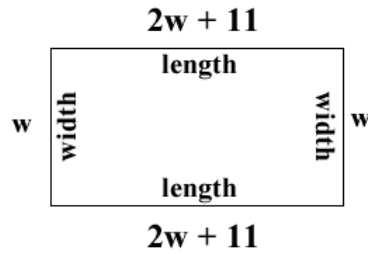
11) a)

$$-2x + 5 \leq 4 - x + 3 \rightarrow -2x + 5 \leq 7 - x \rightarrow -2x + x \leq 7 - 5 \rightarrow$$

$$-1x \leq 2 \rightarrow x \geq \frac{2}{-1} \rightarrow x \geq -2$$

12) a)

**PERIMETER OF A RECTANGLE IS THE LENGTH
AROUND A RECTANGLE**



$$2w + 2(2w + 11) = 88, \text{ Solution is: } w = 11$$

$$2w + 4w + 22 = 88$$

$$6w + 22 = 88$$

$$6w = 88 - 22$$

$$6w = 66$$

$$\frac{6w}{6} = \frac{66}{6}$$

$$w = 11$$

$$\text{length} = 2w + 11 = 2(11) + 11 = 33$$

dimensions are 11×33

13) b)

Strategy: Place the equation of the above line in standard form into $y = mx + b$ form.

$$-3y = -4x + 7$$

$$\frac{-3y}{-3} = \frac{-4x}{-3} + \frac{7}{-3}$$

$$y = \frac{4}{3}x - \frac{7}{3}$$

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

14) d)

Strategy: $Circumference = 2\pi(\text{radius})$

$$Circumference = 2\pi(20 \text{ yds}) = 40\pi \text{ yds}$$

15) d)

Strategy

$$f(-2) = 3(-2) - 7 = -6 - 7 = -13$$

16) c)

I'll use the addition subtraction technique

$$\begin{aligned} -3(5x - 2y = 27) &\rightarrow -15x + 6y = -81 \\ 5(3x - 5y = -18) &\rightarrow 15x - 25y = -90 \end{aligned}$$

$$\begin{aligned} -19y &= -171 \\ \frac{-19y}{-19} &= \frac{-171}{-19} \\ y &= \frac{-171}{-19} = 9 \end{aligned}$$

I'll substitute $y = 9$ into one of the original equations - in this case I'll use $5x - 2y = 27$.

$$5x - 2(9) = 27 \rightarrow 5x - 18 = 27 \rightarrow 5x = 27 + 18 \rightarrow 5x = 45$$

$$x = \frac{45}{5} = 9$$

17) a)

Strategy: Note that any base raised to the power of 0 is defined as 1.

$$\begin{aligned} (-3x^3y^2)^3(4x^3y^5)^0 &\rightarrow (-3x^3y^2)^3(1) \rightarrow (-3x^3y^2)^3 \\ &\rightarrow (-3)^3(x^3)^3(y^2)^3 \rightarrow -27x^9y^6 \end{aligned}$$

18) c)

Strategy: Distribute -1 through $4x^3 - 7x + 12$

$$2x^3 - 3x^2 + 7x - 4x^3 + 7x - 12$$

$$-2x^3 - 3x^2 + 14x - 12$$

19) c)

Strategy: FOIL Technique

$$(7x - 4y)^2 = (7x - 4y)(7x - 4y)$$

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

$$49x^2 - 28xy - 28xy + 16y^2$$

$$49x^2 - 56xy + 16y^2$$

20) c)

Strategy: $3xy$ is the GCF of the trinomial.

$$\text{Therefore } 3xy(2xy - 3 + 5y)$$

21) b)

Strategy: $x^2 - 22x - 48$ factors into $(x + 2)(x - 24)$

22) d)

Strategy: Volume of a rectangular solid is $(Length)(Width)(Height)$

$$(7 \text{ feet})(3 \text{ feet})(2 \text{ feet})$$

$$42 \text{ ft}^3$$

23) b)

Strategy - Factor then cancel like factors

$$\frac{x^2 - x - 6}{2x^2 + 7x + 6} \rightarrow \frac{(x+2)(x-3)}{(x+2)(2x+3)} \rightarrow \frac{x-3}{2x+3}$$

24) d)

Strategy - Adding Common denominators

$$\frac{3y+1}{y+2} + \frac{5}{y+2} \rightarrow \frac{3y+1+5}{y+2} \rightarrow \frac{3y+6}{y+2} \rightarrow \frac{3(y+2)}{y+2} \rightarrow 3$$

25) c)

Strategy - See Summer Math Manual on proportions

$$\frac{5}{x} = \frac{7}{13} \rightarrow 5(13) = 7x \rightarrow 65 = 7x \rightarrow \frac{65}{7} = x \rightarrow 9.2857 = x$$

$x = 9.286$ is nearest thousandths

26) c)

Strategy

$\sqrt{225}$ is asking "What POSITIVE real number squared will produce 225?" **ans:** 15

$\sqrt[3]{-64}$ is asking "What real number cubed will produce -64?" **ans:** -4

$$\sqrt{225} + \sqrt[3]{-64} = 15 + -4 = 11$$

27) d)

Strategy - See Summer Manual

$$3x + 6 = 24 \quad \text{and} \quad 3x + 6 = -24$$

Now solve each equation

Equation 1: $3x + 6 = 24 \rightarrow 3x = 24 - 6 \rightarrow 3x = 18 \rightarrow x = 6$

Equation 2: $3x + 6 = -24 \rightarrow 3x = -24 - 6 \rightarrow 3x = -30 \rightarrow x = -10$

Solutions: $x = 6$ and $x = -10$

Teacher comment: Always check solutions in the original equation.

28) a)

Strategy - See Summer Manual

$$2x^2 + 3 = 39$$

$$2x^2 = 39 - 3$$

$$2x^2 = 36$$

$$\frac{2x^2}{2} = \frac{36}{2}$$

$$x^2 = 18$$

$$x = \pm \sqrt{18} = \pm \sqrt{(9)(2)} = \pm \sqrt{9} \sqrt{2} = \pm 3\sqrt{2}$$

29) c)

Strategy - Use the Quadratic Formula $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

$$8x^2 - 2x - 7 = 0 : a = 8; b = -2; c = -7$$

$$x = \frac{-(-2) \pm \sqrt{(-2)^2 - 4(8)(-7)}}{2(8)} = \frac{2 \pm \sqrt{4 - (-224)}}{2(8)} = \frac{2 \pm \sqrt{4 + 224}}{16}$$

$$= \frac{2 \pm \sqrt{228}}{16} = \frac{2 \pm \sqrt{(4)(57)}}{16} = \frac{2 \pm \sqrt{4} \sqrt{57}}{16} = \frac{2 \pm 2\sqrt{57}}{16}$$

$$= \frac{2(1 \pm \sqrt{57})}{16} = \frac{1 \pm \sqrt{57}}{8}$$

30) a)

Strategy - See Summer Booklet on roots

$\sqrt[5]{-32}$ is asking "What real number raised to the power of 5 will produce -32?"

The answer is -2 .

31) **Strategy**) the coefficient of the variable squared must be 1

$$\text{s1) } \frac{2x^2 + 12x - 18}{2} = \frac{0}{2}$$

$$\frac{2(x^2 + 6x - 9)}{2} = \frac{0}{2}$$

$$x^2 + 6x - 9 = 0$$

$$\text{s2) } x^2 + 6x = 9$$

$$\text{s3) } \frac{+6}{2} = ** 3 \rightarrow 3^2 = 9$$

$$\text{s4) } x^2 + 6x + 9 = 9 + 9$$

$$\text{s5) } (x + 3)^2 = 18$$

$$\text{s6) } x + 3 = \pm \sqrt{18}$$

$$\text{s7) } x = -3 \pm \sqrt{18}$$

$$x = -3 \pm \sqrt{(9)(2)} = -3 \pm \sqrt{9} \sqrt{2} = -3 \pm 3\sqrt{2}$$

$$x_1 = -3 + 3\sqrt{2} \quad x_2 = -3 - 3\sqrt{2}$$

32) **ans:** This is asking "what positive number to the power of 4 will produce 81."

33) d)

$$\text{If } x^2 = 81 \rightarrow x = \pm \sqrt{81} = \pm 9$$

34) b)

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

If you can't factor you could expand each of the answers and see which pair of binomials equals $6x^2 + 17x - 14$.

35) c)

$$D = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

Point 1: (3,4) $x_1 = 3$ and $y_1 = 4$

Point 2: (-6,20) $x_2 = -6$ and $y_2 = 20$

$$D = \sqrt{(-6 - 3)^2 + (20 - 4)^2} = \sqrt{(-9)^2 + (16)^2} = \sqrt{81 + 256} = \sqrt{81 + 256} = \sqrt{337}$$

36) d)

$$\frac{2x^2 - 5x}{3x - 7} = \frac{3}{2}, \text{ Solution is: } \frac{7}{4}, 3$$

$$\text{s1) } 2(2x^2 - 5x) = 3(3x - 7)$$

$$\text{s2) } 4x^2 - 10x = 9x - 21$$

$$\text{s3) } 4x^2 - 10x - 9x + 21 = 0$$

$$\text{s4) } 4x^2 - 19x + 21 = 0$$

$$\text{s5) } (4x - 7)(x - 3) = 0$$

$$\text{s6) } 4x - 7 = 0 \quad x - 3 = 0$$

$$4x = 7 \quad \text{or} \quad x = 3$$

$$x = \frac{7}{4}$$

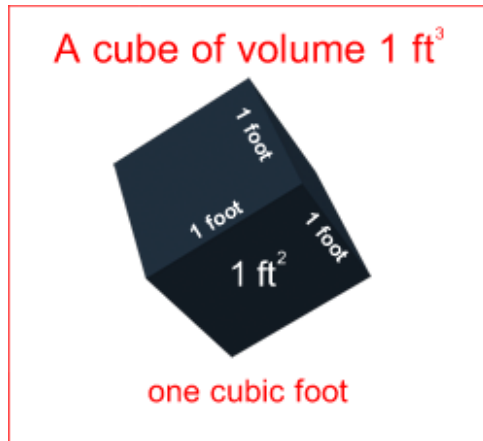
37) Distribute then combine like terms: $2y(x^2 + y^2) - 3(x^2y - 5y^2)$

$$2x^2y + 2y^3 - 3x^2y + 15y^2$$

$$2x^2y + 3x^2y + 2y^3 - 15y^2$$

$$5x^2y + 2y^3 - 15y^2$$

38) **ans:** This is the amount of space made up of 30 cubes with each cube having an edge of 1ft and each face having an area of 1 ft^2 . See image below:



39) d)

$$\text{Area} = \text{Length} \times \text{Width} = (30m)(20m) = 600m^2$$

40) d)

$$2x^2 + x - 3 = 0$$

$$(2x + 3)(x - 1) = 0$$

$$x - 1 = 0 \text{ or } 2x + 3 = 0$$

$$x = 1 \text{ or } x = -\frac{3}{2}$$

41) b)

$$\text{Area} = \pi(\text{radius})^2$$

$$\text{Area} = \pi(10in)^2 = 100\pi \text{ in}^2$$

42) b)

$$\text{Get slope first: } \frac{3-6}{2--1} = -1$$

Use $y - y_1 = m(x - x_1)$ and $m = -1$ and $(2,3)$

$$y - 3 = -1(x - 2)$$

$$y - 3 = -1x + 2$$

$$y = -1x + 5$$

43) c)

Strategy - Get common denominator

$$\frac{x+2}{(x+3)(x+2)} + \frac{2x}{x+2}$$

$$\frac{x+2}{(x+3)(x+2)} + \frac{2x}{x+2} \cdot \frac{x+3}{x+3}$$

$$\frac{x+2+2x(x+3)}{(x+3)(x+2)}$$

$$\frac{x+2+2x^2+6x}{(x+3)(x+2)}$$

$$\frac{2x^2+7x+2}{(x+3)(x+2)} \rightarrow \frac{2x^2+7x+2}{x^2+5x+6}$$

44) b)

Since $f(x) = 40$

$$40 = 7x + 12 \rightarrow 40 - 12 = 7x \rightarrow$$

$$28 = 7x \rightarrow 4 = x \text{ or } x = 4$$

45) **OPEN ENDED:**

...**Integers** are the numbers ..., -3, -2, -1, 0, 1, 2, 3, ...

...Rational numbers are numbers that can be written as a fraction with an integer in the numerator and an integer in the denominator, i.e. $.25 = \frac{1}{4}$; $7 = \frac{14}{2}$; $-.8 = \frac{-4}{5} = \frac{4}{-5}$ etc.

46) d)

Get the root on one side then square both sides then solve for x.

$$\sqrt{3x+4} + 2 = x$$

$$(\sqrt{3x+4})^2 = (x-2)^2$$

$$3x+4 = x^2 - 4x + 4$$

$$0 = x^2 - 4x + 4 - 3x - 4$$

$$0 = x^2 - 7x$$

$$0 = x(x-7)$$

$$x = 0 \text{ or } x - 7 = 0$$

$$x = 0 \text{ or } x = 7$$

Always **TEST** your solutions when solving equations with roots.

$$x = 0 : \sqrt{3(0)+4} + 2 = 0$$

$$\sqrt{4} + 2 = 0 \text{ Certainly not true!}$$

$$x = 7 : \sqrt{3(7)+4} + 2 = 7$$

$$\sqrt{25} + 2 = 7 \text{ This is true!}$$

Solution is $x = 7$

47) c)

Strategy:

$$3x + 6 \leq 24 \quad \text{and} \quad 3x + 6 \geq -24$$

Solve the first inequality $3x + 6 \leq 24$

$$3x \leq 24 - 6$$

$$3x \leq 18$$

$$x \leq 6$$

Solve the second inequality $3x + 6 \geq -24$

$$3x + 6 \geq -24$$

$$3x \geq -24 - 6$$

$$3x \geq -30$$

$$x \geq -10$$

So the answers are $x \leq 6$ and $x \geq -10$

Place both answers on one number line. Where they intersect is where you will have your solutions. Check and see!



The solution written as an inequality
 $-10 \leq x \leq 6$

48) b) $2\sqrt{3} + 2$
 $\sqrt{2x+3} = 1 + \sqrt{x+2}$

Strategy:

Teacher Comment: When you square a square root you "free" the radicand.

$$(\sqrt{2x+3})^2 = (1 + \sqrt{x+2})^2$$

$$2x+3 = (1 + \sqrt{x+2})(1 + \sqrt{x+2})$$

$$2x+3 = 1 + \sqrt{x+2} + \sqrt{x+2} + x+2$$

$$2x+3 = 3 + 2\sqrt{x+2} + x$$

$$2x+3 - 3 - x = 2\sqrt{x+2}$$

$$(x = 2\sqrt{x+2})^2$$

$$x^2 = 4(x+2)$$

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

$$x^2 - 4x - 8 = 0$$

Use Quadratic Formula

$$x = \frac{-(-4) \pm \sqrt{(-4)^2 - 4(1)(-8)}}{2(1)}$$

$$x = \frac{4 \pm \sqrt{16 + 32}}{2} = \frac{4 \pm \sqrt{48}}{2} = \frac{4 \pm \sqrt{(16)(3)}}{2} \rightarrow$$

$$= \frac{4 \pm 4\sqrt{3}}{2} = 2 \pm 2\sqrt{3}$$

49) d)

Strategy

Average rate of change is another name for the slope: $\frac{y_2 - y_1}{x_2 - x_1}$

Call $(-5, 11)$ Point 1; therefore $x_1 = -5$ and $y_1 = 11$

Call $(-18, 27)$ Point 2; therefore $x_2 = -18$ and $y_2 = 27$

$$\text{AROC} = \frac{y_2 - y_1}{x_2 - x_1} = \frac{27 - 11}{-18 - (-5)} = -\frac{16}{13}$$

50) d)

Factor then cancel.

$$\frac{x^2 + 2x - 15}{x^2 + 9x + 20}$$

$$\frac{(x + 5)(x - 3)}{(x + 5)(x + 4)}$$

$$\frac{x - 3}{x + 4}$$

51) b)

Strategy:

Solve for y first.

$$12x + 6y + 24 = 0$$

$$6y = -12x - 24$$

$$\frac{6y}{6} = \frac{-12x - 24}{6}$$

$$y = \frac{6(-2x - 4)}{6}$$

$$y = -2x - 4 \text{ The slope of this line is } -2$$

A line goes through the point $(2, 7)$ and this line is perpendicular to the above line. Hence the slope of this line is the negative reciprocal of -2 which is $\frac{1}{2}$.

$$y - y_1 = m(x - x_1)$$

I'll use the point slope formula.

$$y - 7 = \frac{1}{2}(x - 2)$$

$$y - 7 = \frac{1}{2}x - 1$$

$$y = \frac{1}{2}x - 1 + 7$$

$$y = \frac{1}{2}x + 6$$